LUND UNIVERSITY
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DECODING INSIDER INFORMATION ON THE SWEDISH STOCK MARKET

-A COMPARISON OF THE ABNORMAL RETURNS GAINED BY ROUTINE AND OPPORTUNISTIC INSIDERS

Master thesis
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Abstract

Title:	Decoding Insider Information on the Swedish Stock Market: *A Comparison of the Abnormal Returns Gained by Routine and Opportunistic Insiders.*
Seminar date:	2011-06-01
Course name:	BUSM26, Degree Project in Finance (15ECTS).
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Key words:	Insider trading, Routine insider trading, Opportunistic insider trading, Event study, Market model, CAAR, Signaling effect, Efficient market hypothesis.
Purpose:	The main purpose of this thesis is to classify insiders of firms listed on the OMX Stockholm stock exchange into two groups, one group whose trading contain strong predictive power of the future returns of the firms stock and one group whose trading contain as little predictive power as possible. The abnormal returns of these two groups of insiders are then compared.
Methodology:	An event study based on the market model is used to determine the abnormal returns of the insiders. The abnormal returns of the two groups of insiders are compared using an independent samples t-test and a Mann-Whitney test.
Theoretical framework:	The theoretical framework is based on previous research in addition to the efficient market and the signaling hypotheses.
Conclusions:	It is found that buy transactions by insiders defined as opportunistic are associated with higher abnormal return than buy transactions by insiders classified as routine during the longer term event windows. It is also found that buy transactions by insiders defined as opportunistic are associated with higher abnormal return than buy transactions by insiders classified as routine during the longer term event windows. All insider transactions are generally associated with positive abnormal returns. By classifying Swedish insiders as routine and opportunistic using the method previously used by Cohen et al (2010), the transactions of the opportunistic insiders contain somewhat stronger predictive power of the future returns of the firm, however, this predictive power is not by far as strong as Cohen et al (2010) found it to be in there study on the American stock market.

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1 Introduction

1.1 Background

On the afternoon of June 1st 2010, the district court of Stockholm announced their verdicts in the so called "Insider case", the largest prosecution of insider trading in Swedish history. The verdict had been preceded by several years of investigation and a trial lasting more than three months. Six persons now stood accused of involvement in 23 cases of suspected illegal insider trading. According to the prosecutor this trading had generated profits of over a hundred million SEK. The verdict declared all of the accused not guilty of any insider trading charges[1]. This case is one of many acquittals in large media attended cases of suspected insider trading in Sweden, spanning from the "Trustor case" in 2002 to the "Carnegie case" of late 2010. Following these acquittals a number of critical voices were raised against the Swedish National Economic Crimes Bureau and the district court of Stockholm. Annika von Hartmann, head of market monitoring at Nasdaq OMX (the Stockholm stock exchange) stated (translated from Swedish):

"*We are concerned by all acquittals. We understand if the many among the general public are upset and loses their confidence in the stock market {…] I think it is time for an overlook and analysis of how the whole machinery works today. Spontaneously I think we could get some inspiration from UK and USA. There you can judge on indices in a way that is not possible in Sweden".* Catarina af Sandeberg, associate professor in civil right and security paper right stated (translated): *I am convinced that all acquittals make the financial criminals reckon that the risk of being caught is very small"*[2].

During the two months following the acquittal of the "insider case" in June 2010, the Swedish National Economic Crimes Bureau noticed an 80 % increase of reported crimes regarding undue market influencing and insider trading (about half of the reported crimes revolved insider trading)[3]. The number of reported insider crimes has however been increasing for a longer period of time. During 2009, the

[1] SvD 2010-06-01
[2] SvD 2010-12-21
[3] SvD 2010-08-04

number of suspected cases of illegal insider trading reported in Sweden was 209[4], the corresponding number for the four years 2003-2006 was 239[5].

These facts combined gives raise to questions regarding the effectiveness of the Swedish insider trading legislation, and also to some extent regarding the market efficiency in Sweden.

The need to regulate the trading of insiders in Sweden was first paid attention to in the 1970s; in 1972 the first insider trading act was enforced[6]. Since then, the Swedish insider legislation has undergone several amendments. A number of new acts has also been introduced, the most important being the Insider act of 1990[7], the insider penal code of 2000[8] and Penalties for Market Abuse in Trading Financial Instruments act of 2005[9].

The first well known study showing that insiders tend to buy more often than usual before large price increases and sell more than usual before price decreases is Rogoff (1964) [10]. His study indicates that an analysis of data on insider trading can be profitable even though almost all previously published studies until then had reached the contrary conclusion[11].

Since Rogoff's study there have been numerous studies on insider trading determining that insider transactions may hold informative value. The vast majority of the previous research on insider trading, in Sweden as well as internationally, has concluded that abnormal returns are achieved by insiders. A study conducted on the Swedish stock market shows that insider trades in Sweden generates abnormal returns, however they also determine that the abnormal gains will most likely vanish when investors attempt to imitate insider transactions[12].

[4] Ekobrottsmyndigheten 2010
[5] Ekobrottsmyndigheten 2007
[6] af Sandeberg (2002), p 57
[7] af Sandeberg (2002) p 61
[8] af Sandeberg (2002), p 64
[9] Svernlöv & Sjöman (2010)
[10] Rogoff (1964), p 697
[11] Lorrie, Niederhoffer (1968), p 35
[12] Li, Nogeman (2008), p 38

1.2 Problem Discussion

The efficient market hypothesis holds, that under the strong form of market efficiency security prices reflect all relevant information, regardless of what information is publicly available[13]. Hence there should be no opportunities to generate abnormal profits through the use of inside information. However, both international and national research has found that insider transactions are generally followed by abnormal returns[14]. This confirms that insider trading is informative and that insiders generally possess better information than the market. Looking closer at the insiders trades, their trading behavior seem to vary significantly. A review of the insider trading pattern of e.g. the real estate company Klövern AB, shows that one of the insiders (the CEO) has performed thirteen trades of the stock during the three years ranging from 2003-01-01 to 2005-12-31. Meanwhile seven of the insiders have performed only one or two transactions during the same time period[15]. In the example of Klövern AB, the CEO and a few other rather active traders can be assumed to trade their stock at a routine basis. The seven insiders with two or less trades however may be assumed to trade the stock at a more opportunistic basis. This pattern of more and less frequent traders is assumed to apply to essentially all of the publicly traded stocks in Sweden. The main idea behind this classification of insiders is to ignore the uninformative signals of insider trading believed to be incorporated in the trades of the routine insiders. With the routine insiders stripped off, what remain is the opportunistic insiders, whose trading behavior is assumed to be more predictive of the future returns of the traded stock. The classifications of insiders into routine and opportunistic are thereby performed on basis of their trading behavior.

The main objective of this thesis is to compare the abnormal returns gained by the insiders who have been classified as opportunistic with the abnormal returns of the insiders who has been classified as routine. A similar attempt has been made on the US stock market in a recent working paper[16]. In their paper Cohen et al. (2010) finds that abnormal returns associated with trading by routine insiders are essentially zero while the opportunistic insiders gain abnormal returns[17].

Apart of investigating and comparing the abnormal returns of routine and opportunistic insiders, the study also attempts to investigate if either the acquittal of the "Insider case" in 2010, or the introduction

[13] Fama (1970), p 409
[14] e.g. Lorrie and Niederhoffer (1968), Li and Nogeman (2008)
[15] Appendix 1
[16] Cohen, Malloy & Pomorski (2010)
[17] Cohen et al (2010), p 22

of the act of Penalties for Market Abuse in Trading Financial Instruments has affected the abnormal returns gained by insiders.

The main question formulations of this thesis are:

1. Is there a difference in abnormal returns of Swedish insiders classified as opportunistic compared to those classified as routine using the insider classification method developed by Cohen et al (2010)

2. Is there a difference in abnormal returns of Swedish insiders classified as opportunistic compared to those classified as routine, defining a routine insiders as having conducted at least four transactions during a four year investigation period?

3. Has the abnormal returns of the insiders been affected by the following events:
    A. The introduction of the Penalties for Market Abuse in Trading Financial Instruments on June 1st 2005
    B. The acquittal of the "Insider case" on June 1st 2010.

The answers of the two first questions determine the success of the purpose discussed next.

1.3 Purpose

Our analysis rests on the rational assumption that insiders, like outsiders, trade for many different reasons. Hence there is reason to believe that some insider trades are less informative than other. In addition to prior Swedish research, we will attempt to distinguish between truly informative "opportunistic" transactions and "routine" transactions. By doing so, we aim to deduce which insider transactions that possess predictive power. The primary purpose of this thesis is to classify insiders into two groups, one group whose trading contain strong predictive power of the future returns of the firms stock and one group whose trading contain as little predictive power as possible. The abnormal returns of these two groups of insiders are then compared.

The secondary purpose of this study is to investigate the effect that two major events in Swedish insider regulation has had on the abnormal returns gained by insiders. These two events are the acquittal of the "Insider case" in 2010 and the introduction of the Swedish act of Penalties for Market Abuse in Trading Financial Instruments in 2005.

1.4 Limitations

The limitations made in this thesis are:

1. Only insider transactions in companies currently traded at Stockholm OMX are investigated.
2. Only regular purchases and sales of stocks are included as insider transactions.
3. The time period being investigated is 2003-01-01 – 2011-03-31.

The main reasons of conducting the study on this time range are, firstly, the period is recent and includes two events (the acquittal of the "Insider case" and the legislation enforcement) that may have affected the insiders' behavior. Secondly, the classification of insiders, as performed by Cohen et al, (2010) is performed on basis of the insiders' behavior during the first three years of the investigated period. This means that the longer investigation period used, the less likely it is that the insiders that has been defined as e.g. routine will still be trading on a routine basis at the end of the period. For this reason the investigated period has been reduced to just over eight years. This means that the period from the classification of the insiders to the end of the investigated period is just over five years.

The study is performed on the Swedish stock market since, prior to this study, no study has attempted to decode the trading patterns of insiders on the Swedish stock market. Only stocks traded at the Stockholm OMX are incorporated in the study, this means that Swedish public firms listed on other Swedish stock markets are not included. These firms, listed on other stock markets, represent a minority of the total number of Swedish stocks. The main reason for not including these firms in the study is due to poor data availability of the historical stock prices.

By only including regular purchases and sales, option programs and gifts are discarded, which are regarded as managerial benefits and not informative transactions.

2. Theoretical Framework

2.1 Insider definition

The Swedish Supervisory Authority defines an insider as a person whom through his or her position in the company is considered likely to have access to nonpublic information about the company. When comparing our results with equivalent American studies it is important to recognize that the Swedish definition of an insider is slightly different from the American, which states, that an insider is a company officer, director or a beneficial owner of more than ten percent of a class of the company's equity securities[18]. The Swedish definition is wider as the regulation occasionally also demands reports form auditors and persons with close relationships with an insider. Another difference is that the Swedish regulation also considers individuals closely related to insiders, so called secondary insiders, as viable insiders. According to the "Act concerning reporting obligations for certain holdings of financial instruments (2000:1087)" the Swedish Financial Supervisory Authority states that the following persons are considered insiders[19]:

1. A member or alternate member of the company or its parent company's board
2. A managing director or deputy director of the company or its parent company
3. An auditor or deputy auditor of the company or its parent company
4. A partner in a partnership company that is the company's parent company, though not limited partner
5. The holders of senior management posts or other qualified functions of the permanent nature at the company or its parent company, if the post or function normally are likely to have access to unpublished information on circumstances that may affect the price of shares in the company
6. Executives or employees in accordance 1-3 or other senior executives of a subsidiary, if they can normally be assumed to have access to unpublished information on circumstances that may affect the price of shares in the company
7. A person who by themselves or together with one or more natural or legal persons owns at least ten percent of the share capital or of the voting shares of the Company
8. Persons that are closely related to insiders as defined by definitions above.

[18] Securities Exchange Act of 1934
[19] Act concerning reporting obligations for holding of financial instruments (2000:1087)

2.2 Regulations

The Act concerning reporting obligations for holding of financial instruments specifies the structure of regulations that insiders operating on the Swedish market have to oblige. All Swedish companies with publicly registered securities are required to report a list of people holding insider positions to the Swedish Financial Supervisory Authority. The law also states that these insiders have to report all changes in their holdings and changes to the Supervisory Authority within five days of the transaction. Further, there is a trading restriction denying insiders to trade any financial instrument of its company within thirty days of the interim reports announcement[20].

The current insider regulation law was instated on June 1st, 2005, which means that our data consist of transactions during both the current and the old insider law legislation. The main adjustment in the new legislation is the implementation of a thirty day trading prohibition in connection to interim reports. The prior law instated in 1991 did not have such a prohibition but instead had a rule prohibiting an insider to sell a security within three months of the purchase[21]. The data, covering both the current and the old regulations, gives us the opportunity to evaluate the efficiency of the current regulation by comparing the market efficiency during both legislations periods.

2.3 Signaling effect

The concept of signaling, first presented in a used car market context[22], later developed into an equilibrium model, this time in the context of the job market[23] has its foundation in the information asymmetry. The Signaling effect theory is applicable on all situations where there is information asymmetry creating a lack of information equilibrium. Spence (1973) argues that one way to equilibrate this information gap is for the informed party to signal its information to the uninformed party hence reducing the information gap[24].

