Insider Trading: Evidence from Thailand

Karuntarat Boonyawat*
Seksak Jumreornvong **
Piman Limpaphayom***

This study examines the profitability of insider trading in the Thai stock market. The result shows that there is significant information content in insider trade in the Thai stock market. Thai corporate insiders can earn abnormal profits by trading on their own stocks for purchase transactions though they cannot gain from the superior information for sales transactions. Moreover, the result suggests that outside investors who mimic the trading of insiders can also make profits. The study suggests that CEOs, a group of insiders, of Thai firms have more valuable information of the company's future prospects than other insiders in longer periods. Though most Thai firms have a family control structure, the evidences does not suggest that corporate insider trading in both purchase and sales transactions for firms with concentrated shareholders can significantly earn abnormal returns. The finding of this study shows that even the strict regulation for companies regarding the 3-day reporting interval is imposed by the SEC of Thailand, insider trading information leakage is still evident. In other words, outsiders can make significant abnormal profits by trading like insiders.

* and ** Faculty of Commerce and Accountancy, Thammasat University
*** Sasin Graduate Institute of Business Administration of Chulalongkorn University
** Corresponding Author (disaksek@tu.ac.th). We would like to thank Chayaporn Uahkowithchai, Nop Udomchok and Kochawan Boonyawat for their valuable research assistance. We also would like to thank participants at the 12th annual conference on Pacific Basin Finance, Economics, Accountings, and Business, 2004,Bangkok, Thailand for their comments and suggestions.

1. Introduction

Insiders, or persons who hold management positions in the corporation, are those who always possess non-public information and tend to gain abnormal returns from their superior information. Insider trading in the Thai stock market is interesting and unique in its setting. Public companies in Thailand have characteristics and ownership structure, which are different from those in U.S or Europe. As reported in Claessens, Simon, Djankov, and Lang (2000), and Lin (2003), companies in Thailand have a very strong family-control structure. This allows corporate insiders, who are close to the family, to exercise extensive control over the companies. This characteristic may lead insiders who first know special information to potentially use this information to find profit by trading on their own stocks, and therefore results in managerial agency problems since the private benefits of control are large. Lemon and Lin (2002) found that the absence of strong legal protections and other external governance mechanisms in many emerging economics like East Asian markets further increases the severity of agency problems between controlling insiders and outsiders. Fan and Wong (2002) finds that public corporations in East Asia have low levels of transparency and disclosure quality of accounting information to outsiders.

In recent years, there are many cases of illegal insider trading reported in Thailand. In some companies, managements spread out rumors to create benefits of their own, such as the rumor about growth of operation, additional capital for new investment, or change in par value. These kinds of rumor made the stock price of Picnic Gas and Engineering Co., jump by about 1,000 percent within nine months (www.bangkokbiznews.com, December 24, 2003). Moreover, the SEC (Securities and Exchange Commission) of Thailand criminated TPIPL's management of manipulating the stock price (www. bangkokbiznews.com, December 23, 2003). The SEC found that, during February 25 to 27 of 2003, managements of TPIPL with

other persons purchased sixteen million shares of TPIPL through the accounts of other companies and individuals. That made the TPIPL stock price unusually rise to about seventeen baht in twenty days.

This study investigates the abnormal return of insider trading in the Thai stock market focusing on approximately 665 insider's transactions during the year 2002 for the companies on the list of SET-Fifty on March 15, 2003. The data are analyzed separately for both buy and sell activities. Moreover, the study also tests whether abnormal profit incurs to outsiders between the date that insiders report their transactions to the SEC (filing date) and the date that insider trading information is announced on the SEC's website one day after filing date

Since information leakage between insider trading date and SEC announcement date may lead to unfair trading, this study also investigates the relationship between abnormal profit and leakage time (interval). The result may lead to the conclusion about the effectiveness of some insider trading regulations stipulated by the SEC.

The SEC Act of B.E. 2535 Section 59 commands that insiders report their change in securities holding within three days after the trading date. This interval is much shorter than that stipulated by the SEC regulation in U.S., which allows insiders to report trading transactions by the 10th of the month following the month in which trading occurs. In other words, U.S. insiders have a legal maximum window of up to 41days to disclose their trading activities to the public while insiders in Thailand have only up to 3 days. So the timing of such disclosure may have significant impact on stock prices in U.S. It may not, however, have any such effect in Thailand. There may be other factors that influence the abnormal returns of the insider trades. This paper will also explore the variables that may have relations with such returns.

2. Hypothesis Development

Previous studies on insider trading focused on the amount of private information, insiders' profit and profit to outsider who follows insider's trading behavior in both stock and bond. There are two main conclusions from the previous studies. First, these studies find that registered corporate insiders[1] can earn significant profits by trading the securities of their own firms. Second, the studies also report that outsiders use public available information about insider trading to earn significant abnormal profits like insiders. However, some studies, such as Jaffe (1974), Seyhun (1986), and Rozeff and Zaman (1988), find that the abnormal profits disappear after offsetting with transaction costs such as commission fees and bid-ask spread.

The existence of insider profits is unsurprisingly inconsistent with the strong-form efficient market hypothesis. Corporate insiders who have monopolistic access to information are capable of trading profitably though with the restrictions placed on them by regulators. In contrast, profit to informed outsiders who merely mimics insider trade is a challenge to the semi-strong form efficient market hypothesis. Jaffe (1974) examines the performance of securities subsequent to specific types of insider trade in those securities. The study confirms that insiders do possess and exploit special information especially those who trade intensively within 8-month holding periods. The study also finds that outsiders for the intensive trading sample can earn abnormal profits even after transaction costs. Finnerty (1976) evaluates stock performance of the insider trade and tests the abnormal profits for the entire population of insider trade instead. The study concludes that insiders can out-

[1] SEC of Thailand defines insider as director, manager, person responsible for the operation, or the auditor of company whose securities are listed in the Securities Exchange or traded at the over-the-counter center. It also includes person who holds securities which its total par value exceeds five percent of the registered capital.

perform the market. Seyhun (1986) reinvestigates stock price behavior following insider's transaction and attempts to reconcile the efficient market hypothesis with the previously reported availability of abnormal profits to outsiders. The study confirms that insiders profit from their trades, but does not support Jaffe's finding that outsiders can profit from public information about insider trading. He argues that Jaffe's outsider profits occur because Jaffe (1974) uses the CAPM to measure the abnormal return. To avoid the biases in measuring expected returns to securities due to size effect (Banz (1981)), Seyhun uses "Market Model" to measure abnormal profit instead of the CAPM. Seyhun also examines the relation between the bid-ask spread and insider's abnormal profits and the relation between firm size and insiders abnormal profits. He finds the positive relation between bid-ask spread and insider's abnormal profits but negative relation between abnormal returns to insiders and the natural log of the firm size. His study also investigates the determinants of insiders' superior predictive ability. The result confirms that insiders can reliably forecast future abnormal stock price changes, and purchase stock prior to abnormal price increases and sell stock prior to abnormal price decreases. By grouping insiders into five categories, the evidence suggests that on average the officer-directors trade on more valuable information than other officers.

Rozeff and Zaman (1988) reexamine the profitability of insider trading by using "Market Model" to measure abnormal profits that takes into account the known tendency of stock returns that depend on market value of equity and earnings/price ratio (E/P ratio). Their result is consistent with previous studies, which indicates that outsiders can earn profits when they use publicly available information concerning insider transactions that appear in the SEC's official summary. However, the outsider's profits disappear after considering transaction cost. This study does not find strong evidences supporting the view that corporate insider can earn significant profits from directly using insider's information.

Lin and Howe (1990) examine the profitability of insider trading in firms whose securities trade in the OTC/NASDAQ market. Although the evidence shows the timing and forecasting ability on the part of insiders, high transaction costs appear to eliminate the potential for positive abnormal profits from active trading. They conclude that outsider investors who mimic the trading of insiders do not earn abnormal profits. Moreover, they also find that insiders closer to the firms trade on more valuable information than insiders farther from the firm.

Karpoff and Lee (1991) examine insider trading before the announcement of primary offerings of common stock, convertible debt, and straight debt. They find that on average there are more insider sellers than buyers before the announcements of common stock and convertible debt issues. Overall, these findings are consistent with the hypothesis that the prospect of legal and market penalties does not deter at least some insider trading before new issue announcement. However, they find that there is no abnormal return for insider trading before new issues of straight debt.

Meulbroek (1992) analyzes 320 cases in which the SEC formally charged investors with illegal insider trading. The study investigates the impact of insider trading on the stock prices. Meulbroek estimates a modified market model regression in which the dependent variable is the daily return on stock that experienced an episode of alleged illegal in insider trading. The evidence shows that the stock market detects the possibility of informed trading and the stock price impounds this information. The study also finds that the abnormal return on insider trading day averages about 3%, and almost half of the pre-announcement stock price run-up observed before and additional trade-specific characteristics lead to the market's recognition of the informed trading.