[20] Act concerning reporting obligations for holding of financial instruments (2000:1087)
[21] Insider law (1990:1342)
[22] Akerlof (1970)
[23] Spence (1973)
[24] Ibid (1973)

The signaling effect of insider trading is founded on the idea that insiders possess nonpublic information with security price-altering implications. In this context one can define the information disequilibrium as the nonpublic information with the potential to have a price changing effect on the market when published[25]. By observing transactions based on such nonpublic information, information is communicated to the market. Hence insider trading acts as an equalizing factor on the Information asymmetry between insiders and the market.

An insider purchasing securities in his or her own company may intuitively be regarded as an indication of the insider possessing nonpublic positive information not reflected in the current security price. Hence insider holding should increase when the nonpublic information expresses an upside in the stock price and the opposite when it expresses a potential overvaluation.

Even though it may seem logical and straight forward to interpret an insider sell as a negative signal and a purchase as a positive signal, it is not always as intuitive as it seems. It can be assume that all insider trades are not founded on the information asymmetry, which means that some transactions are more informative than others. This assumption implies that an investor has to learn how to decode what type of information a transaction holds for the signaling effect to be truly efficient in reducing the information gap.

2.4 Insider trading and the Efficient Market Hypothesis

The efficient market hypothesis developed by Eugene Fama in 1970s states that;

"A market in which prices always fully reflect all available information is called efficient "

Fama (1970)

The hypothesis is based on the random walk theory where a consecutive abnormal return cannot be achieved if the security price reflects all information available. According to the hypothesis the market has three different degrees of efficiency, weak, semi-strong and strong. If the market state is weak, security prices are strictly based on historical information and no other information is considered. However there is no predictive power in analyzing past prices or other historical information. Hence,

[25] Akerlof (1970), p490-492

future prices are determined to follow a random walk unaffected by neither present nor past information. The next efficiency level, the semi-strong market, security prices are based on all public information as well as historical information. New public information is processed at an instant and no excess return can be earned by trading based on such information. If the market has strong efficiency, security prices are based on all information available and there is no theoretical possibility to achieve a consecutive abnormal return. In other words, the strong form tests whether specific groups or individuals have monopolistic access to information that is of relevance when setting security prices[26].

The Efficient Market Hypothesis rests on three fundamental assumptions. The first assumption is that investors are assumed to act rationally and to value securities in a rational way. The second assumption states that even though some investments are irrational their trades are random and should cancel each other out without affecting security prices. Further, if several investors act irrational in a similar way this effect will be adjusted by rational investors eliminating the irrational influence on the security price[27].

2.5 Previous research

There have been several academic attempts to relate insider trades with consecutive abnormal returns since the early 1960s, starting with Rogoff (1964). More recent studies have adapted a different approach to insider research, involving the efficient market hypothesis and the how to interpret its signaling effect. The amount of research conducted in this field makes it impossible to cover everything, this section focus on presenting the fields' progression and studies done on the Nordic market.

2.5.1 Rogoff (1964)

Rogoff's study is the first well known study on the potential forecasting properties of insider transactions. The purpose of Rogoff's study is to test the hypothesis whether insiders, through their purchases or sales of their own company's stock, forecast its market price. By randomly choosing one hundred stocks listed on the New York stock exchange and comparing the company's aggregate numbers of insider purchases-sales with the stocks return above index six months from the date of net buying or

[26] Fama (1974)
[27] Shleifer (2000), p 2

selling, Rogoff conclude that his hypothesis was valid but that the correlation between insider transactions and the future market tendency of the stock was not inevitable. Further, Rogoff finds that certain types of transactions are stronger predictors than others e.g. a stock bought by two or more of its executives is likelier to outperform the market index[28].

2.5.2 Lorie, Niederhoffer (1968)

Lorie and Niederhoffer's paper "Predictive and statistical properties of insider trading" refines Rogoff's method of testing for abnormal insider returns. The main difference is their assumptions on how to calculate the correct stock price of an insider transaction. Rogoff assumes that the insiders execute their transaction at the stocks mid-month Friday prevailing price whereas Lorie and Niederhoffer assumes the insider execute his or her transaction at a price consistently more favorable than the mid-month Friday price Rogoff assumes. They find that this assumption strengthens the correlation between intensive insider accumulation of a stock and the outperformance of the market further and are able to reach the conclusion that insiders tend to buy more often than usual before large price increases and to sell more than usual before price decreases. The study also concludes that an insider purchase is three times more likely to be followed by another purchase than a sell and that such a change of direction may be an important indication of insider expectations[29].

2.5.3 Jaffe (1974)

Jaffe, one of the most prominent academic researchers of the field, examines the connection between abnormal returns and months with excessive insider trading. He acknowledges the information asymmetry between insiders and the market and relates potential abnormal returns to this asymmetry and lack of market efficiency in consistency with Fama's Efficient Market Hypothesis. His paper (1974) improves on previous research by including a larger sample and by relating the different returns to the stocks relative risk and not just a market index. The study concludes that insiders do possess special information and that, unless the information in published prior to the publication of the insider transaction, investors can earn from following insiders. This is however before considering transaction

[28] Rogoff (1964)
[29] Lorie, Niederhoffer (1968)

costs, which render his conclusion to, that only the intensive trading sample with eight-month holding period can earn abnormal returns[30].

2.5.4 Givoly and Palmon (1985)

Givoly and Palmon (1985) extend on previous research conducted by Jaffe (1974) by correlating insider trading with succeeding news releases. Their study suggests that the abnormal returns of insider transactions are not associated with disclosure of news from the company but rather outsiders acting on insider trading recognizing their information superiority[31]. This result acknowledges the signaling effect of insider trading but somewhat contradicts the efficient market hypothesis, which states that security prices respond rapidly to public information. It also gives a rather self-fulfilling aspect of abnormal insider returns due to outsiders recognizing the information asymmetry. A more recent study have however found evidence in contrary to Givoly & Palmon, suggesting that there is significant insider activity in combination with company announcements[32].

2.5.5 Seyhun (1986/88/92)

Seyhun has produced three studies on insiders trading, all three on different aspects and with different approaches. The first study (1986) investigates the findings of previous insider studies that any investor can achieve abnormal returns by imitating insiders. The evidence presented in his study implies that insiders are better at predicting abnormal future security price changes than investors. The study also concludes that some insiders are superior other insiders at predicting abnormal future returns which implies that there is a difference in insider information quality. Seyhun (1986) finds that insiders with the most overall knowledge of the firm, such as chief executives and chairmen, are superior other insiders at predicting future abnormal returns. Finally, Seyhun (1986) concludes that outsiders investing in accordance with insiders, following the publication of insider trading information, do not achieve an

[30] Jaffe (1974)
[31] Givoly and Palmon (1985)
[32] John and Lang (1991)

abnormal return. This result is consistent with Fama's market efficiency hypothesis which states that security prices adapt to all public information in an instance[33].

In his subsequent study on insiders trades Seyhun (1988) studies whether there is a relationship between aggregate insiders trading and the succeeding market portfolio return. His conclusion holds, that there is a significantly positive correlation between net aggregate insider trading and market portfolio return on the two subsequent moths. In other words, insiders generally purchase before bull market and sell before bear market. This result may be interpreted as evidence that insiders interpret economy-wide factors as firm specific. Furthermore, his study suggests that insiders in small firms tend to trade mostly on firm-specific information whereas insiders in large firms tend to trade on the basis of economy-wide factors[34].

In his third study regarding insider trading Seyhun (1992) examines the effects of increases in the US regulation and enforcement of insider trading during the 1980s. The method used examines the effects of the new regulations by analyzing changes in the overall volume and profitability of insider trading. By comparing the abnormal return before and after the new legislation his study determines that, despite the increased statutory sanctions of the 1980s, insiders earned an average abnormal profit of 5.1 percent, which surprisingly is 1.6 percent higher than before the new regulations. Furthermore, the study shows that the number of insider transactions increased during the 1980s, and that the new regulation did not reduce insider trading even on a temporary basis[35].

2.5.6 Lakonishok and Lee (2001)

Lakonishok and Lee's (2001) study is one of the more recent extensive studies conducted on the US market with data spanning from 1975 to 1995. Their main purpose is to determine whether insider trades are informative or not.

Their findings confirm previous research conducted by Seyhun that insiders buy when bull market and sell at bear market. Insider trading appears to predict market movements and insiders in small firms are especially good at predicting their company stock. This partly confirms Seyhuns (1988) study that

[33] Seyhun (1986)
[34] Seyhun (1988)
[35] Seyhun (1992)

suggests that insiders in small firms tend to trade mostly on firm-specific information whereas insiders in large firms tend to trade on the basis of economy-wide factors. Insider trading is therefore a stronger indicator in small cap stocks which indicates that the small cap segment is operating at a weaker form of market efficiency than large cap. Their final conclusion is that insider trades can be very informative when dealing with small cap firms whereas insider trading in large cap firms tends to have limited value[36].

2.5.7 Cohen, Malloy and Pomorski (2010)

Cohen et al.'s (2010) working paper "Decoding insider information" expands on previous research done by Lakonishok and Lee (2001). By acknowledging previous research stating that certain trades are more informative than others[37], they aim to create a simple filter to screen the data from uninformative trades. Their filter sorts insiders into groups of "routine" and "opportunistic" traders. By eliminating the data from all trades regarded as routine, they are left with strictly informative transactions which are believed to hold all predictive value of the future returns of the from. When comparing returns between the two groups, they find that the abnormal return on routine trades are approximately zero while opportunistic trades during the same period of time yields a significant abnormal return. Their research on the US market strengthens previous researchers' conclusion, that certain transactions are more informative than others. This suggests that there is value in creating a simple statistical filter to decode which trades that are truly informative[38]. This study by Cohen et al. forms the main inspiration for our thesis.

[36] Lakonishok and Lee (2001)
[37] Seyhun (1988), Lakonishok and Lee (2001)
[38] Cohen, Malloy and Pomorski (2010)

2.6 Nordic Studies

2.6.1 Eckbo and Smith (1998)

Eckbo and Smith's paper examines the performance of insider trades on the Oslo Stock Exchange (from now on, OSE). Instead of using the same event study approach as e.g. Seyhun, their evaluation is based on portfolios of monthly aggregate insider holdings. These portfolios are then assessed by performance measures and compared to managed mutual funds. The conclusion reached, is that there is no statistically significant abnormal return associated with insider transactions on the OSE[39]. This result is somewhat contradictive to results presented in foreign studies[40].

2.6.2 Hjertstedt and Kinnander (2000)

Hjertstedt and Kinnander's (2000) master thesis investigate the performance of insider trades on the Swedish Stock Exchange (from now on, SSE) between January 1996 and August 1999. Their results show that insiders earn significant abnormal returns both on purchases and sales. They also reach the conclusion that insiders in smaller firms make more profitable trades than those in large firms. This conclusion is consistent with Seyhun's (1988) study which concludes that insiders in small firms tend to trade mostly on firm-specific information whereas insiders in large firms tend to trade on the basis of economy-wide factors[41].

2.6.3 Sjöholm and Skoog (2006)

Sjöholm and Skoog's master thesis on insider trading at the SSE consist of data stretching from 1991 to 2004. This is the most data comprehensive study done on Swedish insiders with the purpose to investigate insider abnormal returns. In addition to investigating insider abnormal returns their research also attempts to classify different types of insider transactions by using a clustering method. Their results

[39] Eckbo and Smiths (1998)
[40] e.g. Seyhun (1986)
[41] Hjertstedt and Kinnanders (2000)

show that both sell and purchase transactions by insiders deliver abnormal returns and that these abnormal returns are even greater when only considering transactions that are classified as clustered[42].

2.6.4 Li and Nogeman (2008)

Li and Nogemans master thesis is one of the most recent studies on insider trading at the SSE. Their purpose is to investigate whether there are differences in abnormal returns within six different sectors of the SSE. Furthermore, they investigate whether outsiders can gain abnormal returns by imitating insider transactions with an event window of two weeks. Their conclusion is that there is a difference in abnormal returns amongst the six sectors and that the sector with highest abnormal return is the Oil, Gas and Fuel sector. They also determine that investors imitating insiders will generally not earn an abnormal return and that any abnormal return earned, will most likely be canceled out by transactions costs[43].

3. Hypotheses

Based on the problem formulations mentioned in the first chapter, the four hypotheses that are to be tested are presented here.

> *Hypothesis 1: There are abnormal returns associated with the transactions of Swedish corporate insiders.*

The question whether abnormal returns are gained by insiders or not have been studied in several papers, this study will investigate this issue on a recent data set. Both the abnormal returns associated with the transactions themselves and those associated with the publication of the transactions is investigated. Thereby both the abnormal returns gained by the insiders as well as the possible abnormal returns gained by an investor aiming to replicate the insider transactions are examined. Since the

[42] Sjöholm and Skoog (2006)
[43] Li and Nogeman (2008)

abnormal returns may be both positive and negative, the statistical tests associated with this hypothesis as well as the other hypotheses are two-sided.

> *Hypothesis 2*: The abnormal returns gained by insiders classified as opportunistic does not differ from the abnormal returns gained by insiders classified as routine.

This hypothesis provides an answer to the main question formulation of this study. This question has not yet been investigated on the Swedish stock market. The hypothesis is tested using two different methods of classifying insiders as routine or opportunistic.

> *Hypothesis 3:* The abnormal returns gained by insiders have changed after the introduction of the act of Penalties for Market Abuse in Trading Financial Instruments in 2005.

It is intuitive that stricter regulation concerning insider trading would result in a decrease of returns gained from insiders. This hypothesis aims to bring clarity regarding the effects of the strengthened regulation on the insiders' abnormal returns.

> *Hypothesis 4:* The abnormal returns gained by insiders have changed after the acquittal of the "Insider case" in 2010.

Statistics from the Swedish National Economic Crimes Bureau (ekobrottsmyndigheten) has indicated an increase in suspected crimes of insider trading after the acquittal of the "Insider case" in 2010. This hypothesis is included to bring clarity regarding the any eventual changes of the abnormal returns gained by insiders in connection with the acquittal. An increase of the abnormal returns in connection with the acquittal would suggest that insiders may have become less afraid of getting sentenced for illegal insider trading after the acquittal.

4. Method

4.1 Data

To be able to determine the correctitude of the hypotheses a first step is to gather the relevant data. The data gathered consists of historical share prices, historical index values and historical data of insider

transactions. Data is collected to enable the study to be performed during the eight years and three months ranging from 2003-01-01 to 2011-03-31.

4.1.1 Insider transaction data

In order to perform the different approaches of classifying insiders (as described later in this chapter), insider transaction data is gathered from 2000-01-01 to 2011-03-31. The source of this data is the Swedish Financial Supervisory Authority (Finansinspektionen). The insider transaction data contains information of both the transaction date and the announcement date of the insider trade. It also discloses whether the trade refers to a buy or a sell transaction, as well as the quantity of stocks being traded. As been mentioned in the limitations chapter, only pure buy and sell transactions by physical persons are incorporated in this study. Examples of transactions that are thereby ignored are bonuses, option exercises and heritages. No further limitations of the insider transaction data are made. This means that transactions are incorporated in the study regardless of their value (the value of the stocks bought or sold). The main reason for not setting a limit of the value of the transactions is the big differences in size of the firms in this study, which would make such a limit harder to define. Since the study covers all stocks currently listed at the OMX Stockholm stock exchange, setting a limitation of value that e.g. removes the smallest ten percent of a typical large cap company would most probably remove a lot more than ten percent of the transactions of one of a typical small cap company. Further the records of the Financial Supervisory only contain information of the number of stocks traded and not the value of these stocks. Limiting the transactions based on their value would therefore be very time-consuming while setting a limit of quantity of stocks traded would be irrelevant.

4.1.2 Historical Share Prices

The historical share prices are gathered from the investment research company Morningstar.inc. Share prices of all stocks present at the OMX Stockholm Stock Exchange 2011-03-31 is collected. This means, that firms that have been present during the investigated time period but have been delisted prior to 2011-03-31 are not included. The main reason for not including these firms is the lack of reliable historical share prices of these firms.

All historical share price data is adjusted for dividend payouts, splits, spin-offs and equivalent events affecting the stock price without having an immediate effect on the stock return. Adjusting the data for these factors brings the real returns gained from holding the shares, which is later used to calculate the abnormal returns. To ensure that the data is correct, randomized parts of the data is double-checked against equivalent data from OMX Nordic Stock Exchange.

When estimating the abnormal returns, the natural logarithms of the historical share prices are used as a measure of the return of the individual securities. The logarithmic returns are calculated using the following equation:

$$R_{\iota\tau} = ln\left[\frac{P_{\iota\tau}}{P_{\iota,\tau-1}}\right] \qquad (1)$$

Where $P_{\iota\tau}$ is the price of security, ι, at time t. $P_{\iota,\tau-1}$ is the price of security ι at time t – 1. The major advantage of using logarithmic instead of discrete returns is that logarithmic returns are time additive; this is an advantage when estimating cumulated returns. The time additivity means that the log return of n, number of periods equals the sum of each periods log returns[44].

4.1.3 Historical Index values

Index values of the Swedish stock market are required in order to perform the market model of the event study presented in the method chapter. The index used in this study is the OMX Stockholm PI (formerly known as OMX All Share). It is a weighted index based on all stocks at the OMX Stockholm stock exchange[45], i.e. the stocks on which this study is conducted. The OMX Stockholm PI index data is collected from 2002-12-01 to 2011-03-31.

The logarithmic returns of the historical index values are used when estimating the abnormal returns. The logarithmic returns of the index values are calculated in the same manner as for the historical share prices according to the following equation:

$$R_{m\tau} = ln\left[\frac{P_{m\tau}}{P_{m,\tau-1}}\right] \qquad (2)$$

[44] Brooks (2008), p 8
[45] Nasdaq OMX

Where $R_{m\tau}$ is the market return and $P_{m\tau}$ is the market index value at time t.

4.1.4 Criticism of sources

The reliability of the index data is considered high since it is received without any intermediaries. The historical share prices however stems from an intermediary, Morningstar. As mentioned earlier, the data is adjusted by Morningstar for various factors to bring the true returns of holding the stock. These adjustments however pose a potential source of error since Morningstar may fail to adjust all stocks for all splits, dividends etc. For this reason, a random sample of about 1 % of the stocks is checked against equivalent data from OMX Nordic Stock Exchange. In order to detect stock prices that have not been adjusted for splits, all stock prices are checked graphically. The insider transaction data is regarded as reliable since it stems from a national database to which all insiders are obliged to report their transactions, namely the Swedish Financial Supervisory Authority (Finansinspektionen). Although the data sources are considered reliable, human error still represent a potential source of error.

4.2 Classification of Insiders

All insiders are classified as either routine or opportunistic based on their previous trading. To perform this classification, all insider trades of the first three years of the investigated period are explored. All trades of insiders that have been classified as routine are then classified as routine trades during the entire investigated period, and vice versa for the trades of the opportunistic insiders. The routine traders are assumed to show a cyclic pattern in their trading of the stock. In order to promote the comparability with the major previous study on this field (namely Cohen et al (2010)), the same method to define routine and opportunistic insiders will primarily be used in this study. Using this approach, a routine insider is defined as an insider that has traded the stock in each of the first three years of the investigated period. All transactions performed by an insider classified as routine is defined “routine buy or sell transactions” during the entire investigated period, no matter which stock the insider is trading.

4.2.1 Alternative classification

As an attempt to enhance the informativeness of the opportunistic insider transactions on the future returns, an alternative classification of the insiders is conducted. The alternative classification defines a routine insider as an insider who has conducted at least four buy or sell insider transactions during the first four years of the investigated period, i.e. 2003 to 2006. All remaining insiders are defined as opportunistic.

4.3 Event Study

In order to estimate the abnormal returns gained by the routine and opportunistic insiders an event study is conducted using a single factor approach. The event study represents a useful method when measuring the effect of an economic event on the value of a firm. All previous studies discussed in this paper have used the event study as method. The event study method is used to measure the abnormal returns gained by the two groups of insiders after both the transaction dates and the publication dates of their trades. In the following subsections, the different steps of creating an event study are covered. The first step of the event study is to estimate the normal performance of a security's return. The abnormal returns are then defined as the difference between the actual performance and the normal (expected) performance. There are several methods to estimate the normal performance of a security. The method used in this study is the market model. The market model relates the return of any given security to the return of the market portfolio. This means that the portion of the return that is related to variations in the market return is removed. This reduces the variance of the abnormal returns and can lead to an increased ability to detect event effects. The market model assumes a linear relation between the return of the market and the return of the security[46].

A more simple method sometimes used to estimate the normal performance is the constant mean return model. Instead of relating the return of a given security to the market return, this model relates the return of a security to its historical mean return. The benefit of using the market model instead of the constant mean return model depends on the size of the coefficient of determination (R^2) of the

[46] Campbell et al. (1997)

market model regression[47] (equation 3). Since this study is performed on a very large data sample, the R^2 of the market model regression is assumed to be high enough to motivate usage of the market model instead of the constant mean return model.

Other models of measuring the normal performance include multifactor models and the market-adjusted-return model. The market model represents a one factor model where the factor is the return of the market. The factors of multifactor models are typically industry indexes. According to Campbell et al (1997), the gains of using multifactor models for event studies is limited since the explanatory power of additional factors in excess of the market factor is small. Based on this fact and the fact that multifactor models are more complex, the market model is preferred to the multifactor models. Restricted models like the market-adjusted-return may be suitable in cases of limited data availability. Since this is not the case in this study, the market model is preferred also to this model. An underlying assumption of the market model is that the returns are normally distributed. In this study, given the vast amount of data this is assumed to be the case.

The full procedure of the event study described below will be conducted using both the original method to classify the insiders (as proposed by Cohen et al 2010) and using the alternative approach (as discussed in section 4.2.1).

4.3.1 Definition of the event

The event is defined as any buy or sell transaction performed by an insider of any of the firms incorporated in this study. The Swedish Financial Supervisory authority (Finansinspektionen) keeps record of both the transactions dates and the announcement dates of these insider transactions. The announcement date is the date the transaction is published.

In order to provide answers for all problem formulations, this study examines the abnormal returns gained by insiders both after the transaction dates and after the publication dates of the transactions.

When investigating the first two problem formulations, i.e. whether there is a difference between the abnormal returns gained by routine and opportunistic insiders, both the transaction date and the publication date of the insider transaction is used as the event. The abnormal returns gained after the

[47] Campbell et al. (1997)

transaction date is a measure of the abnormal returns gained by the insiders themselves. The abnormal returns gained using the publication date as the event is a measure of the abnormal returns that would be gained by an investor who follows the trading pattern of the insider, given that no transaction costs are present.

When investigating the third problem formulation, i.e. whether there is a difference between the abnormal returns gained by the insiders before and after the law enforcement in 2005 and the acquittal of the insider case in 2010, the event is defined as the transaction date. The transaction date is used as the event since the study aims to clarify whether the returns gained by the insiders themselves has changed in connection to the two dates.

4.3.2 Definition of the event windows

In order to capture the abnormal returns gained by insiders, both on short and long terms, a number of different event windows are used for each event, i.e. each insider transaction or publication date. The event windows used are 1 trading day, 5 trading days, 10 trading days, 1 month (21 trading days), 3 months (63 trading days) and 6 months (126 trading days).

The event windows are shown in table 1 below; t_0 represents the day of the event.

Event window 1, 1 trading day	t_0
Event window 2, 5 trading days	$t_0 – t_4$
Event window 3, 10 trading days	$t_0 – t_9$
Event window 4, 21 trading days	$t_0 – t_{20}$
Event window 5, 63 trading days	$t_0 – t_{62}$
Event window 6, 126 trading days	$t_0 – t_{125}$

Table 1. Event windows

The one day, five day, and ten day event windows are intended to capture any short term abnormal returns. As mentioned in the theoretical framework, insiders are obliged to report an insider transaction within five days, this means that, when using the transaction date as the event, the abnormal returns

gained during the one day event window can be expected to be caused by virtually no signaling effects. The signaling effects can be assumed to be greater during the five day window, and is expected to be fully incorporated in the ten day window. This means that a result showing e.g. no abnormal returns during the one day window but significant abnormal returns during the ten day window may be caused by signaling effects. The one, three, and six month windows are intended to capture the longer term abnormal returns. These longer event windows are assumed to capture more information compared to the shorter windows, conversely the longer windows also contain more noise than the shorter windows. When comparing the short term event windows based on the transaction date with those based on the publication date, it may be possible to observe the presence of signaling effects. Using short and long terms event windows decreases the risk of drawing incorrect conclusions from random significant relations.

4.3.3 The Market model

As been previously discussed in section 4.3, the market model is used to estimate the abnormal returns in this study. To measure the abnormal return during an event window, the following equation is used for firm ι, at the event date, τ:

$$AR_{\iota\tau} = R_{\iota\tau} - E(R_{\iota\tau}|X_{\tau}) \qquad (3)$$

Where $R_{\iota\tau}$ is the actual return and $E(R_{\iota\tau}|X_{\tau})$ is the normal return of security ι at time, τ. X_{τ} is the conditioning information for the normal return model[48].$AR_{\iota\tau}$ is the abnormal return of security ι at time τ. The conditioning information, X_{τ} ,is represented by the market index. The market model regression for a security, ι, is:

$$R_{\iota\tau} = \alpha_{\iota} + \beta_{\iota}R_{m\tau} + \varepsilon_{\iota\tau} \qquad (4)$$

$E(\varepsilon_{\iota\tau}) = 0$

$Var(\varepsilon_{\iota\tau}) = \sigma_{\varepsilon}^2$.

[48] MacKinlay (1997)

Where $R_{\iota\tau}$ is the return of security ι, at period t and $R_{m\tau}$ is the return of the market portfolio at period t. $\varepsilon_{\iota\tau}$ is a zero mean disturbance term. $\alpha_\iota, \beta_\iota$ and σ_ε^2 are parameters of the market model[49].

Another important step in the creation of the event study is defining an estimation period. The estimation period is the period during which the normal returns are estimated[50]. The estimation period used in this study is the 126 trading days (six months) preceding the event window. This estimation window length has been used in most equivalent studies and is assumed to be long enough to capture enough data to calculate normal performance, but at the same time short enough to not capture any alterings of the firms risk level. In the study, the estimation windows and the event windows never overlap since such overlap would cause the event itself to influence the estimated normal return[51].