Datta and Isakandar-Datta (1996) examine insider trading in bond markets and find that there is significant information content in insider trades corporate insiders. They report significant positive price reaction for convertible and straight bonds in response to the

Wall Street Journal's insider Trading Spotlight publication of insider buy transaction and significant negative reactions for insider sell transaction. They find that bond market participants extract the quality of the insider trading signal by observing factors such as the dollar volume of trade, percentage change in the holding of the insider and insider's position in the firm. The evidence also suggests that the absence of any reporting requirement for insider bond transactions may create an enhanced opportunity for the insiders to exploit private information and expropriate wealth from the uninformed bond traders.

Rozeff and Zaman (1998) test whether the market prices reflect investors' overreaction. They measure insider buying and selling in stocks that are ranked by measures such as the ratio of cash flow per share to price per share (CF/P). They find that number of insider buying increases as stock change from growth (low CF/P) to value (high CF/P) categories. They also find that insider buying is greater after low stock returns, and lower after high stock returns. Finally, the findings are consistent with a hypothesis of overreaction, which states that prices of value stocks tend to stay below fundamental values, and price of growth stock tend to stay above fundamental values.

Carter, Mansi, and Reeb (2003) investigate the informational content of corporate insider buying activity and conclude that the market impact of insider transactions varies with the length of interval between buy transactions and the disclosure of the information to the public. The result suggests that insiders are able to use their disclosure timing to make profits from their buying activity. The paper also tests for the differences in information leaks between CEOs and other officers. They find that the leakage is similar for CEOs and other officers. However, the stock price impact related to the reporting interval is significantly greater for CEOs.

Based on the previous studies reviewed above, the hypotheses in this paper will be separated into four parts as follows.

1. General hypothesis

H_0 : $APE = 0$

H_A : $APE < 0$ or $APE > 0$

From the previous studies of insider trading (Jaffe (1974), Finnerty (1976), Seyhun (1986), Lin and Howe (1990) etc.), main result is that corporate insiders earn abnormal profits by trading on their own securities. This implies that the insider trading contains information. To perform this test in Thai market, the null hypothesis is that average prediction error (APE) for stock is equal to zero. If the null hypothesis is rejected, it means that insiders can earn either positive or negative average abnormal returns by trading their own securities and conclusion is that the trade has information content. If the null hypothesis holds, this means that there is neither abnormal return to the insider nor information content for insider trading.

2. Insiders' Profitability

2.1 Profits from Purchases

H_{01} : $CAPE = 0$ or $CAPE < 0$

H_{A1} : $CAPE > 0$

Basing on the studies of Jaffe (1974), Seyhun (1986) and Lin and Howe (1990) which conclude that if insiders have some superior information and believe that stock price would be rising in the future because of favorable information, they would purchase the stock prior to the release of such information. Consequently cumulative average prediction errors (CAPE) should be positive after insider trading day. This conclusion implies that the insider can predict the future stock movement. If not, the CAPE would become zero or negative following the trading days and thus leads to the conclusion that the insider cannot at all predict the future trend of stock price.

2.2 Profits from Sales

H_{02} : $CAPE = 0$ or $CAPE > 0$

H_{A2} : $CAPE < 0$

If insiders have some superior information, and they believe

that stock price would drop in the future because of unfavorable information, they would sell the stock prior to the release of such information. Then negative CAPE should be found following the trading days. This proposition also leads to the conclusion that insider can predict future stock movement. If not, the CAPE would become zero or positive following the trading days and then leads to the opposite conclusion.

3. Outsiders' Profitability

3.1 Profits from Purchases

H_{03} : $CAPE = 0$ *or* $CAPE < 0$

H_{A3} : $CAPE > 0$

Similar to the argument of the profit to insiders for purchase transaction, if outsiders purchase stock following insider trading, then cumulative average prediction errors (CAPE) should be positive after insider trading day. This proposition leads to the conclusion that outsiders can earn abnormal profit by trading on the basis of insiders. If not, the CAPE would become zero or negative following the trading days. This implies that outsiders cannot earn abnormal profits by just mimicking insider trading.

3.2 Profits from Sales

H_{02} : $CAPE = 0$ *or* $CAPE > 0$

H_{A2} : $CAPE < 0$

Like the profitability of insiders for sales transaction, if outsiders sell stocks following insider's sales, then negative CAPE should be found following the trading days. This proposition also leads to the conclusion that outsiders can earn abnormal stock prices like insiders if they trade just like insiders do. If not, the CAPE would become zero or positive following the trading days and implies that outsiders that trade following insiders, cannot earn abnormal returns.

4. Determinants of the abnormal returns

Cumulative average abnormal returns = f(CEO, Interval,

Ownership)

Referring to Seyhun (1986), he classifies all insiders into 5 groups; officers, directors, officer-directors, chairman of the board of directors and large shareholder. He finds that the insider information set expands as a result of insiders' association with the firm. Insiders who are closer to day-to-day decision-making trade profitably on more valuable information. Carter, Mansi and Reeb (2003) also find that higher abnormal returns are generated from buy transactions by CEOs, which includes board chairs, presidents or chief operating officers, than other officers. Based on their studies, CEOs have more complete information about the company's current operations and future prospects. So their trading transactions should convey more information to the market about the company and may have a greater effect on stock price. Lin and Howe (1990) also test the effect of valuable information and find the strong supporting evidence that CEOs have more information than large shareholders who are not familiar with the company's operation.

In our regression analysis, the dependent variable is the estimate of insider's abnormal profit, which is cumulative daily average prediction error. In this paper, we test whether the identity of the insider has effect on the abnormal returns. A binary variable, CEOs, is included in the model (CEOs =1, Non CEOs = 0). CEOs are defined as CEOs and presidents (or any titles that represent these positions) who should have more valuable information than others. The result is expected to have a positive sign for coefficient of CEOs. It means CEOs have more valuable information leading to greater effect on abnormal stock prices.

Carter, Mansi and Reeb (2003), focus on the reporting interval between the actual insider trading activity and the formal disclosure of this activity. They find that insiders tend to delay the impact of their buying activity on stock price. Those insiders who delay the longest appear to have more abnormal return. Seyhun (1986) finds that there are substantial delays in reporting and publishing insiders' transactions.

Based on their studies, *INTERVAL* is added into the model. *INTERVAL* is defined as the times between the insider trading day and announcement day. To avoid immediate high profit, corporate insiders may be willing to delay their reporting to SEC. Thus, the greater time interval, the greater the impact of cumulative average daily prediction error. The positive sign is expected for this variable.

The other variable that will be added into the model is *OWNERSHIP*. It is defined as the percentage of share holding of top-five concentrated shareholders (financial institutions or any investment funds are excluded). Since Thai companies have strong family control structures, these allow corporate insiders to exercise extensive control over the companies (Claessens, Simon Djankov, and Lang (2000), and Lin (2003)). This means the higher the percentage of concentrated shareholders, the higher the cumulative average prediction errors. The positive sign is expected for this variable. Firm size, total volume of trading, and total Baht value of insider trading are also added into the model as control variables.

3. Data and Methodology

This study uses the insider trading information data from *The 59-2 Form*[2] provided by the Securities and Exchange Commission's

[2] Based on Securities and Exchange Act of B.E. 2535 Section 59, the director, manager, person who holds management position as specified in the notification of the Office, and the auditor of the company which issues securities must prepare and submit Form 59-2 to the Office on each person's securities holding and the holding of securities by his spouse and children in the company including changes in such holdings under the rules and procedures as specified in the notification of the Office with the approval of the SEC. Under this section, the person above must report his trading in securities of his own firm within 3 days after the transaction date.

(SEC) from the year 2002[3]. Insider Trading transactions in Thailand are quite large for the first time in the year 2002 so they make good representation for the study. The data contains (1) relationship to management (positions), (2) report date which is the date that corporate insider submits the 59-2 form to SEC, (3) filing date which is the date that the SEC submits the form (usually the same as report date.) (4) transaction date which is the date that corporate insiders trade their own securities, (5) type of securities that are traded, (6) number of securities that are traded (7) average security price and (8) method of acquisition and disposition. For large shareholders, the data is collected from the Form 246-1 provided by the SEC in the same year. Only individual large shareholders are included in the sample. In this study, we investigate only trading of common shares traded in the Stock Exchange of Thailand (SET). Since the SEC will announce the insider-trading transaction one day after receiving the form, we assume this day as the public announcement date.