To estimate the market model an ordinary least squares (OLS) procedure is used to estimate the parameters, $\alpha_\iota, \beta_\iota$, and σ_ε^2. In the OLS estimators for firm ι, are shown below in equations (5) to (7). The event date is defined as $\tau = 0$. The event window is represented by $\tau = T_1 = +1$ to $\tau = T_2$. The estimation window is represented by $\tau = T_0 + 1$ to $\tau = T_1$. In the equations below $L_1 = T_1 - T_0$ and $L_2 = T_2 - T_1$. In other words L_1 is the length of the estimation window while L_2 is the length of the event window[52].

$$\hat{\beta}_\iota = \frac{\sum_{\tau=T_0+1}^{T_1}(R_{\iota\tau} - \widehat{\mu_\iota})(R_{m\tau} - \widehat{\mu_m})}{\sum_{\tau=T_0+1}^{T_1}(R_{m\tau} - \widehat{\mu_m})^2} \quad (5)$$

$$\widehat{\alpha_\iota} = \widehat{\mu_\iota} - \hat{\beta}_\iota \widehat{\mu_m} \quad (6)$$

$$\hat{\sigma}_\varepsilon^2 = \frac{1}{L_1 - 2}\sum_{\tau=T_0+1}^{T_1}(R_{\iota\tau} - \widehat{\alpha_\iota} - \hat{\beta}_\iota R_{m\tau})^2 \quad (7)$$

Where:

$$\widehat{\mu_\iota} = \frac{1}{L_1}\sum_{\tau=T_0+1}^{T_1} R_{\iota\tau} \quad (8)$$

[49] MacKinlay (1997)
[50] MacKinlay (1997)
[51] MacKinlay (1997)
[52] MacKinlay (1997)

$$\hat{\mu}_m = \frac{1}{L_1}\sum_{\tau=T_0+1}^{T_1} R_{m\tau} \quad (9)$$

The OLS estimators estimated by equations (4) to (8) is then used in the following regression model in order to estimate the abnormal return of firm i at time, τ[53].

$$AR_{i\tau} = R_{i\tau} - \hat{\alpha}_i - \hat{\beta}_i R_{m\tau} \quad (10)$$

The abnormal returns during the event window are then cumulated. The cumulative abnormal return (CAR) over an event window is calculated according to the equation:

$$CAR_i(\tau_1\tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AR_{i\tau} \quad (11)$$

The variance of the cumulative abnormal return over an event window is expressed as:

$$\sigma_i^2(\tau_1,\tau_2) = (\tau_2 - \tau_1 + 1)\sigma_\varepsilon^2 \quad (12)$$

The next step of the event study is to estimate the average cumulative abnormal return and its variance. The sample aggregated abnormal returns for period, τ, given N, number of events is[54]:

$$\overline{CAR}(\tau_1,\tau_2) = \frac{1}{N}\sum_{i=1}^{N} CAR_i(\tau_1\tau_2) \quad (13)$$

The variance of the average cumulated abnormal returns is then calculated according to the equation:

$$var\left(\overline{CAR}(\tau_1,\tau_2)\right) = \frac{1}{N^2}\sum_{i=1}^{N}\sigma_i^2(\tau_1,\tau_2) \quad (14)$$

This variance is used when calculating the test statistic in section 4.3.5.

4.3.4. Explanatory Data Analysis

Before performing the statistical tests, the abnormal returns determined by the market model are examined. The data is checked for normality and outliers using the statistics program SPSS. A normal probability plot is created for the entire sample as well as for each of the subsamples. In this way any subsamples that cannot be assumed to be normally distributed is identified. Conclusions regarding

[53] MacKinlay (1997)
[54] MacKinlay (1997)

possible subsamples whose distribution is not normal will have to be drawn solely from the non-parametric tests. The entire abnormal return data as well as the subsamples is also checked for extreme values using by conducting a stem and leaf plot.

4.3.5 Test for the significance of the results

Once equations (13) and (14) have been estimated, the null hypothesis, that the abnormal returns during an event window equal zero can be tested using the equation[55]:

$$\theta_1 = \frac{\overline{CAR}(\tau_1,\tau_2)}{\sqrt{var(\overline{CAR}(\tau_1,\tau_2))}} \sim N(0,1) \qquad (15)$$

The statistical significance of the estimated abnormal returns is tested using a two sided t-test. The two sided test is used in order to test for both positive and negative abnormal returns. The critical values for the t-test, using a 95 % significance level, is +/- 1.96. Positive abnormal returns are found when the t-value exceeds 1.96, negative abnormal returns are found when the t-values are less than -1.96. In order to provide a better view of the significance of the results, the p-values of each significance test is calculated. The p-values define at which significance level the null hypothesis is rejected.

Apart from testing the significance of the abnormal returns of all event windows, t-tests are conducted comparing the abnormal returns gained by routine and opportunistic insiders. The t-tests are conducted for all event windows and for both buy and sell transactions. Because of the unequal size of the sample sizes, their variance cannot be assumed to be equal. For this reason a Levene's t-test is conducted. The Levene's t-test is an independent samples t-test that can be used when the two samples cannot be assumed to have equal variances. The first sample in the series of t-tests is represented by abnormal returns gained after opportunistic insiders buy transactions. The second sample is represented by abnormal returns gained after routine insiders buy transactions. The t-tests are conducted comparing the abnormal returns associated with each event window respectively. In the same manner a second series of t-tests is conducted comparing the abnormal returns gained by the two groups after sell transactions. The Levene's t-tests are conducted using the statistics program SPSS. The null hypothesis in these cases is expressed as (see chapter 3 for more thorough discussion of the hypothesis):

[55] MacKinlay (1997)

H_0: There is no difference in abnormal returns gained after routine and opportunistic insiders buy transactions.

H_0: There is no difference in abnormal returns gained after routine and opportunistic insiders sell transactions.

4.4 Investigating the effects of the acquittal and the law enforcement

The abnormal returns estimated by the event study are used to determine whether there has been a change in the size of the abnormal returns before and after two events of importance for Swedish insider legislation. The first event examined is the introduction of "law: 2005:377: Penalties for Market Abuse in Trading Financial Instruments". This law came into legal force in 2005-06-01. The second event examined is the acquittal of the so called "Insider case". The date of this acquittal is 2001-06-01.

The abnormal returns before and after these two dates are investigated using an independent samples t-test. The null hypotheses are in both cases are (see chapter 3 for a deeper review of the hypotheses):

H_0: There is no difference in the abnormal returns gained by insiders before and after the event.

All the abnormal returns gained by insiders before and after the events during all six event windows respectively are compared. Since the two samples are of unequal size, their variances are also assumed to be unequal. For this reason the independent samples t-test is conducted. The first sample is represented by the abnormal returns gained by the insiders before the event and the second sample is represented by the abnormal returns gained after the event.

4.5 Mann-Whitney test

A Mann-Whitney test is performed in order to improve the credibility of the results. The Mann-Whitney U test (sometimes called the Wilcoxon rank-sum test) is a non-parametric test used on two independent samples. The Mann-Whitney test assesses whether the samples have equally large values. The test is conducted by ranking all observations of both samples by their size. Each observation is then given a rank number. The sum of ranks can then be calculated by simply adding the rank numbers of the two

samples respectively. The sum of ranks is denoted *U*. The critical z-value is the calculated using the mean and standard deviation of *U* in the equation[56]:

$$z = \frac{U - E(U)}{\sigma_U} \qquad (16)$$

Where:

$$E(U) = \frac{n_1 n_2}{2}$$

$$\sigma_U = \frac{n_1 n_2 (n_1 + n_2 + 1)}{12}$$

The Mann-Whitney test is conducted using the statistics program SPSS.

4.6 Validity and Reliability

The reliability of this study is upheld by using reliable data sources and through double checking parts of the data. Another way in which the reliability is enhanced is through the use of logarithmic instead of discrete returns.

Potential drawbacks on the reliability of this study include the fact that the future beta values of the market model are calculated on basis of historical price data. Thereby the beta value used as a risk measure is only a proxy of the future beta values. The beta values play an essential role in determining the abnormal returns. Even though this disadvantage, the market model is assumed to be the most suitable method for this study (see section 4.3 for a discussion of various possible methods).

The most crucial procedure, threatening both the reliability and the validity of the study is assumed to be the classification of the insiders into routine and opportunistic traders. Since the true motives for the insiders buy or sell transactions is unknown, it is quite impossible to determine whether any of the insiders is trading on a truly opportunistic basis. Even though not all insiders will be classified in the correct group regarding their motives for trading, it can be assumed that the group classified as opportunistic will be trading on a more opportunistic basis than the group classified as routine, and vice

[56] Acxel & Sounderpandian (2002)

versa. This fact combined with the fact that insiders are classified in accordance to the consistent rules discussed earlier, makes it possible to draw conclusions based on the results of the study. A fact that may however decrease the significance of the results is that the methods of classifying the insiders is not continuous, i.e. insiders are defined as routine or opportunistic based on their trading behavior during the first few years of the investigated period. This will not be a problem as long as the insider's motives for trading do not change, however this cannot be taken for granted. Further any persons gaining an insider status in a firm after the classification period, e.g. in 2008, is automatically defined as opportunistic. This fact may decrease the significance of the opportunistic insider's abnormal returns.

Regarding the examination of the abnormal returns gained by insiders in connection to the law enforcement in 2005 and the acquittal of the "Insider case" in 2010, there may be difficulties in assessing the results. Especially when it comes to the longer terms event windows it can be hard to determine whether any higher or lower abnormal returns after the event date is due to the event itself or some other circumstances.

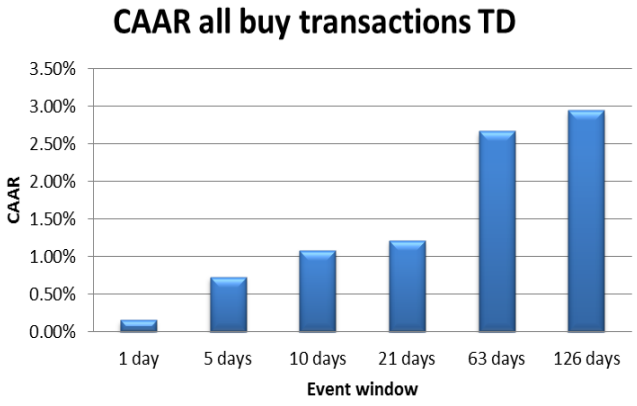
5. Results

5.1 Explanatory data analysis

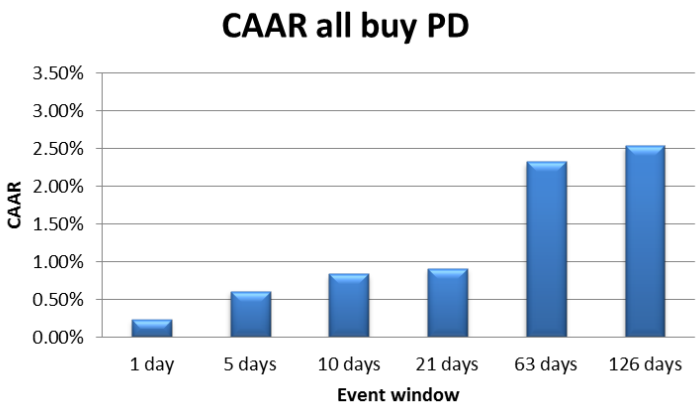
The normality probability plots for the whole sample as well as for each of the subsamples shows the distribution of all samples can be regarded as normal. The stem leaf plot shows that none of the subsample has any significant amount of outliers. The number of outliers (bach leaf outliers) in each of the subsamples represent less than 0,2 % of the total number of values in the samples. Based on their uncommonness, these outliers are not excluded from the respective sample. A summary of the data analysis can be found in Appendix 2a and 2b.

5.2 Cumulative average abnormal return, all transactions

The cumulative average abnormal return (from now on CAAR) determines the average abnormal return of all chosen transactions. Graph 2 illustrates CAAR for all buy transactions with day 1 of the event window being the same day as the transaction date (TD). Graph 3 illustrates the transactions but this time with day 1 of the event window being the publication date (PD). Almost all TD CAARs are higher than the PD CAARs.



Graph 1. CAAR all buy transactions TD



Graph 2. CAAR all buy transactions PD

Table 2 and 3 below shows test statistics and significance for graph 2 and 3. All CAARs are highly statistically significant.