Moreover, we use daily stock returns for companies listed on the Stock Exchange of Thailand (SET). The stocks in the sample must be listed stock and have about 10 months of return data prior to the event day. In other words, the data must be available 230 days before and after the event day (-230 to 230 days, the event day is counted as day 0). These criterions ensure that we are able to estimate the market model and standardized abnormal return. This study analyzes a sample of transactions in 50 firms listed on SET-fifty on March 15, 2003. Out of 50 firms, 15 firms did not report any

[3] Form 59-2 are collected and kept in the SEC by scanning into PDF files separated by management of the firms. One file of each manager includes all of his/her transactions in the past until the current year. From our scanning of total data, there have been about 13,000 managers reporting their transactions to the SEC since 1995 to 2004. Based on the large transactions, we used insider data that occurred in the year 2002 for companies listed on the SET-fifty on March 15, 2003.

insider trading in the year 2002, and one firm did not have enough daily stock returns matching with the criteria. Consequently, the actual number of firms analyzed is thirty-four firms. Table 1, panel A shows the breakdown of the insider trading sample by firm size. The sample analyzed in this study contains totally 665 sales and purchases in the SET[4]. Panel B shows the breakdown of the insider trading sample by the identity of insiders, which are officers, directors, chief officers and directors, CEOs and presidents, chairman of the board of directors and large shareholders.

Table 1 Distribution of Volume and Value of Insider Trading Transaction and Descriptive Statistics

The table shows the distribution of the number of firms, Baht value, and number of transactions grouped by the average size of market value of equity of the firm and the identity of insiders (Baht figures are in Baht million) occurred in the year 2002. The descriptive statistics presents descriptive statistics for 108 samples of firms' observations during the year 2002 with insider trading activity separated into purchase and sales. In order to avoid bias data, the sample of maximum interval is excluded from both purchase and sales regression model. Finally, there are 42 purchases and 64 sales transactions are test in the regression model separated by purchase and sales.

[4] We exclude transactions trading less than 100 shares.

Table 1 Distribution of Volume and Value of Insider Trading Transaction and Descriptive Statistics (continued)

PANEL A: Sample composition/number of observations: Grouping by firm size					
	Less than 5,000	Between 5,000 and 10,000	Between 10,000 and 50,000	More than 50,000	All firms
Number of firm	4	11	14	5	34
Total Baht value of sell transactions	76	1,088	432	23	1,619
Total Baht value of purchase transactions	19	115	308	17	459
Number of sell transactions	7	212	134	19	372
Number of purchase transactions	11	101	163	18	293

PANEL B: Sample composition/number of observations: Grouping by type of insiders.							
	Officers	Directors	Chief-officers and directors	CEOs and Presidents	Chairmen of boards of directors	Large Shareholders	All insiders
Ratio of purchases to sales			1.57	0.48	1.22	0.95	0.79
Total Baht value of sell transactions	36	297	565	569	19	133	1,619
Total Baht value of purchase transactions	4	102	123	175	53	2	459
Number of sell transactions	43	135	163	15	10	6	372
Number of purchase transactions	16	100	121	49	6	1	293

Table 1 Distribution of Volume and Value of Insider Trading Transaction and Descriptive Statistics (continued)

PANEL C: Descriptive statistics of variables.					
			Purchases		
	Mean	**Std. Dev.**	**Median**	**Maximum**	**Minimum**
CEO	0.1163	0.3244	0.0000	1.0000	0.0000
INTERVAL (days)	5.4186	13.1407	2.0000	80.0000*	1.0000
OWNERSHIP	0.3203	0.2779	0.3339	0.8490	0.0000
SIZE (Baht millions)	34,432	33,010	24,505	126,939	1,596
VOLUME (thousands)					
Trading day to announcement day	131.01	256.07	20	1,000	0.20
1 through 5 days	131.01	256.07	20	1,000	0.20
1 through10 days	136.47	257.86	20	1,000	1.00
1 through 20 days	160.15	296.44	40	1,110	1.00
1 through 30 days	175.08	312.17	50	1,210	1.00
VALUE (Baht thousands)					
Trading day to announcement day	1,377.05	1,969.89	392.20	9,600	16.40
1 through 5 days	1,377.05	1,969.89	392.20	9,600	16.40
1 through10 days	1,510.84	2,134.82	676	9,600	33.18
1 through 20 days	1,647.95	2,179.10	812	9,600	33.18
1 through 30 days	1,912.66	2,727.85	870	10,606.51	33.18
			Sales		
	Mean	**Std. Dev.**	**Median**	**Maximum**	**Minimum**
CEO	0.0615	0.2422	0.0000	1.0000	0.0000
INTERVAL (days)	4.4308	9.4719	2.0000	63.0000*	1.0000
OWNERSHIP	0.3324	0.2507	0.3104	0.8990	0.0000
SIZE (Baht millions)	20,568	20,947	11,008	100,320	2,817
VOLUME (thousands)					

Table 1 Distribution of Volume and Value of Insider Trading Transaction and Descriptive Statistics (continued)

	Sales				
	Mean	**Std. Dev.**	**Median**	**Maximum**	**Minimum**
Trading day to announcement day	136.27	335.84	18.20	2,000	0.40
1 through 5 days	117.81	306.37	19.45	2,000	0.40
1 through10 days	117.81	306.37	19.45	2,000	0.40
1 through 20 days	123.27	305.99	21.95	2,000	0.40
1 through 30 days	146.25	364.63	24.45	2,000	0.40
VALUE (Baht thousands)					
Trading day to announcement day	4,767.07	14,577.52	649	82,886.47	32.45
1 through 5 days	3,507.49	10,681.89	792.75	75,000	32.45
1 through10 days	3,507.49	10,681.89	792.75	75,000	32.45
1 through 20 days	3,723.59	10,688.29	792.75	75,000	32.45
1 through 30 days	4,131.69	10,945.96	792.75	75,000	32.45

The average interval, which is the time between insider trading days and the announcement day, is about 5.41 days and 4.43 days for purchase and sales, respectively. In the previous study by Carter, Mansi and Reeb (2003), they find that the average interval is about 22 days. The SEC of Thailand requires that insiders report their transactions within 3 days after the trading days, which is shorter than that in the U.S. The SEC in U.S. requires their insiders to report within 41 days after the trading days. The average ownership is about 32% and 33% for purchase and sales, with standard deviations of 27% and 25%, respectively. It is in the expectation that percentages of share holding of concentrated shareholders are large in the Thai stock market.

The average firm size (average market value of equity) in the purchases and sales sample are about Baht 34,432 million and 20,568 million with standard deviations of Baht 33,010 million and

20,974 million, respectively. The average total trading volume since insider trading day for purchase and sales are about 146.74 thousand and 128.28 thousand shares, with average standard deviations of 2,196.31 thousand shares and 377.84 thousand shares, respectively.

This study uses the market model like Seyhun (1986) to estimate abnormal returns of insiders. Banz (1981) shows that the CAPM based residuals are on average positive for small firms and negative for large firms. This systematic bias in CAPM residual can lead to biases in estimating abnormal returns in insider trading studies. The market model is a statistical model basing on the joint normality of the distribution of security returns. Given parameter stationarity, the market-model prediction errors have zero expected value for firms of any size so it can avoid the bias in CAPM.

Abnormal returns[5] and significant test

First, we apply the general market model by assuming the last insider trading day in each month as the event day (day 0) and the daily return on stock $r_{i,t}$ for security i on day t, with 200 days pre-event and 200 days post-event daily return data. The model is as follows;

$$r_{i,t} = \alpha_{i,t} + \beta_{i,t} r_{m,t} + \varepsilon_{i,t} \quad \text{for } t = -200,200, \qquad (1)$$

where

$r_{i,t}$ = Return on stock i on day t

$r_{m,t}$ = Return on value-weighted portfolio of all SET stocks on day t

$\alpha_{i,t}, \beta_{i,t}$ = Market model intercept and slope as of day t

$\varepsilon_{i,t}$ = Disturbance term assumed to be normally distributed with zero mean and constant variance.

[5] Abnormal returns are sometimes called excess returns (ER) or prediction errors (PE). We use the term prediction error in this paper.

The ordinary least squares (OLS) method was used to estimate model parameters $\alpha_{i,t}$, and $\beta_{i,t}$ with 200 days pre-event and 200 days post-event daily return data, excluding period of 30 days before to 30 days after the event day. We apply these estimates to realized returns on the market portfolio during the event period of 61 days (i.e., 30 days prior to and 30 days after the event date) in order to get the estimated risk adjusted return for each security for each event date[6].

Then, we calculate the prediction error ($PE_{i,t}$) for security i on day t, from 30 days before to 30 days after each event by subtracting the estimated return from the realized return for each security and for each event day. That is,

$$PE_{i,t} = (r_{i,t} - (\hat{\alpha}_i + \hat{\beta}_i r_{m,t})) \quad \text{for } t = -30,30, \tag{2}$$

where

$PE_{i,t}$ = Prediction error for security i on day t

$\hat{\alpha}_i + \hat{\beta}_i$ = Estimated market model intercept and slope

If the number of buyers equal the number of sellers in a month, that particular month will be excluded. An insider is considered as a buyer if he buys more shares than what he sells, and as a seller if he sells more shares than what he buys. Insiders who buy as many shares as they sell are ignored.

Next, the average portfolio prediction error is calculated for the event day t (APE_t). APE_t represents the average of all prediction error for K securities in a given portfolio on day t, where t is the trading day,

---

[6] Because there were many transactions traded by corporate insiders in each month, we decided to use a non-overlapping one-month period to classify insider's transaction in order to make the window clean from other effects. As a result, 108 event days from 665 transactions are remained.

$$APE_t = \frac{1}{K}\sum_{i=1}^{K_t} PE_{i,t} \quad \text{for } t = -30,30, \tag{3}$$

where

K_t = Number of prediction errors on event day t

To examine performance over a holding period, we calculate the cumulative daily average prediction error *(CAPE)* from event day t_1 to event day t_2 by summing the daily average prediction error as follows:

$$CAPE\,(t_1, t_2) = \sum_{t=t_1}^{t_2} APE_t \quad \text{for } t = t_1, t_2 \tag{4}$$

Following Brown and Warner (1985), the statistical significances of the average portfolio prediction errors are measured by standardizing the average portfolio prediction errors by their sample standard error[7], $\hat{\sigma}(APE)$,

$$t(APE_t) = APE_t / \hat{\sigma}(APE) \tag{5}$$

where

APE = Average prediction error over n different firms on day t

$\hat{\sigma}(APE)$ = Standard deviation of the average prediction error obtained from the estimation period between day -230 and day -31 before the event day and between day 31 and day 230 after the event day

For the statistical tests of cumulative daily average prediction error, we apply the method suggested by Barber and Lyon (1997) as

[7] We use the estimation period both pre-event and post-event to calculate standard error of APE following Brown and Warner (1985).

follows:

$$t(CAPE\,(t_1, t_2)) = CAPE\,(t_1, t_2) / \hat{\sigma}\,(CPE)\,\sqrt{n}, \qquad (6)$$

where

$CPE\,(t_1, t_2)$ = Cumulative prediction error across t_1 to t_2 periods of firm i, calculated by

$$CPE_{t_1, t_2} = \sum_{t=t1}^{t2} PE_{t_1, t_2}$$

$CAPE\,(t_1, t_2)$ = Cumulative prediction error across t period over n different firms or Cumulative average prediction error return between t_1 and t_2 periods

$\hat{\sigma}\,(CPE)$ = Standard deviation of the cumulative prediction error of the cross-sectional sample of n firms on t_1 to t_2 periods

n = Number of sample firms

Profitability of Outsider

To test the profitability of outsider, we use the same methods as mentioned above except assuming the first day that *The Form 59-2* is submitted to Securities and Exchange Commission (filing date) and the day the insider trading transaction becomes publicly available (usually one day after the filing date) as event day.

4. Empirical Results

4.1 Profitability of insider trading

The cumulative daily prediction errors for sales transactions and purchase transactions are plotted in figure 1 and 2, respectively. Table 2 presents the cumulative daily average prediction errors and their t-statistics calculated from equation (4) and (6). For the

overall sample, the prediction errors for sales are multiplied by minus one before averaging with purchases in order to get the realized abnormal profit of insiders.

Table 2 Cumulative Daily Average Prediction Errors of Insiders

The table shows cumulative daily average prediction errors before transaction cost, CAPE, and their t-statistics in parentheses, for 34 firms traded by insiders during the year 2002 for selected period around the insider trading day, denoted as day 0.

Event Period	CAPE for overall sample	CAPE for purchase	CAPE for sales
Day -30 through 0	-0.0158	0.0112	0.0338
	(-0.5945)	(0.4523)	(0.8201)
Day -20 through 0	-0.0215	-0.0026	0.0340
	(-0.8621)	(-0.1264)	(0.8662)
Day -10 through 0	-0.0134	-0.0093	0.0161
	(-0.5736)	(-0.6739)	(0.4263)
Day -5 through 0	-0.0295	-0.0128	0.0406
	(-4.9698)	(-1.4682)	(5.2275)

Table 2 Cumulative Daily Average Prediction Errors of Insiders (Continued)

Trading day to An-			
nouncement day (T, A)	-0.0209	0.0046	0.0377
	(-2.3456)	(0.7838)	(2.7117)
Day 1 through 5	0.0022	0.0195	0.0092
	(0.3669)	(2.6169)****	(1.0878)
Day 1 through 10	0.0034	0.0295	0.0138
	(0.3904)	(2.4261)****	(1.1629)
Day 1 through 20	0.0094	0.0482	0.0163
	(0.6778)	(2.7850)****	(0.8453)
Day1 through 30	-0.0061	0.0562	0.0473
	(-0.3108)	(2.4491)****	(1.6980)
Sample Size	108	43	65

* Significant at10 percent level with one-tail t-test
** Significant at 5 percent level with one-tail t-test
**** Significant at 1 percent level with one-tail t-test

For purchase transactions, Table 2 shows that during all selected days, 5-day, 10-day, 20-day and 30-day, following the insider-trading day, stock prices continue to rise abnormally by about 1.95% (*t*-statistic 2.62), 2.95% (*t*-statistic 2.43), 4.82% (*t*-statistic 2.79), and 5.62% (*t*-statistic 2.45), respectively. They all are statistically significant at 1% level.

Consistent with the hypothesis of "Profit from Purchases" and other previous studies, when insiders purchase stock prior to an announcement of favorable information, the insiders' purchase will gain positive abnormal returns. The evidence shows that corporate insiders purchase stock prior to the release of favorable information in order that they have gross abnormal return. The evidence in the Thai stock market suggests that corporate insiders of Thai firms know that some favorable thing will happen in the near future or

they believe that their stock is undervalued so they use this superior information to purchase their own stocks before the stock prices rise.

For sales transactions, Table 2 shows that during all selected days, 5-day, 10-day, 20-day and 30-day, following the insider-trading day, stock prices continue to rise abnormally by about 0.92% (*t*-statistic 1.09), 1.38% (*t*-statistic 1.16), 1.63% (*t*-statistic 0.85), and 4.73% (*t*-statistic 1.70), respectively. None is significant.

Inconsistent with the hypothesis of "Profit from Sales" and previous studies, corporate insiders sell their stocks prior to the release of unfavorable information. Surprisingly, the evidence shows that corporate insiders in Thai firms do not gain from inside information for sales. After selling, stock prices tend to rise and insiders lose money. This result implies that corporate insider do a poor job for predicting the future stock price. Nevertheless, many insiders may trade for reasons other than making profit from inside information. With employee stock option given to them, insiders sell their own firms stocks immediately after they have the right to exercise the option without concern of any inside information. They still gain as long as the option is in-the-money.

For overall sample, the results in Table 2 shows that the stock price changes for all selected periods around the day insider traded are insignificant positive abnormal returns. This may be due to the effect of loss from sales transactions.

In practice, insiders also have to pay some expenses for trading (transaction cost) such as commissions[8] to broker etc. When the transaction costs that they have to pay are higher than estimated abnormal profit, the profit could vanish.

---

[8] Jaffe (1974, p.423) assumes 2% of transaction costs, which includes 1% of brokerage charge plus other costs and benefit for both purchase and subsequent sales (or sales and subsequent purchases). According to Rozeff and Zaman (1988, p.38 note 10), they also use 2% for round-trip transaction. In the Thai stock market, commission plus vat for round-trip transactions is about 0.5%

4.2 Profitability of Outsiders

To examine the profitability to outsiders, this study examines outsiders' profit following the first day insider's report is submitted to the SEC (filing day) and the day that insider trading transactions become public information on the SEC's website which is one day after filing day. The cumulative daily prediction errors for sales and purchases are plotted separately in Figure 3 and 4 respectively. The result of cumulative daily prediction errors and their *t*-statistic for sales and purchase transactions are shown in Table 3.

Table 3 Delay of Reporting for Insiders' Sales and Purchase Transactions

The table shows insiders' sales and purchase transactions during the year 2002, grouped by the number of calendar days between the insider trading day, the day insiders' reports are first received by the SEC and the announcement day that are reported on SEC's website. Numbers in parentheses are the fraction of the total sample of 293 purchase transactions and 372 sales transactions.

PANEL A: Delay for insiders' purchase transactions				
Event period	**Within 3 days**	**Delay between 1 and 30 days**	**Delay between 31 and 60 days**	**Delay over 60 days**
Trade day to	230	55	8	-
filing day	(0.78)	(0.19)	(0.03)	(0.00)
Filing day to	293	-	-	-
announcement day	(1.00)	(0.00)	(0.00)	(0.00)
Trade day to	196	89	8	-
announcement day	(0.67)	(0.30)	(0.03)	(0.00)

Table 3 Delay of Reporting for Insiders' Sales and Purchase Transactions (Continued)

PANEL B: Delay for insiders' sales transactions				
Event period	**Within 3 days**	**Delay between 1 and 30 days**	**Delay between 31 and 60 days**	**Delay over 60 days**
Trade day to	288	78	1	5
filing day	(0.77)	(0.21)	(0.002)	(0.01)
Filing day to	372	-	-	-
announcement day	(1.00)	(0.00)	(0.00)	(0.00)
Trade day to	254	112	1	5
announcement day	(0.68)	(0.30)	(0.003)	(0.01)

Panel A and B in Table 3 shows the delay between insider trading days, insiders' reporting (filing days) and announcement days for purchase and sales transactions. The table shows that about 68% and 67% of purchase and sales transactions between trading days and filing days are submitted to SEC within 3 days, which is legally required by the SEC. About 19% and 21% of purchase and sales are in the delay between on day to sixty days. The delay over the required period is about 1% for sales but there is no delay for purchase. The percentages of delay for all periods are not significantly different for purchases and sales. Between the trade day and announcement days, the percentage of submitting within 3 days is about 67 and 68 for purchase and sales. About 30% of these transactions are classified as the delays between 1 to 60 days and only 1% for the delay over 60 days.