All Buy transaction date						
Event window	1 day	5 days	10 days	21 days	63 days	126 days
CAAR	0.15%***	0.72%***	1.0%***	1.2%***	2.6%***	2.9%***
Number of transactions	12566	12542	12500	12425	12214	11877
Test Statistic (θ)	3.62	9.76	10.65	8.45	10.71	8.26

*p<0.05 **p<0.01 ***p<0.001

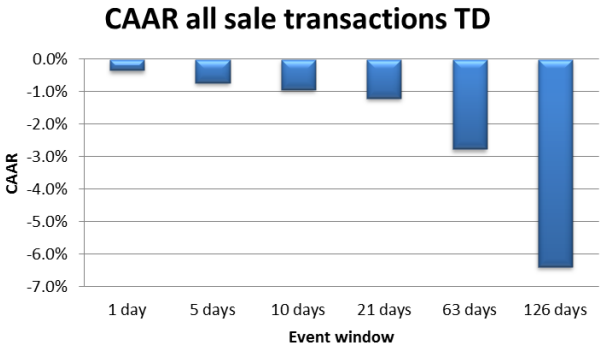
Table 2. Statistical test on all buy transactions TD

All Buy publication date						
Event window	1 day	5 days	10 days	21 days	63 days	126 days
CAAR	0.22%***	0.60%***	0.83%***	0.90%***	2.3%***	2.5%***
Number of transactions	12566	12542	12500	12425	12214	11877
Test Statistic (θ)	5.32	8.12	8.27	6.29	9.27	6.98

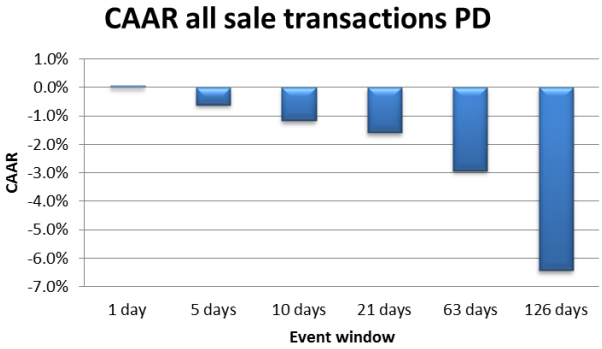
*p<0.05 **p<0.01 ***p<0.001

Table 3. Statistical test on all buy transactions PD

Graph 3 illustrates all sell transactions with day 1 of the event window being the same day as the transaction date (TD). Graph 4 illustrates the same data but with the first day of the event being the publication date (PD). The sell PD CAARs are almost all lower but very similar to the sell TD CAARs.



Graph 3. CAAR all sell transactions TD



Graph 4. CAAR all sell transactions PD

Table 4 and 5 exhibits test statistics and significance for graph 4 and 5. All CAARs are highly statistically significant except the 1 day TD event window.

All Sell transaction date						
Event window	1 day	5 days	10 days	21 days	63 days	126 days
CAAR	0.08%	-0.61%***	-1.1%***	-1.5%***	-2.9%***	-6.4%***
Number of transactions	6111	6103	6089	6040	5923	5674
Test Statistic (θ)	1.15	-5.07	-7.04	-6.78	-7.17	-10.86

*p<0.05 **p<0.01 ***p<0.001

Table 4. Statistical test on all sell transactions TD

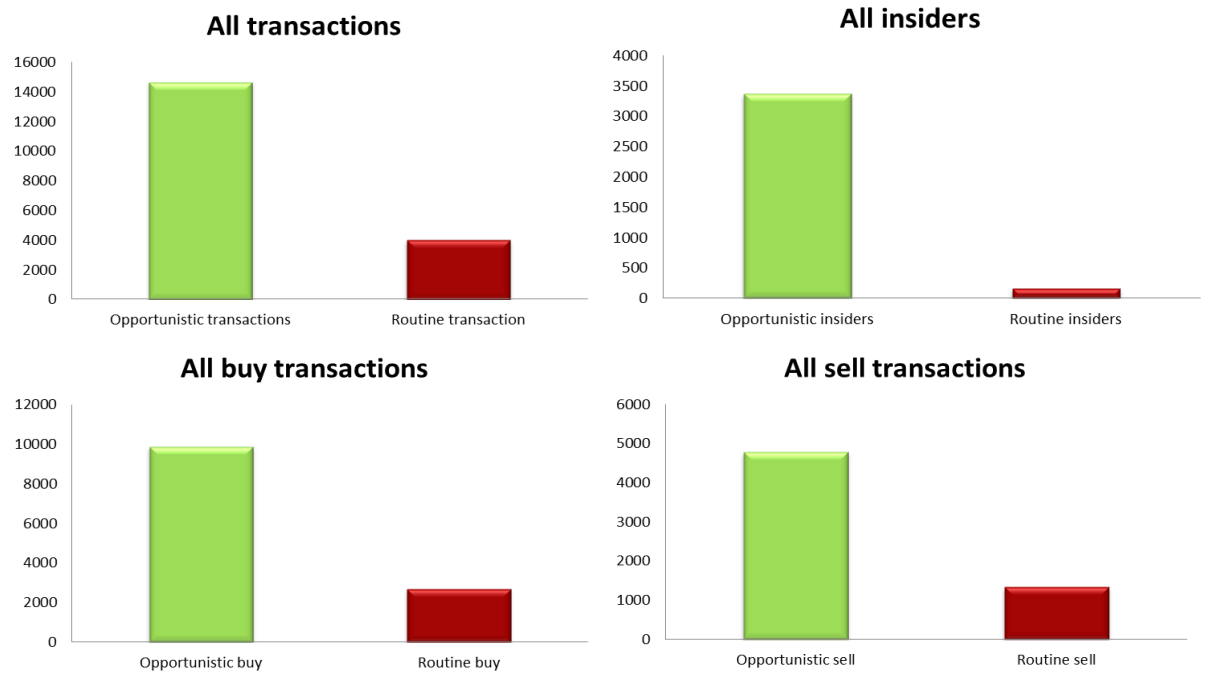
All Sell publication date						
Event window	1 day	5 days	10 days	21 days	63 days	126 days
CAAR	-0.33%***	-0.71%***	-0.92%***	-1.1%***	-2.7%***	-6.3%***
Number of transactions	6111	6103	6089	6040	5923	5674
Test Statistic (θ)	-4.73	-5.83	-5.58	-5.05	-6.70	-10.56

*p<0.05 **p<0.01 ***p<0.001

Table 5. Statistical test on all sell transactions PD

5.3 Classification original method

Graph 5 illustrates the distribution of opportunistic versus routine insiders in accordance with the first classification filter. Even though the number of routine insiders is very small in comparison to the amount of opportunistic insiders, (about 4.5 percent of the entire population), they still account for almost 22 percent of the transaction universe[57]. The distribution between routine sales and opportunistic sales has the same relation as the distribution between routine buys and opportunistic buys.



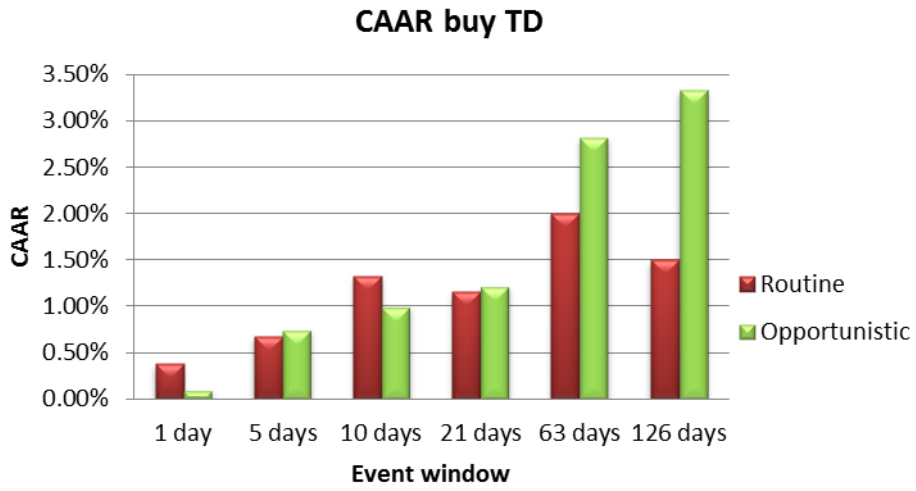
Graph 5. Distribution of routine and opportunistic traders and transaction according to the original method

5.3.1 Cumulative average abnormal return, original method

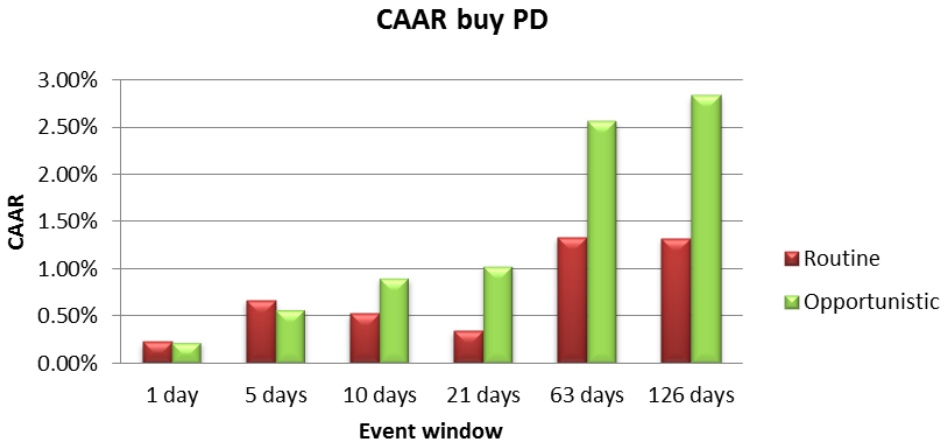
Graph 6 shows the CAAR for all routine and opportunistic buy transactions with day 1 of the event window being the same day as the publication date (TD). Graph 7 illustrates all routine and opportunistic

[57] Graph 5.

buy transactions (PD). Almost all opportunistic CAARs are higher than the routine CAARs for both PD and TD. The opportunistic insiders 126 day event's CAAR is more than twice as high as the routine insiders[58].



Graph 6. CAAR, buy transactions TD, routine respective opportunistic



Graph 7. CAAR, buy transactions PD, routine respective opportunistic

[58] Graph 6 and 7

Table 6 exhibits t-test and Mann-Whitney test with H_0 being; that opportunistic buy abnormal return TD is equal to routine buy abnormal return TD. The mean differences are positive when the abnormal returns of the opportunistic insiders are higher than those of the routine insiders.

Event Length window	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
T-test; H0: Opportunistic buy abnormal return = Routine buy abnormal return TD						
t	-3.057	0.418	-1.476	0.229	1.692	2.76
df	3662.765	4361.79	4077.664	4251.534	4349.843	4329.835
Mean difference	**-0,0028****	0.0006	-0.0032	0.0007	0.0082	**0.0183****
Significance (two-tailed)	0.002	0.676	0.14	0.819	0.091	0.006
Mann-Whitney test; H0: Opportunistic buy abnormal return = Routine buy abnormal return TD						
Mean rank of abnormal ret. after opportunistic transactions pub.	6229,4*	6252.26	6218.67	**6203.41**	6091.72	**5942.18**
Mean rank of abnormal ret. after routine transactions pub.	**6426,94***	**6286.2**	**6311.65**	6192.14	**6109.18**	5877.4
Z-value	-2.502	-0.43	-1.181	-0.144	-0.225	-0.852
2-tailed significance	0.012	0.667	0.237	0.886	0.822	0.394

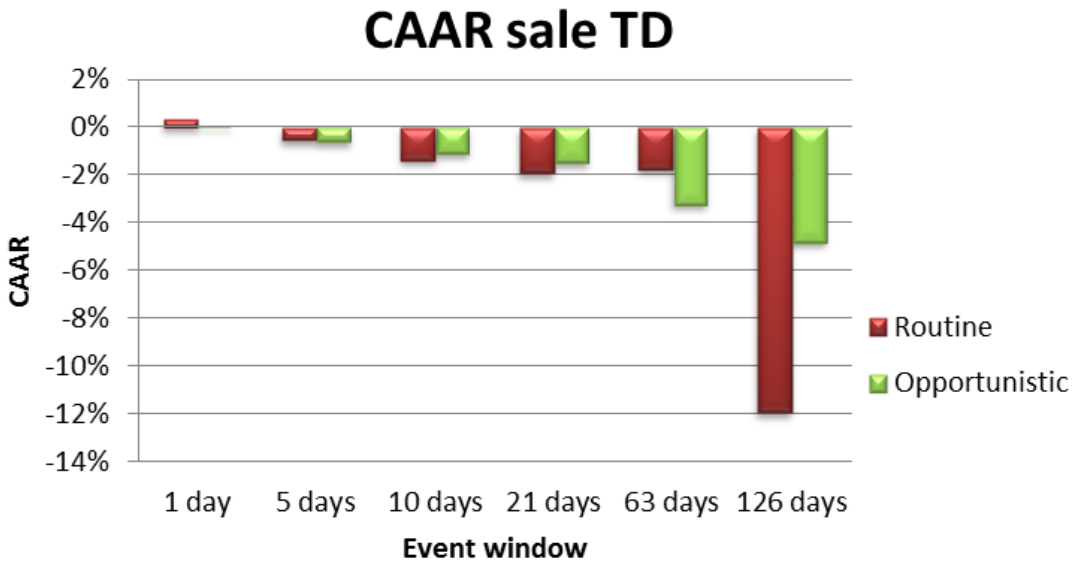
Table 6. H_0 statistical tests on all buy transactions TD

Table 7 shows independent samples T-test and Mann-Whitney test with H_0 being; that opportunistic buy abnormal return PD is equal to routine buy abnormal return PD.