Seyhun (1986) finds that, for overall, the delay over 60 days is about 8% from trading day to filing days, and 80% from trading days to announcement days. Carter, Mansi and Reeb (2003) find that about 11.28% are in the period over 41 days. It is very interesting that most of the insider's in the Thai stock market report their trading

transactions, both purchases and sales, in time. Moreover, there are very few transactions that are reported late to the SEC. At this point, it seems like the SEC has good control over corporate insiders in Thai stock market.

Table 4 Cumulative Daily Average Prediction Errors for Outsiders

The table shows cumulative daily average prediction errors, CAPE, and their t-statistics in parentheses, for 34 firms traded by insiders during the year 2002 around the day that insiders' report are first received by the SEC and the day that insider transactions are announced on SEC's website. (CAPE, which outsiders can earn by mimicking insider trading).

Event Period	Cumulative daily average prediction errors					
	Insiders' reports are received by SEC; day 0 is the last day of month			Announcement on day 0		
	Overall	Purchase	Sales	Overall	Purchase	Sales
Day 1 through 5	-0.0033	0.0083	0.0109	-0.0016	0.0080	0.0080
	(-0.5800)	(0.9662)	(1.4864)	(-0.2847)	(0.9734)	(1.0413)
Day 1 through 10	-0.0002	0.0159	0.0108	0.0017	0.0168	0.0084
	(-0.0229)	(1.3038)*	(1.0851)	(0.2105)	(1.4230)*	(0.8112)
Day 1 through 20	0.0085	0.0375	0.0106	0.0043	0.0350	0.0160
	(0.6709)	(2.1199)**	(0.6131)	(0.3319)	(1.9637)**	(0.8902)
Day1 through 30	-0.0112	0.0366	0.0428	0.0070	0.0334	0.0105
	(-0.6451)	(1.5058)*	(1.8424)	(0.3153)	(1.4163)*	(0.3141)
Sample Size	108	43	65	108	43	65

* Significant at 10 percent level with one-tail t-test

** Significant at 2.5 percent level with one-tail t-test

The evidence from Table 4 implies that if the outsider trades on the basis of insiders' purchase transactions as soon as insiders' reports are received by the SEC, he can earn 1.59% (*t*-statistic 1.30), 3.75% (*t*-statistic 2.12) and 3.66% (*t*-statistic 1.51) for the 10-day, 20-day and 30-day, respectively. When an outsider waits until after announcement date, their gross abnormal return is 1.17% (*t*-statistic 1.42), 3.50% (*t*-statistic 1.96) and 3.34% (*t*-statistic 1.42), respectively. For 5-day following these days, there is no significant abnormal return.

Table 5 Comparison of Cumulative Daily Average Prediction Error of Insider and Outsider for Purchase Transactions

The table shows comparison between cumulative daily average prediction error of insiders (day 0 is equal to trading day) and cumulative daily average prediction error of outsiders (day 0 is equal to filing day or announcement day), following day 0 for purchase transactions. In this table, cumulative daily average prediction error of insider and outsider are an average of 4 ranges which are day 1 to day 5, day 1 to day 10, day 1 to day20 and day 1 to day 30

Cumulative Daily Average Prediction Error			
	Insider	**Outsider**	
	(Trading day)	**(Filing Day)**	**(Announcement Day)**
Mean	0.0384	0.0246	0.0233
Variance	0.0003	0.0002	0.0002
t-statistic	-	6.7343****	5.7998****

**** Significant at 0.05 percent level

Table 5 shows the comparison of profitability to insiders in the previous section and profitability to outsiders; outsiders'

abnormal profits are still less than insider's abnormal profit. It's implied that outsider's trade on the basis of insiders. They do not however gain as much as insiders do for the purchase transactions. They nevertheless earn some return.

For sales transactions, Table 4 shows that the stock price adjustment for all selected periods following the filing day and announcement day are positive. Inconsistent with the hypothesis about "Profits from Sales", the evidence in the Thai stock market suggests that when outsiders sell the stocks following insiders, they lose from the increase in stock prices in subsequent periods. This evidence confirms that insiders do not have excess gain from using inside information for sales of their stock. When outsiders imitate insider trading, they lose from such trading. For overall sample, abnormal returns are all insignificant.

Table 6 Comparison of Cumulative Daily Average Prediction Error of Insiders and Outsiders for Sales Transactions

The table shows comparison between cumulative daily average prediction error of insider (day 0 is equal to trading day) and cumulative daily average prediction error of outsider (day 0 is equal to filing day or announcement day), following day 0 for sales transactions. In this table, cumulative daily average prediction error of insider and outsider are an average of 4 ranges which are day 1 to day 5, day 1 to day 10, day 1 to day20 and day 1 to day 30

Cumulative Daily Average Prediction Error			
	Insider	**Outsider**	
	(Trading day)	**(Filing Day)**	**(Announcement Day)**
Mean	0.0217	0.0188	0.0107
Variance	0.0003	0.0003	0.0000
t-statistic	-	1.7682**	1.2616*

* Significant at 10 percent level ** Significant at 5 percent level

Table 6 compares the profitability of insiders and outsiders for sales transactions. The table shows that when outsiders trade on the basis of insiders, they lose more than that of insiders.

The evidences above support the semi-strong form of market efficiency for sales and overall sample. Without offsetting with transaction cost, outsiders in Thai stock market do not have excess gain for sales like insiders. However, for purchase transaction, the evidence suggests that outsiders earn significant abnormal profit by mimicking insider trading and thus refuse the semi-strong form of market efficiency. In practice, outsiders also have to pay for some expenses such as commission to brokers. When these expenses get higher, these abnormal profits then vanish.

4.3 Determinant of the abnormal returns

The dependent variable for the regression is the estimate of insider's abnormal profit, which is the cumulative daily average prediction error (CAPE). The regression models are as follows:

$$CAPE\ (t1,\ t2) = a_0 + a_1\ (CEO) + a_2 (INTERVAL) + a_3 (OWNERSHIP) + a_4 (SIZE) + a_5 (VOLUME) \quad (7)$$

$$CAPE\ (t1,\ t2) = a_0 + a_1\ (CEO) + a_2 (INTERVAL) + a_3 (OWNERSHIP) + a_4 (SIZE) + a_5 (VALUE) \quad (8)$$

CAPE($t1$, $t2$) is the cumulative daily average prediction error from day $t1$ to day $t2$ around the insider trading day. CEO is a binary variable that indicates the type of officers (CEOs versus Non-CEOs). INTERVAL is the time, in trading days from actual insider trade to announcement date. OWNERSHIP is the percentage of concentrated shareholder of the firm (excluding from financial institutions, and any investment funds).

The CEO coefficient should be positively related to the CAPE for both purchases and sales since CEOs have better information than other officers. For OWNERSHIP, the sign should be positive because the higher family control should result in the greater inside information. The INTERVAL is also expected to be positively related to CAPE prior to the announcement due to the reason that insiders tend to delay to report their trading transactions in order to avoid a run-up in stock price.

The other variables in equation (7), (8) are control variables. SIZE is the log of average market capital before the event day (in millions of Baht). VOLUME is the log number of total shares that insiders trade since trading day for each selected period and VALUE is the total Baht value of insider trade since the trading day.

Table 7 Regression of the Cumulative Daily Average Prediction Errors for the Purchases with Trading Volume

The table presents coefficients of explanatory variables related to dependent variables, cumulative daily prediction errors for purchase in selected period following the insider trading. The explanatory variables are type of insider (CEO or non-CEO), interval, and percentage of ownership. The control variables are log of Baht volume of insider trading, and log of firm size. The t-statistics for estimated coefficients are shown in the parentheses. Sample period is during the year 2002. CAPE (T,A) is the cumulative daily average prediction errors from insider trading day to announcement day, CAPE (1,5) is the cumulative daily average prediction errors from 1 day to 5 day following the insider trading day, CAPE (1,10) is the cumulative daily average prediction errors from 1 day to 10 day following the insider trading CAPE (1,20) is the cumulative daily average prediction errors from 1 day to 20 day following the insider trading , CAPE (1, 30) is the cumulative daily average prediction errors from 1 day to 30 day following the insider trading. CEO = 1 if traders CEO and president, or 0 otherwise. INTERVAL is day

between insider trading day and announcement day, OWNERSHIP is percentage of share holding of the top-five concentrated share-holders before the insider trading days, SIZE, is log of average market value of equity measured at the closest ended of the quarter before the insider trading days, VOLUME, is log of the total number of shares for selected period following insider trading days

Variable	$CAPE_{T,A}$	$CAPE_{1,5}$	$CAPE_{1,10}$	$CAPE_{1,20}$	$CAPE_{1,30}$
Constant	0.0434	0.0394	0.0139	0.0078	0.0096
	(1.5019)	(1.5708)	(0.6370)	(0.5091)	(0.6669)
CEO	-0.0064	0.0017	0.0043	0.0063	0.0045
	(-1.0668)	(0.3300)	(1.0104)	(2.1599)**	(1.6425)
INTERVAL	0.0001	0.0003	0.0002	0.0000	0.0000
	(0.3054)	(1.0300)	(1.0934)	(-0.1715)	(-0.1271)
OWNERSHIP	-0.0111	-0.0023	0.0040	0.0041	0.0007
	(-1.3476)	(-0.3288)	(0.7001)	(1.0205)	(0.1893)
SIZE	-0.0040	-0.0032	-0.0003	-0.0003	-0.0002
	(-1.7983)*	(-1.6491)*	(-0.2044)	(-0.2589)	(-0.1483)
VOLUME	0.0001	-0.0004	-0.0010	-0.0004	-0.0007
	(0.0726)	(-0.4554)	(-1.2494)	(-0.7976)	(1.3207)
R2	0.1224	0.1434	0.1349	0.1706	0.0945
Prob (F-statistic)	0.4293	0.3265	0.3658	0.2201	0.5906

* Significant at 10 percent level using two-tailed t-test

** Significant at 5 percent level using two-tailed t-test

Table 7 provides the regression results for the purchase. Consistent with the expectation and other previous studies, for the 20 days following the insider trading day, the coefficient of CEO is significant and positively related to the cumulative daily average prediction error at 5% level. For other periods, most coefficients of this variable are positive but not significantly different from zero.

The result is consistent with the expectation that CEOs should trade on valuable information more than other insiders and

thus gain higher abnormal profits. The evidence suggests that in the Thai stock market, CEOs gain from their private information in the purchase activity in longer periods.

However, CEOs may purchase their owns stock to maintain or increase their proportion of holding shares and gain more power to control the company. Moreover, CEOs may have broader views than those of other insiders. They may expect that, in the long period, the company would have good projects or opportunities with potentials. They therefore tolerate the current losses as they expect to gain more in the future.

The coefficient of INTERVAL for all selected periods around trading day are not significantly different from zero. The evidence is inconsistent with the study by Carter, Mansi and Reed (2003). The reason may be that the regulation of the SEC requires corporate insider to report their transactions within 3 days after trading day while the SEC in U.S. allows the maximum window for reporting in about 41 days after the trading day.

Coefficients of OWNERSHIP are not consistent with the expectation. The result shows that coefficients of OWNERSHIP are not significantly different from zero for all selected period. Insiders do not seem to receive profit even when they have a high percentage of concentrated ownership. This finding may be caused by the reason that the sample firms in this study are in the SET-fifty companies, which are strictly controlled by the SEC.

For control variables, only coefficient of SIZE is negative and significant in relation with the abnormal profit for the period between trading day and announcement day and 5-day following the insider trading day. The result is consistent with the previous studies. In the Thai stock market, insiders in small firms earn substantially greater abnormal returns than the insiders in large firms. This can be explained by the nature of Thai company structure. Small firms have a higher percentage of concentrated shareholders than those in large firms. For example, Asian Property Development Company (a rather small firm) has market value of

equity for the second quarter in the year 2002 at about Baht 1,596.20 million and the percentage of concentrated ownership is 84.90%. Thai Airway International Company (a rather large firm) has market value of equity for the first quarter in the year 2002 at about Baht 174,900 million but the percentage of concentrated ownership is zero. This suggests that insiders in smaller firm have more valuable inside information than that in larger firms.

Table 8 Regression of the Cumulative Daily Average Prediction Errors for the Purchases with Trading Value

The table presents coefficients of explanatory variables related to dependent variables, cumulative daily prediction errors for purchases in selected period following the insider trading. The explanatory variables are type of insider (CEO or non-CEO), interval, and percentage of ownership. The control variables are log of Baht value of insider trading, and log of firm size. The t-statistics for estimated coefficients are shown in the parentheses. Sample period is during the year 2002. CAPE (T,A) is the cumulative daily average prediction errors from insider trading day to announcement day, CAPE (1,5) is the cumulative daily average prediction errors from 1 day to 5 days following the insider trading day, CAPE (1,10) is the cumulative daily average prediction errors from 1 day to 10 days following the insider trading CAPE (1,20) is the cumulative daily average prediction errors from 1 day to 20 days following the insider trading , CAPE (1, 30) is the cumulative daily average prediction errors from 1 day to 30 days following the insider trading. CEO = 1 if traders are CEO and president, or 0 otherwise. INTERVAL is day between insider trading day and announcement day, OWNERSHIP is percentage of share holding of the top-five concentrated shareholders before the insider trading days, SIZE, is log of average market value of equity measured at the end of the quarter before the insider trading days and VALUE, is the log of total Baht value of selected period since insider trading days.

Variable	$CAPE_{T,A}$	$CAPE_{1,5}$	$CAPE_{1,10}$	$CAPE_{1,20}$	$CAPE_{1,30}$
Constant	0.0331	0.0104	-0.0120	-0.0132	-0.0080
	(1.1407)	(0.4191)	(-0.5423)	(-0.8521)	(-0.5339)
CEO	-0.0081	-0.0028	0.0011	0.0039	0.0026
	(-1.3029)	(-0.5350)	(0.2518)	(1.2980)	(0.8883)
INTERVAL	0.0001	0.0004	0.0004	0.0001	0.0001
	(0.4105)	(1.4895)	(1.6265)	(0.3501)	(0.4117)
OWNERSHIP	-0.0108	-0.0023	0.0038	0.0049	0.0013
	(-1.3321)	(-0.3305)	(0.6454)	(1.2141)	(0.3322)
SIZE	-0.0040	-0.0028	0.0006	0.0003	0.0005
	(-1.8880)*	(-1.5346)	(0.3761)	(0.2996)	(0.5390)
VALUE	0.0008	0.0016	0.0005	0.0008	0.0003
	(0.6390)	(1.4426)	(0.5056)	(1.1635)	(0.4257)
R^2	0.1321	0.1855	0.1038	0.1866	0.0554
Prob (F-statistic)	0.3794	0.1744	0.8337	0.1716	0.8303

*Significant at 10 percent level using two-tailed t-test

From Table 8, the coefficients of CEOs are not significantly different from zero. Similar to panel A in the same table, the coefficient of CEO shows a positive sign in the longer period. This confirms that CEO trades for other reasons than just selling their stock and receive gain outright.

The coefficients of INTERVAL for all selected periods around trading day are not significantly different from zero. The evidence is inconsistent with the study by Carter, Mansi and Reed (2003). The reason may be that the regulation of the SEC in Thailand that requires corporate insiders to report their transactions within 3 days after trading day while the SEC in U.S. allows the maximum window for reporting in about 41 days after the trading day.

The coefficients of OWNERSHIP are not consistent with the expectation. The result shows that coefficients of OWNERSHIP are not significantly different from zero for all selected periods. The result can be explained by the reasons as before.

For control variables, only coefficient of SIZE is negative and significant in relation with the abnormal profit for the period between trading day and announcement day and 5-day following the insider trading day. The result is consistent with the previous studies and can be explained as above.