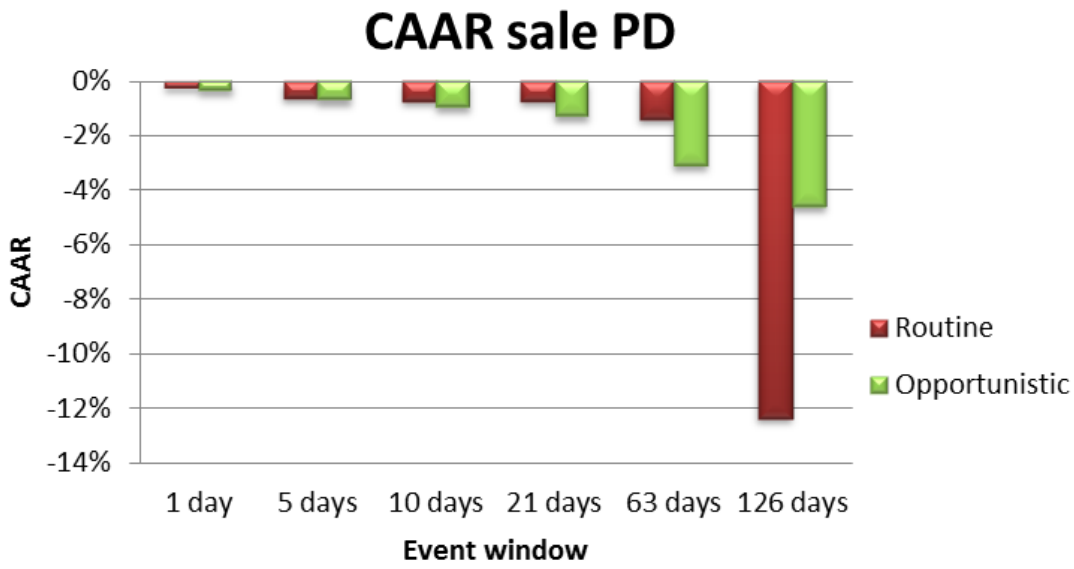
Event length window	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
T-test; H0: Opportunistic buy abnormal return = Routine buy abnormal return PD						
t	-0.022	-0.356	0.99	2.229	2.195	2.177
df	4864.527	3150.386	3052.785	4222.05	3927.096	4188.212
Mean difference	0.0000	-0.0009	0.0038	**0,0068***	**0,01228***	**0,0151***
Significance (two-tailed)	0.983	0.722	0.322	0.026	0.028	0.03
Mann-Whitney test; H0: Opportunistic buy abnormal return = Routine buy abnormal return PD						
Mean rank of abnormal ret. after opportunistic transactions pub.	6243.08	6255.65	**6284,2****	6223.15	**6125.12**	**5951.24**
Mean rank of abnormal ret. after routine transactions pub.	**6376.42**	**6271.34**	6069,95**	**6117.35**	5988.21	5845.07
Z-value	-1.689	-0.199	-2.722	-1.35	-1.769	-1.397
2-tailed significance	0.091	0.842	0.006	0.177	0.077	0.163

Table 7. H_0 statistical tests on all buy transactions PD

Graph 8 displays CAAR for both routine and opportunistic classified sell transactions (TD). Graph 9 shows CAAR for the two groups with the event defined as the publication date (PD). CAAR for 126 days routine sell is almost three times as high as the respective opportunistic CAAR.



Graph 8. CAAR for all sell transactions TD, divided into routine or opportunistic



Graph 9. CAAR for all sell transactions PD, divided into routine or opportunistic

Table 8 displays t-test and Mann-Whitney test with H_0 being; that opportunistic sell abnormal return TD is equal to routine sell abnormal return TD. Higher abnormal returns of the opportunistic insiders result in positive mean differences.

Event Length window	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
T-test; H0: Opportunistic sale abnormal return = Routine sale abnormal return TD						
t	-2.509	-0.469	0.854	0.941	-1.971	5.461
df	2398.932	2582.516	2402.294	2129.837	2054.659	1657.236
Mean difference	-0,0033*	-0.0011	0.00267	0.0042	**-0,0149***	**0,0711****
Significance (two-tailed)	0.012	0.639	0.393	0.347	0.049	0.000
Mann-Whitney test; H0: Opportunistic buy abnormal return = Routine buy abnormal return TD						
Mean rank of abnormal ret. after opportunistic transactions pub.	3036.55	**3051.2**	**3054.17**	**3014.51**	2913,74***	**2859,09***
Mean rank of abnormal ret. after routine transactions pub.	**3096.02**	3025.05	2982.37	3012.2	**3105,17*****	2736,76*
Z-value	-1.089	-0.479	-1.318	-0.043	-3.577	-2.353
2-tailed significance	0.276	0.632	0.188	0.966	0.00000	0.019

Table 8. H_0 statistical tests on all sell transactions TD

Table 9 displays t-test and Mann-Whitney test with H_0 being; that opportunistic sell abnormal return PD is equal to routine sell abnormal return PD.

Event Length window	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
T-test; H0: Opportunistic sale abnormal return = Routine sale abnormal return PD						
t	-1.013	-0.473	-0.718	-1.218	-2.241	5.984
df	3456.237	2162.606	2234.582	1975.549	2007.199	1670.007
Mean difference	-0.0012	-0.0011	-0.0021	-0.0057	**-0,0170***	**0,0774****
Significance (two-tailed)	0.311	0.636	0.473	0.223	0.025	0.000
Mann-Whitney test; H0: Opportunistic sale abnormal return = Routine sale abnormal return PD						
Mean rank of abnormal ret. after opportunistic transactions pub.	3045.89	**3054.01**	**3049.52**	3007.98	**2909,9*****	**2859,92***
Mean rank of abnormal ret. after routine transactions pub.	**3062.45**	3015	2999.03	**3035.4**	**3118,71*****	2733,89*
Z-value	-0.3030	-0.7150	-0.9270	-0.5060	-3.9020	-2.4250
2-tailed significance	0.7620	0.4750	0.3540	0.6130	0.0000	0.0150

Table 9. H_0 statistical tests on all sell transactions PD

5.4 Classification, alternative method

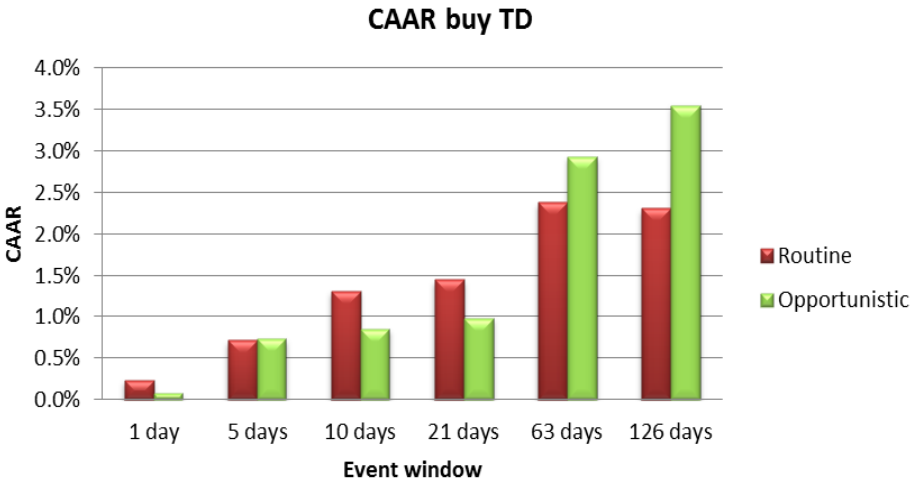
Graph 10 demonstrates the distribution of opportunistic versus routine insiders in accordance with our second method of classifying transactions. Even though the number of routine insiders is much smaller than the amount of opportunistic, they account for almost exactly half transaction universe[59]. The distributions between routine sales and opportunistic sales have nearly the same relation as the distribution between routine buys and opportunistic buys.

Graph 10. Group distribution of all transactions and insiders alternative method

[59] Graph 10

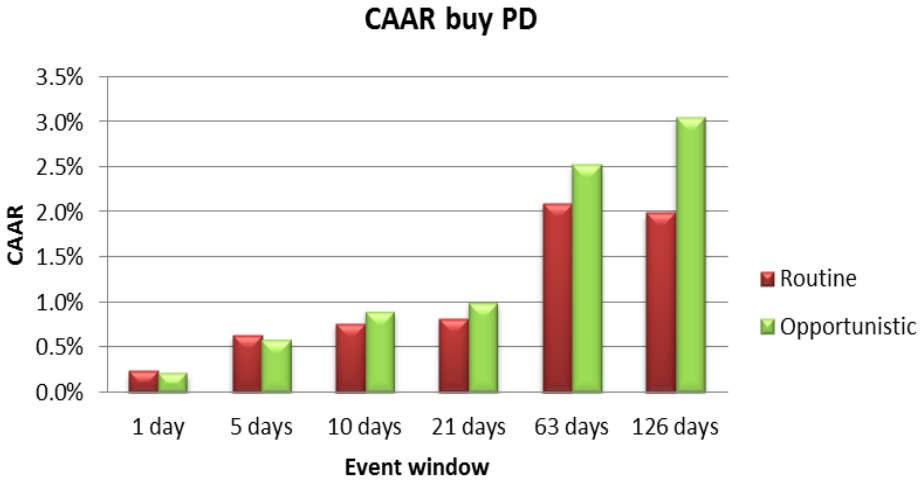
5.4.1 Cumulative average abnormal, alternative method

Graph 11 shows CAAR for all routine and opportunistic buy transaction TD. The routine CAARs are higher for the four shortest event windows (1 day – 21 days) but slightly lower for the two longest (63 days – 126 days).



Graph 11. CAAR for all buy transactions TD, divided into routine or opportunistic alternative method

Graph 12 illustrates CAAR for all routine and opportunistic buy transaction PD. The routine CAARs are higher for the two shortest event windows (1 day – 5 days) but slightly higher for the four longest (10 days – 126 days).



Graph 12. CAAR for all buy transactions PD, divided into routine and opportunistic alternative method

Table 10 shows t-test and Mann-Whitney test with H_0 being; that opportunistic buy abnormal return TD is equal to routine buy abnormal return TD.

Event length window	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
T-test; H0: Opportunistic buy abnormal return = Routine buy abnormal return TD						
t	-2.504	0.132	-2.592	-1.846	1.344	2.213
df	11776.572	12417.083	12330.854	12318.638	12205.202	11759.537
Mean difference	**-0,0016****	0.0001	**-0,0045****	-0.0046	0.0055	**0,0124***
Significance (two-tailed)	0.01	0.895	0.01	0.065	0.179	0.027
Mann-Whitney test; H0: Opportunistic buy abnormal return = Routine buy abnormal return TD						
Mean rank of abnormal ret. after opportunistic transactions pub.	6175,73***	6215.71	6141,67***	6109,37***	6081.28	5922.41
Mean rank of abnormal ret. after routine transactions pub.	**6399,09*****	**6331.25**	**6366,93*****	**6323,12*****	**6134.98**	**5956.12**
Z-value	-3.449	-1.786	-3.488	-3.32	-0.841	-0.536
2-tailed significance	0.001	0.074	0	0.001	0.4	0.592

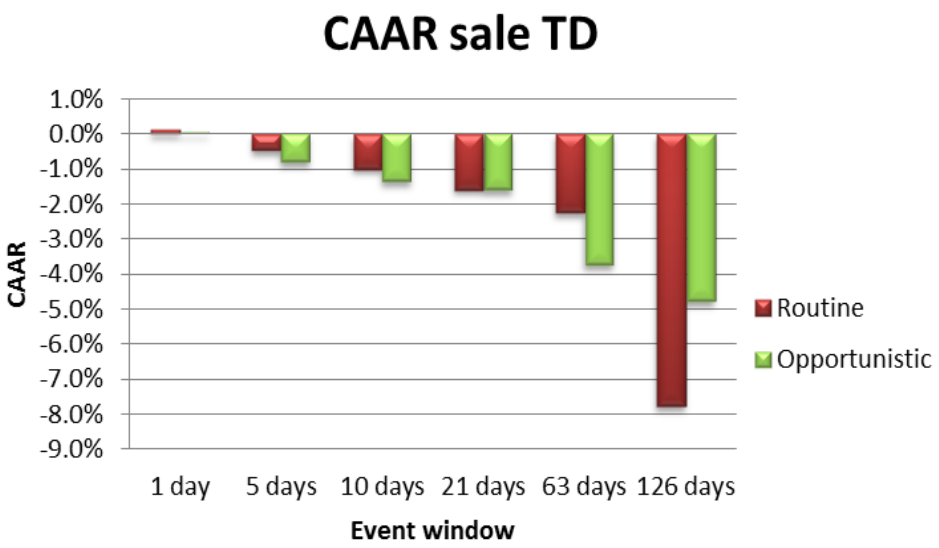
Table 10. Statistical tests on all buy transactions TD, classification alternative method

Table 11 shows t-test and Mann-Whitney test with H_0 being; that opportunistic buy abnormal return PD is equal to routine buy abnormal return PD. Higher abnormal returns of the opportunistic insiders result in positive mean differences in the table below.

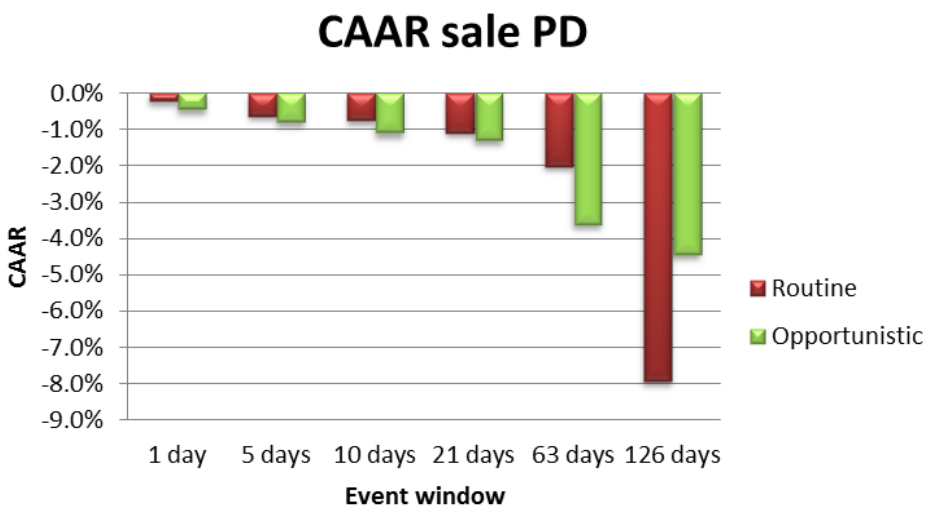
Event length window	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
T-test; H0: Opportunistic buy abnormal return = Routine buy abnormal return PD						
t	-0.362	-0.313	0.608	0.738	0.976	1.836
df	11227.261	11232.118	10904.805	12396.694	12190.426	11762.177
Mean difference	-0.0002	-0.0005	0.0014	0.0019	0.0043	0.0106
Significance (two-tailed)	0.717	0.754	0.543	0.461	0.329	0.066
Mann-Whitney test; H0: Opportunistic buy abnormal return = Routine buy abnormal return PD						
Mean rank of abnormal ret. after opportunistic transactions pub.	6206,45*	6254.41	6245.05	6175.82	6100.53	5938.84
Mean rank of abnormal ret. after routine transactions pub.	**6366,14***	**6289.8**	**6256.33**	**6252.51**	**6114.81**	**5939.16**
Z-value	-2.466	-0.547	-0.175	-1.191	-0.224	-0.005
2-tailed significance	0.014	0.584	0.861	0.234	0.823	0.996

Table 11. Statistical tests on all buy transactions PD, classification alternative method

Graph 13 displays CAAR for all routine respective opportunistic sell transactions (TD). The opportunistic CAARs are slightly larger for all event windows except for the 126 days event. Graph 14 shows the same transactions data as graph 13, but with the event window for each transaction starting at publication date (PD).



Graph 13. CAAR for all sell transactions TD, divided into routine and opportunistic



Graph 14. CAAR for all sell transactions PD, divided into routine and opportunistic

Table 13 displays t-test and Mann-Whitney test with H_0 being; that opportunistic sell abnormal return TD is equal to routine sell abnormal return TD.

Event length window	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
T-test; H0: Opportunistic sale abnormal return = Routine sale abnormal return TD						
t	-0.922	-1.475	-1.229	-0.017	-2.402	3.341
df	5610.768	5141.209	5557.049	5696.318	5578.135	5608.591
Mean difference	-0.0011	-0.0035	-0.0035	-0.0001	**-0.0149***	**0.0299****
Significance (two-tailed)	0.357	0.14	0.219	0.986	0.016	0.001
Mann-Whitney test; H0: Opportunistic sale abnormal return = Routine sale abnormal return TD						
Mean rank of abnormal ret. after opportunistic transactions pub.	3045.62	3037.01	3018.9	3002.77	2851,66***	2833.21
Mean rank of abnormal ret. after routine transactions pub.	**3065.11**	**3065.13**	**3067.77**	**3035.81**	**3055,51*****	**2840.98**
Z-value	-0.431	-0.622	-1.082	-0.734	-4.572	-0.178
2-tailed significance	0.666	0.534	0.279	0.463	0	0.859

Table 13. Statistical tests on all sell transactions TD, classification alternative method

Table 12 displays t-test and Mann-Whitney test with H_0 being; that opportunistic sell abnormal return PD is equal to routine sell abnormal return PD. Positive mean differences implies that the abnormal returns associated with opportunistic insider transactions are larger.

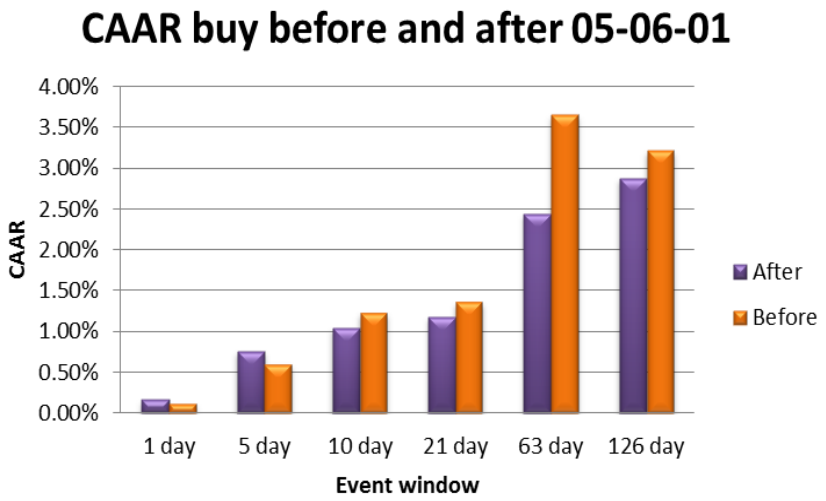
Event length window	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
T-test; H0: Opportunistic sale abnormal return = Routine sale abnormal return PD						
t	-1.707	-0.858	-1.403	-0.574	-2.601	3.877
df	3755.988	5535.225	5761.713	5788.163	5625.589	5570.248
Mean difference	-0.0023	-0.0017	-0.0036	-0.0021	**-0,0160****	**0,0349*****
Significance (two-tailed)	0.088	0.391	0.161	0.566	0.009	0.000
Mann-Whitney test; H0: Opportunistic sale abnormal return = Routine sale abnormal return PD						
Mean rank of abnormal ret. after opportunistic transactions pub.	3039.21	3046.54	3035.56	3014.01	2855,96***	**2849.69**
Mean rank of abnormal ret. after routine transactions pub.	**3070.74**	**3056.78**	**3053.23**	**3026.1**	**3051,87*****	2827.62
Z-value	-0.697	-0.227	-0.391	-0.269	-4.394	-0.504
2-tailed significance	0.486	0.821	0.696	0.788	0	0.614

Table 12. Statistical tests on all sell transactions PD, classification alternative method

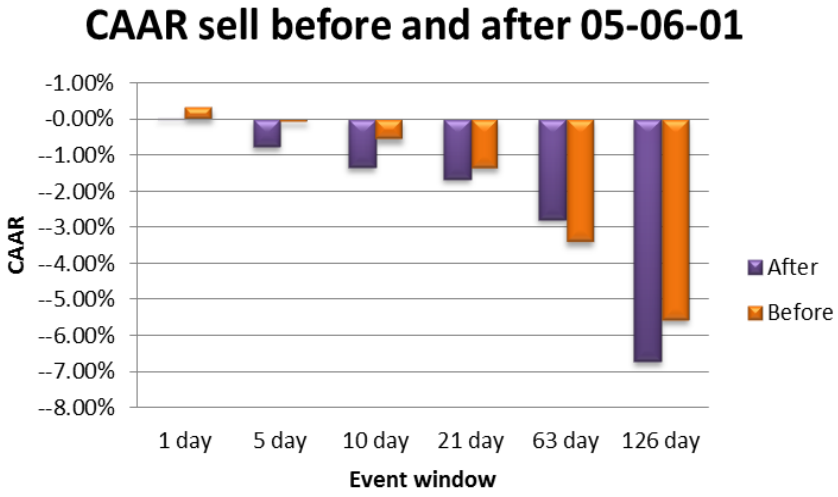
5.5 CAAR before and after regulations and acquittals

Graph 15 and 16 shows CAAR on all buy respective all sell transactions before and after the new regulation, Penalties for Market Abuse in Trading Financial Instruments act of 2005, came into force.

Almost all buy events have lower CAARs after the new law came into force[60]. Most sell event windows have higher negative CAARs after the new law came into force[61].



Graph 15. CAAR buy transactions before and after the new regulation



Graph 16. CAAR sell transactions before and after the new regulation

[60] Graph 15
[61] Graph 16

Table 14 displays t-test and Mann-Whitney test with H_0 being; that buy transactions abnormal return before 2005-06-01 (the day of the law enforcement) TD, is equal to buy transactions abnormal return after 2005-06-01 TD. The mean differences are positive when the abnormal returns found before the date is larger.

Event length window	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
T-test; H0: Buy abnormal return before 2005-06-01 = Buy abnormal return after 2005-06-01 TD						
t	-0.488	-0.954	0.85	0.545	2.335	0.54
df	3356.612	3502.002	3470.516	3230.269	3465.122	4107.695
Mean difference	-0.0004	-0.0015	0.0019	0.0019	**0,0121***	0.0034
Significance (two-tailed)	0.626	0.34	0.395	0.586	0.02	0.589
Mann-Whitney test; H0: Buy abnormal return before 2005-06-01 = Buy abnormal return after 2005-06-01 TD						
Mean rank of abnormal ret. after date	6233,93**	6251.61	6200,77**	6182.03	6025,34***	5875,58***
Mean rank of abnormal ret. before date	**6472,7****	**6327.6**	**6439,14****	**6317.31**	**6430,98*****	**6172,95*****
Z-value	-2.851	-0.909	-2.86	-1.632	-4.968	-3.733
2-tailed significance	0.004	0.363	0.004	0.103	0.000	0.000

Table 14. Statistical tests on all buy transactions before and after the day of the new law enforcement 2005-06-01

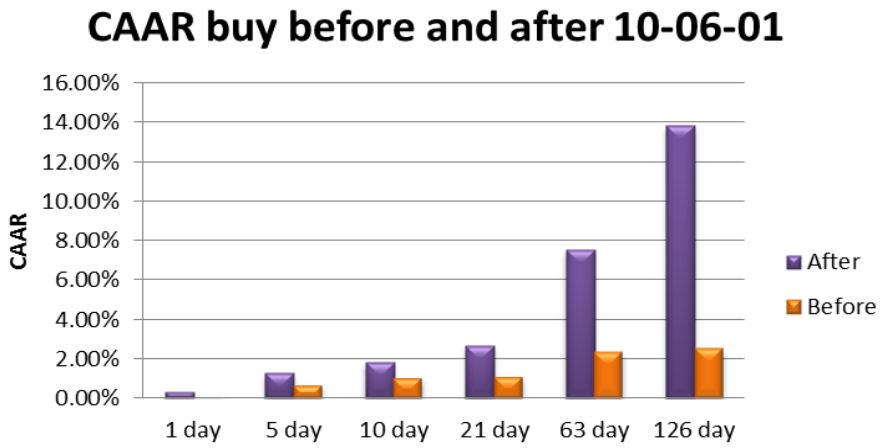
Table 15 displays t-test and Mann-Whitney test with H_0 being; that sell transactions abnormal return before 2005-06-01 (the day of the law enforcement) TD, is equal to sell transactions abnormal return after 2005-06-01 TD.

Event length window	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
T-test; H0: Sale abnormal return before 2005-06-01 = Sale abnormal return after 2005-06-01 TD						
t	2.547	2.812	2.32	0.678	-0.877	1.18
df	2805.502	2733.948	2281.412	2179.056	2306.247	2677.874
Mean difference	**0.0031***	**0.0068****	**0.0076***	0.0031	-0.0063	0.0114
Significance (two-tailed)	0.011	0.005	0.02	0.498	0.381	0.238
Mann-Whitney test; H0: Sale abnormal return before 2005-06-01 = Sale abnormal return after 2005-06-01 TD						
Mean rank of abnormal ret. after date	3034.55	3027.47	3012,55*	3009.09	2937.8	2793,45**
Mean rank of abnormal ret. before date	**3117.36**	**3123.98**	**3144,28***	**3046.42**	**3030.03**	**2964,54****
Z-value	-1.528	-1.782	-2.438	-0.696	-1.747	-3.362
2-tailed significance	0.127	0.075	0.015	0.487	0.081	0.001

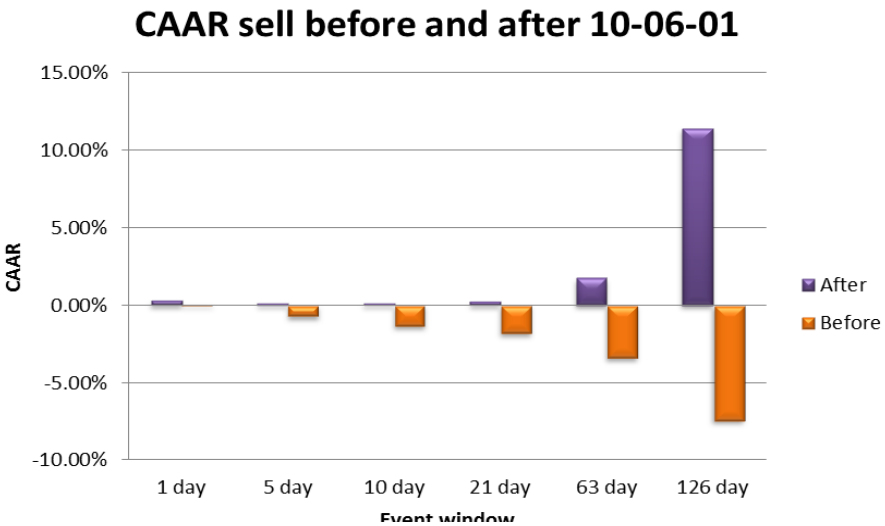
Table 15. Statistical tests on all sell transactions before and after the day of the new law enforcement 2005-06-01

Graph 17 and 18 shows all buy respective sell transactions CAAR before and after the acquittal of the "Insider case" on June 1st 2010. All buy event CAARs are higher after the acquittal, 126 days event

windows CAAR is almost seven times higher after the acquittal as before[62]. All sell CAARs are more negative before the acquittal[63].