Table 9 Regression of the Cumulative Daily Average Prediction Errors for the Sales with Trading Volume

The table presents coefficients of explanatory variables related to dependent variables, cumulative daily prediction errors for sales in selected period following the insider trading. The explanatory variables are type of insider (CEO or non-CEO), interval, and percentage of ownership. The control variables are log of Baht volume of insider trading, and log of firm size. The t-statistics for estimated coefficients are shown in the parentheses. Sample period is during the year 2002. CAPE (T,A) is the cumulative daily average prediction errors from insider trading day to announcement day, CAPE (1,5) is the cumulative daily average prediction errors from 1 day to 5 days following the insider trading day, CAPE (1,10) is the cumulative daily average prediction errors from 1 day to 10 days following the insider trading CAPE (1,20) is the cumulative daily average prediction errors from 1 day to 20 days following the insider trading , CAPE (1, 30) is the cumulative daily average prediction errors from 1 day to 30 days following the insider trading. CEO = 1 if traders CEO and president, or 0 otherwise. INTERVAL is day between insider trading day and announcement day, OWNERSHIP is percentage of share holding of the top-five concentrated shareholders before the insider trading days, SIZE, is log of average market value of equity measured at the end of the quarter before the insider trading days, VOLUME, is log of the total number of shares for selected period following insider trading days. Variable

Variable	$CAPE_{T, A}$	$CAPE_{1, 5}$	$CAPE_{1, 10}$	$CAPE_{1, 20}$	$CAPE_{1, 30}$
Constant	0.0627	0.0153	0.0201	0.0117	-0.0009
	(2.1692)**	(0.5412)	(1.0233)	(0.7444)	(-0.0618)
CEO	-0.0018	-0.0007	0.0002	0.0015	0.0045
	(-0.2390)	(-0.1020)	(0.0342)	(0.3797)	(1.1867)
INTERVAL	0.0005	0.0005	0.0003	0.0004	0.0004
	(1.4412)	(1.5454)	(1.5006)	(2.5365)***	(2.8683)****
OWNERSHIP	0.0025	0.0054	0.0016	0.0041	0.0037
	(0.2963)	(0.6580)	(0.2832)	(0.9099)	(0.8705)
SIZE	-0.0056	-0.0021	-0.0023	-0.0008	0.0001
	(-2.3395)***	(-0.900)	(-1.4089)	(-0.5975)	(0.0980)
VOLUME	-0.0006	0.0003	0.0001	-0.0006	-0.0002
	(-0.5097)	(0.2962)	(0.1824)	(-1.1234)	(-0.3257)
R^2	0.1325	0.0788	0.0865	0.1280	0.1537
Prob (F-statistic)	0.1329	0.4305	0.3711	0.1483	0.0774

** Significant at 5 percent level using two-tailed t-test

*** Significant at 2 percent level using two-tailed t-test

**** Significant at 1 percent level using two-tailed t-test

Table 9 provides the result of the regression for the sales transactions. Inconsistent with the expectation, the coefficients of CEO for sales transaction are not significantly different from zero for all selected periods following insider trading day. The evidence suggests that in the Thai stock market, CEOs seem not to know valuable inside information than other insiders. However, the coefficients of CEOs seem to be increasing since they may receive more gain in the longer period.

Consistent with the expectation, coefficients of INTERVAL for all selected periods following trading day are all positive and significantly related to the cumulative average daily prediction errors only twenty days and thirty days following insider trading day. The implication is that corporate insiders seem to delay their

reporting to the SEC in order to avoid the immediate higher profits, and they expect to make more profit in the future.

The coefficients of OWNERSHIP for all selected periods are positive but insignificantly different from zero. For other variables, the coefficient of SIZE is negative and significant in relation with the abnormal profit for the period between trading day and announcement day. The result is consistent with the previous studies. Thus, in the Thai stock market, insiders in small firms earn substantially greater abnormal returns than the insiders in large firms.

Table 10 Regression of the Cumulative Daily Average Prediction Errors for the Sales with Trading Value

The table presents coefficients of explanatory variables related to dependent variables, cumulative daily prediction errors for sales in selected period following the insider trading. The explanatory variables are type of insider (CEO or non-CEO), interval, and percentage of ownership. The control variables are log of Baht value of insider trading, and log of firm size. The t-statistics for estimated coefficients are shown in the parentheses. Sample period is during the year 2002. CAPE (T,A) is the cumulative daily average prediction errors from insider trading day to announcement day, CAPE (1,5) is the cumulative daily average prediction errors from 1 day to 5 days following the insider trading day, CAPE (1,10) is the cumulative daily average prediction errors from 1 day to 10 days following the insider trading CAPE (1,20) is the cumulative daily average prediction errors from 1 day to 20 days following the insider trading, CAPE (1, 30) is the cumulative daily average prediction errors from 1 day to 30 days following the insider trading. CEO = 1 if traders are CEO and president, or 0 otherwise. INTERVAL is day between insider trading day and announcement day, OWNERSHIP is percentage of share holding of the top-five concentrated shareholders before the insider trading days, SIZE,

is log of average market value of equity measured at the end of the quarter before the insider trading days and VALUE, is the log of total Baht value of selected period since insider trading days.

Variable	$CAPE_{T, A}$	$CAPE_{1, 5}$	$CAPE_{1, 10}$	$CAPE_{1, 20}$	$CAPE_{1, 30}$
Constant	0.0402	0.0102	0.0123	0.0024	-0.0119
	(1.4438)	(0.3775)	(0.6540)	(0.1581)	(-0.8372)
CEO	-0.0027	-0.0012	-0.0003	0.0015	0.0041
	(-0.3572)	(-0.1653)	(-0.0660)	(0.3643)	(1.1050)
INTERVAL	0.0003	0.0004	0.0003	0.0004	0.0004
	(0.9485)	(1.4939)	(1.4220)	(2.4703)***	(2.7928)****
OWNERSHIP	0.0013	0.0054	0.0015	0.0036	0.0036
	(0.1599)	(0.6701)	(0.2617)	(0.8024)	(0.8555)
SIZE	-0.0052	-0.0022	-0.0023	-0.0003	0.0004
	(-2.2507)**	(-1.0024)	(-1.4922)	(-0.2550)	(0.3059)
VALUE	0.0010	0.0007	0.0007	-0.0001	0.0005
	(0.9080)	(0.6666)	(0.9533)	(-0.1708)	(1.0181)
R^2	0.1408	0.0844	0.1001	0.1095	0.1671
Prob (F-statistic)	0.1080	1.0695	0.2807	0.2283	0.0540

** Significant at 5 percent level using two-tailed t-test

*** Significant at 2 percent level using two-tailed t-test

**** Significant at 1 percent level using two-tailed t-test

Table 10, by changing the variable in the regression model using log of total Baht volume of trading instead of total Baht value, the results do not change.

5. Conclusion

Consistent with previous studies about insider trading, the evidence presented in this study indicates that, corporate insiders in the Thai market can make abnormal returns on stock when they are buyers. Corporate insiders know some favorable private information

and buy their own stocks prior to the stock price rises. However, they lose when they are sellers. They sell stocks before the price rises. So in the subsequent period, they get a loss from such trading.

This study also examines whether outsiders can use public information announced by the SEC and then earn abnormal profits like insiders. For the purchase transactions, the evidence shows that outsiders can earn abnormal return by mimicking insider trading though it is lower. On the other hand, evidence from the sales transactions shows that outsiders cannot earn abnormal return by trading like insiders.

Moreover, the evidences in this study show that CEOs (both CEOs and presidents) in Thai firms have more valuable information about the company's future prospects than other insiders in the longer period. Though most Thai firms have family control structure, the evidences do not suggest that corporate insiders in firms with concentrated shareholders can significantly earn abnormal return for both purchase and sale transactions. The finding of this study shows that even though we have strict regulations for companies regarding the 3-day reporting interval by the SEC of Thailand, it cannot prevent the insider trading information leakage. In other words, outsiders can make significant abnormal profit by trading like insiders.

References

Banz, R.W. (1981), "The relationship between return and market value of common stocks", *Journal of Financial Economics*, vol. 9, pp. 3-18.

Barber, B.M. and Lyon,J.D. (1996), "Detecting abnormal operating performance: The empirical power and specification of test statistics", *Journal of Financial Economics*, vol. 41, pp. 359-399.

Barber, B.M. and Lyon, J.D. (1997), "Detecting long-run abnormal stock returns: The empirical power and specification of test statistics", *Journal of Financial Economics*, vol. 43, pp. 341-372.

Brown, S.J., Warner, J.B. (1985), "Using daily stock returns: The case of event studies", *Journal of Financial Economics*, pp. 3-31.

Carter, Mansi and Reeb. (2003), "Quasi- private information and insider trading", *Financial Analysis Journal*, pp. 60-68.

Datta and Iskandar-Datta.(1996), "Does insider trading have information content for the bond market?", *Journal of Banking & Finance*, vol. 20, pp. 555-575.

Fama, E.F. (1970). "Efficient capital market: A review of theory and empirical work", *Journal of Finance*, vol. 25, pp. 383-417.

Fama, E.F., L. Fisher, M.C. Jensen and R. Roll. (1969), "The adjustment of stock prices to new information", *International Economic Review*, vol. 10, pp. 1-21.

Finnerty, J.E. (1976). "Insiders and market efficiency", *Journal of Finance*, vol. 31, pp. 1141-1148.

Jaffe, F.F. (1974). "Special information and insider trading", *Journal of Finance*, vol. 47, pp. 410-428.

Karpoff, J., Lee, D. (1991)."Insider trading before new issue announcements", Financial Management, vol. 20, pp. 18-26.

Lin, J. and Howe, J.S. (1990)."Insider Trading in the OCT Market", *Journal of Finance*, vol. 45(4), pp. 1273-1284.

Lorie, J.H., and V. Niederhoffer. (1968), "Predictive and statistical properties of insider trading" *Journal of Law and Economics*, vol. 11, pp. 35-51.

Meulbroek L.K. (1992), "An Empirical Analysis of Illegal Insider Trading", *Journal of Finance*, vol. 47(5), pp. 1661-1699.

Myers, S. and N. S. Majluf .(1984), "Corporate financing and investment decisions when firms have information that investors do not have", *Journal of Financial Economics*, vol. 13, pp. 187-221.

Rozeff, M.S. and M.A. Zaman.(1988), "Market Efficiency and insider trading: New evidence", *Journal of Business*, vol. 61, pp. 25-44.

Rozeff, M.S. and M.A. Zaman.(1998), "Overreaction and Insider Trading: Evidence from Growth and Value Portfolios", *Journal of Finance*, vol. 2, pp. 701-716.

Seyhun, H.N. (1986), "The insiders' profits, cost of trading, and market efficiency", *Journal of Financial Economics*, vol. 16, pp. 189-212.

Appendixes

Appendix A
Variable definitions

Variable		Definition
CEO	=	CEOs, a binary variable that indicates the types of officer. In this study, we define CEOs as the top management of the company that are chief executive officers and president or any title that represent this job and are expected to have more valuable information than others. Other insiders are classified as Non-CEOs. So in this case, CEOs is equal to 1 and Non-CEOs is equal to 0.
INTERVAL	=	*INTERVAL*, is the time between actual insider trading days and the announcement day.
OWNERSHIP	=	*OWNERSHIP*, is the percentage of share holding of the top-five concentrated shareholders before the insider trading days collected from the I-SIM data set.
SIZE	=	*SIZE*, is the log of average market value of equity measured at the end of the quarter before the insider trading days collected from the I-SIM data set.
VOLUME	=	*VOLUME*, is log of total number of shares that are traded since insiders trading days for each selected period.
VALUE	=	*VALUE*, is the log of total Baht value of insider trading shows that are traded since insider trading days for each selected period.

Appendix B
Name of Companies listed in the SET-fifty
on March 15, 2004

No.	Company Symbol	Industry Section
1	ADVANC	Communication
2	AMATA	Property Development
3	AP	Property Development
4	ATC	Chemical and Plastics
5	BANPU	Energy
6	BAY	Banking
7	BBL	Banking
8	BEC	Entertainment and Recreation
9	BECL	Transportations
10	BOA	Banking
11	BT*	Banking
12	CPF	Agribusiness
13	DELTA	Electronic Components
14	DTDB*	Banking
15	EGCOMP	Energy
16	GOLD	Property Development
17	GRAMMY	Entertainment and Recreation
18	HANA	Electronic Components
19	ITD	Property Development
20	ITV*	Entertainment and Recreation
21	KBANK	Banking
22	KGI*	Finance and Securities
23	KK	Finance and Securities
24	KTB*	Banking
25	LH	Property Development
26	MAJOR*	Entertainment and Recreation
27	MS*	Companies under Rehabilitation
28	NFS	Finance and Securities
29	PTT**	Energy

Appendix B
Name of Companies listed in the SET-fifty on March 15, 2004 (Continued)

No.	Company Symbol	Industry Section
30	PTTEP	Energy
31	QH	Property Development
32	RATCH	Energy
33	SATTLE*	Communication
34	SCB*	Banking
35	SCC	Building and Furnishing Materials
36	SCCC	Building and Furnishing Materials
37	SHIN*	Communication
38	SIRI	Property Development
39	SPL*	Finance and Securities
40	SSI*	Building and Furnishing Materials
41	TA	Communication
42	THAI	Transportations
43	TISCO	Finance and Securities
44	TMB*	Banking
45	TPIPL*	Building and Furnishing Materials
46	TT&T*	Communication
47	TUF	Food and Beverages
48	UBC	Entertainment and Recreation
49	VNG	Building and Furnishing Materials
50	VNT	Chemical and Plastics

* Management of companies does not report their transaction during the year 2002

** Not enough daily stock data for the estimation period.

Figure 1: Cumulative daily average prediction errors from 30 days before to 30 day after the insider trading day, for portfolio of 34 firms traded by insider during the year 2002 (purchase transactions).

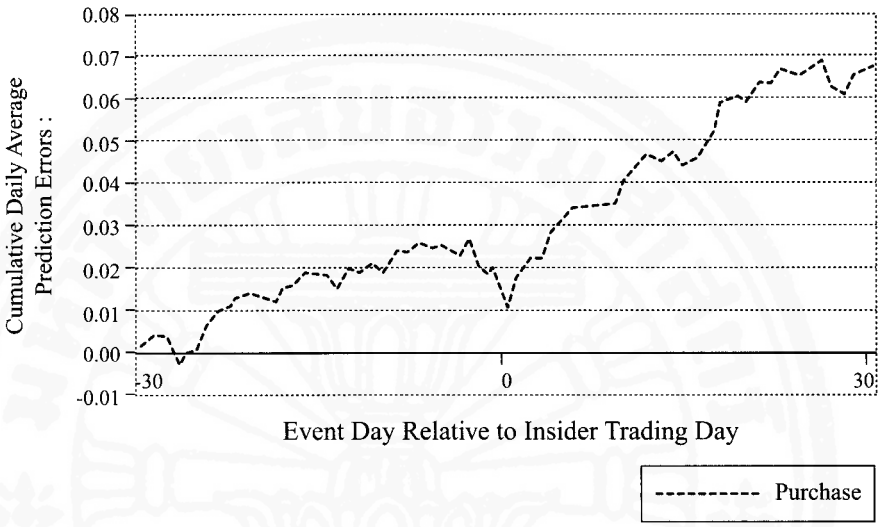

Figure 2: Cumulative daily average prediction errors from 30 days before to 30 day after the insider trading day, for portfolio of 34 firms traded by insider during the year 2002 (sales transactions).

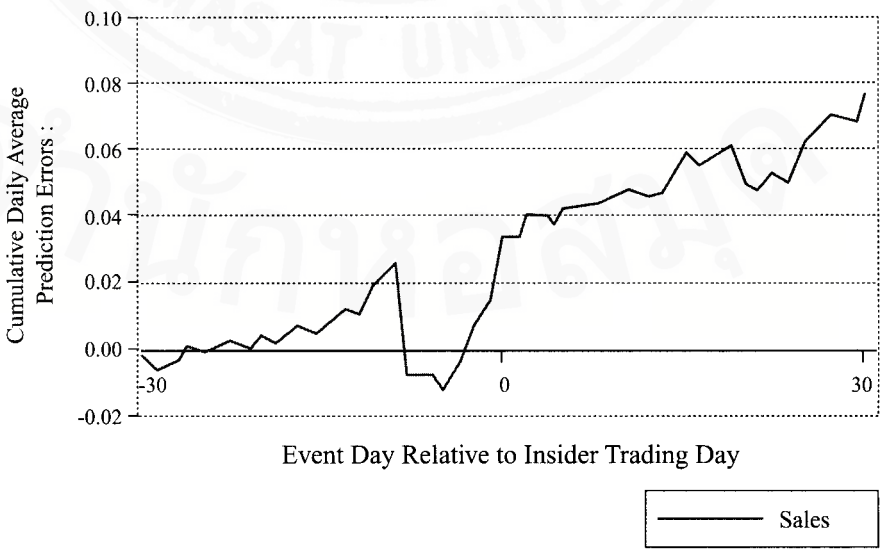

Figure 3: Cumulative daily average prediction errors plotted separately for purchase and sales transactions from 30 days before to 30 days after the first day insiders' report are received by SEC to a portfolio of 34 firms traded by insiders during the year 2002.

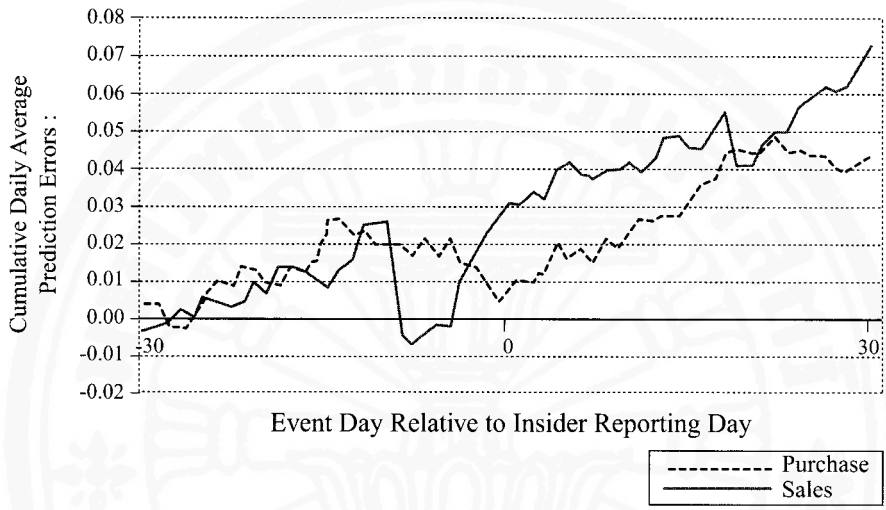

Figure 4: Cumulative daily average prediction errors plotted separately for purchase and sales transactions from 30 days before to 30 days the announcement day reported on the SEC's website to a portfolio of 34 firms traded by insiders during the year 2002.