Graph 17. CAAR buy transactions before and after the new regulation



Graph 18. CAAR sell transactions before and after the new regulation

[62] Graph 17
[63] Graph 18

Table 16 displays t-test and Mann-Whitney test with H_0 being; that buy transactions abnormal return before 2010-06-01 (the day of the acquittal) TD, is equal to buy transactions abnormal return after 2010-06-01 TD. The negative mean differences in the tables below means that the abnormal returns found after the date is larger.

Event length window	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
T-test; H0: Buy abnormal return before 2010-06-01 = Buy abnormal return after 2010-06-01 TD						
t	-2.198	-3.391	-3.668	-4.881	-7.948	-8.176
df	1646.101	1475.605	1523.025	1402.189	946.283	481.794
Mean difference	**-0.0018***	**-0.0060*****	**-0.0081*****	**-0.0156*****	**-0.0522*****	**-0.1133*****
Significance (two-tailed)	0.028	0.001	0.000	0.000	0.000	0.000
Mann-Whitney test; H0: Buy abnormal return before 2010-06-01 = Buy abnormal return after 2010-06-01 TD						
Mean rank of abnormal ret. after date	**6588,53****	**6620,1****	**6777,57*****	**6783,36*****	**7128,03*****	**7472,89*****
Mean rank of abnormal ret. before date	6248,39**	6232,84**	6197,03***	6159,29***	6034,24***	5873,94***
Z-value	-2.965	-3.353	-4.954	-5.18	-8.268	-9.629
2-tailed significance	0.003	0.001	0.000	0.000	0.000	0.000

Table 16. Statistical tests on all buy transactions before and after the day of the acquittal 2010-06-01

Table 17 displays t-test and Mann-Whitney test with H_0 being; that sell transactions abnormal return before 2010-06-01 (the day of the acquittal) TD, is equal to sell transactions abnormal return after 2010-06-01 TD.

Event length window	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
T-test; H0: Sale abnormal return before 2010-06-01 = Sale abnormal return after 2010-06-01 TD						
t	-1.814	-3.83	-5.172	-5.343	-7.896	-15.35
df	1210.787	1510.797	1376.148	1267.474	959.15	393.047
Mean difference	-0.0024	**-0.0085*****	**-0.0146*****	**-0.0204*****	**-0.0515*****	**-0.1882*****
Significance (two-tailed)	0.07	0	0	0	0	0
Mann-Whitney test; H0: Sale abnormal return before 2010-06-01 = Sale abnormal return after 2010-06-01 TD						
Mean rank of abnormal ret. after date	**3164.3**	**3242****	**3328,75*****	**3357,74*****	**3498,33*****	**4056,31*****
Mean rank of abnormal ret. before date	3037.1	3022,5**	3003,93***	2975,64***	2904,93***	2768,02***
Z-value	-1.814	-3.12	-4.588	-5.266	-7.627	-13.021
2-tailed significance	0.07	0.002	0.000	0.000	0.000	0.000

Table 17. Statistical tests on all sell transactions before and after the day of the acquittal 2010-06-01

6. Analysis

6.1 Abnormal returns on all transactions

The vast majority of prior American empirical studies on insider trading indicate that insiders can, and do, use their informational advantage to gain abnormal returns[64]. Li and Nogeman's recent study on the Swedish market based on data between 2004 and 2008 is consistent with these prior American studies[65], and so are the results of this study.

Our results show a highly statistically significant average abnormal return above zero for all transaction dates (TD), and publication dates (PD) buy event windows. All CAARs except the one day event window are higher for the TD than for PB event windows[66]. This can be interpreted as evidence of presence of the signaling effect and the implication it is argued to have on the stocks performance on the one day event window. The large data sample has most likely influenced the significance in a positive way.

All sell CAARs, except the one day TD event window CAAR, are statistically significant and negative. This, in combination with all buy CAARs being positive gives strong indication that the Swedish market is not operating at strong efficiency and that there is value in observing insider transactions since they communicate information to the market. The one day PD event window's CAAR is higher than the respective TD CAAR, this is consistent with our previously argued evidence of presence of the signaling effect[67]. This evidence implies that the Swedish market is operating at a semi-strong form, with all new public information being processed at an instant.

Abnormal returns associated with sales transactions are much higher than abnormal returns associated with buy transactions (high abnormal returns in connection to sell transactions means negative abnormal returns). This may be considered as evidence that insiders are better at recognizing when their company is overvalued than when it is undervalued. The 126 day event sell TD CAAR is more than twice as high as the respective sell event window CAAR.

[64] e.g. Seyhun (1986), Cohen et al. (2010)
[65] Li and Nogeman (2008)
[66] Table 2 and Table 3
[67] Table 4 and Table 5

6.2 Comparing opportunistic and routine insider abnormal return, original classification method

While using the same classification method as us Cohen et al. find, that both opportunistic buys and opportunistic sales are strongly predictive of future returns, while routine sales and buys are not. Our results show the same tendency as their study with almost all opportunistic buy PD and TD CAARs being higher than the respective routines. This implies that the classification method is successful at determining which transactions that are based on information advantages. The differences between the abnormal returns of the opportunistic and the routine transactions are however not statistically significant during all event windows. The differences are significant during the longer term event windows, i.e. one month, three, months and half a year[68]. The fact that these three event windows all show higher abnormal returns than their respective event window for all buy transactions (both TD and PD), furthers our belief that the classification is successful when it comes to buy transactions.

The results for sell transactions are somewhat contradictive to what our buy results imply. Cohen et al. find the relation between opportunistic sales and routine sales to be similar to their buy results. This is not our case, the two event windows showing statistically significant results are contradictive to each other, with one showing that opportunistic sales earn higher CAAR than the routine sales (63 days), and one showing that routine sales earn more than twice the CAAR of opportunistic sales (126 days)[69]. This ambiguous result leads us to disbelieve the classification models efficiency at extracting which sales that are initiated by information advantages.

6.3 Comparing opportunistic and routine insiders abnormal return, alternative classification method

The alternative classification model divided the transaction universe in half[70]. The results are similar to the first classification method but slightly more ambiguous. Buy TD alternative method has three statistically significant event windows according to the independent samples T-test. Two of these (1day

[68] Table 6 and Table 7
[69] Table 8 and Table 9
[70] Graph 10

and 10 days) show routine CAARs that are higher than the opportunistic while one (126 days) shows an opportunistic CAAR that is higher than the routine[71]. This result suggests that the original classification method is superior the alternative at stripping the transaction universe from uninformative transactions. Yet the two longest event windows (TD buy) shows higher CAARs for the alternative classification than for the original classification which implies that the alternative classification method is better at determining which transactions that are based on information advantages in the long term. PD buy shows higher opportunistic CAARs for almost all events but none of the CAARs are statistically significant[72].

The results for sell are also similar to the original classification method results. The same two event windows that show statistical significance and the results are contradictive to each other in the similar fashion as before, with one showing that opportunistic sales earn higher CAAR than the routine sales (63 days), and one showing that routine sales earn more than twice the CAAR of opportunistic sales (126 days)[73]. The biggest difference is that the spread between opportunistic and routine sell CAAR for the two events is smaller for the alternative classification method. This indicates that the alternative method is slightly more efficient at extracting which sales that are initiated by information advantages.

6.4 Summary of comparisons between opportunistic and routine insiders

As mentioned before our results may seem a bit ambiguous and are not entirely consistent with Cohen et al.'s results of their previous study on the American market. Nonetheless, our two longest buy event windows (63 days and 126 days) for both classification methods show strong statistical significance and much higher CAARs for the opportunistic trades than the routine. This result shows that by using a simple statistical method we are able to filter the transaction universe and identify insiders as either opportunistic or routine traders. Through stripping away the less informative transactions, we are left with a set of transactions that are based on potentially security price altering information. These transactions have the ability to reduce the information asymmetry between insiders and the market and act as predictors of the future returns of the firms stock.

[71] Table 10
[72] Table 11
[73] Table 12 and Table 13

Our result on sell transactions is not as clear and intuitive as buy transactions. Both methods have two statistically significant results according to the independent samples T-test and in both cases these results contradict each other. The ambiguity of our results makes it impossible to draw a general conclusion about the two methods ability to filter the transactions based on their information value. This result is consistent with the logic that a sell can be done for many different reasons whereas buy transactions are normally only to create return. The multitude of reasons for sell transactions makes it harder to sort the informative sell transactions from the uninformative.

It is important to recognize that our results inconsistency with Cohen et al.'s previous results may be due to differences in trading patterns between American and Swedish insiders. While their filtering resulted in 44 percent opportunistic to 56 percent routine transactions[74] our result was 78 percent opportunistic to 22 percent routine transactions when adopting the same filter to the Swedish market[75].

Another possible explanation for the classification working less well on the Swedish market is that those insiders defined as routine in this study is to high extent CEO's and board members i. e. insiders that presumably hold a greater deal of insider information than most other insiders. This implies that routine insider while trading on a more routine basis would on the other hand be more informed of the future returns and thus be able to gain more from the trading. This assumed higher potential of gaining from insider transactions among the routine insiders presumably works to even put the abnormal returns of the two groups. The idea that the prominence of the insiders have an effect on their ability to predict future stock returns and their ability to gain abnormal returns from insider transactions[76].

Another potential cause of the dissimilarities between the results of this study and the study conducted by Cohen et al. (2010) may be the fact that the definition of an insider is wider in Sweden than it is in USA. If the discussion above of more active insiders (routine) being insiders holding more prominent positions holds, then the majority of those insiders covered by the wider Swedish definition, but not covered by the American insider definition, are likely to have been classified as opportunistic in this study. The reason for this being is that this group presumably consists of neither active nor well-informed traders. This group of insiders would then dilute the group of opportunistic insiders with their less informed transactions.

[74] Cohen et al. p 22
[75] Graph 5
[76] Seyhun (1986)

The reasons mentioned above should not be considered a conclusion but rather a "best guess" as to explaining the differences between the results found by Cohen et al. (2010) on the American market and this study.

6.5 Comparing insider abnormal return before and after the law enforcement in 2005

The purpose of this thesis is not to take a stand on whether the current laws on insider trading are efficient or not. Nor is it to take a stand on the Swedish Financial Supervisory Authority's ability to regulate insider trading. The purpose with our thesis is simply to compare insider abnormal return before and after the law enforcement in 2005 and create a basis to which such conclusions can be drawn.

All buy events except the 1 day and 5 day event windows show higher CAARs before the new law but the only statistically significant value is the 63 day event widow (p=0.02). This result suggests that insider buy transactions created higher returns before then after 2005[77].

Our sell event results do however contradict this suggestion. Four out of the six event length windows have higher CAARs for transactions after the new law than before, and all three of the statistically significant results have higher CAARs after then before[78]. The result is most likely affected by the negative trend the market has been in during de past five years. There should be no conclusions drawn by this result due to this compromised reliability.

6.6 Comparing insider abnormal return before and after the acquittal of the insider case in 2010

All buy events CAARs are statistically significant and higher after the acquittal than before than acquittal. These results imply that insiders generally earn significantly higher returns on their buy transactions after the acquittal[79], than before the acquittal. The results of the sell event however suggest the contrary to

[77] Table 14
[78] Table 15
[79] Table 16

this. All sell event CAARs are statistically significant and lower after than before the acquittal[80]. The result is most likely affected by last years' positive market trend. This in addition to the small number of observations, compromises the reliability, and there ought to be no decisive conclusion drawn from the result.

7. Conclusions

In this study we expose Swedish insider transactions to two different simple statistical filters. By doing so we aim to classify the insiders into groups of routine or opportunistic based on their trading patterns. The purpose of this classification is to filter out opportunistic insiders whose transactions are believed to hold predictive power of the future returns of the firm from transactions of routine insiders who are believed to hold no predictive power.

The first classification method defines a routine insider as an insider having conducted at least one buy or sell transaction during each of three investigated years, 2003-2005. All remaining insiders are classified as opportunistic. This method of categorizing has been used in a recent study on the American stock market by Cohen et al (2010). The second classifying method defines a routine insider as an insider who has performed at least four transactions during the four year period ranging from 2003 to 2006.

The two classifications show similar results, abnormal returns are found when examining the buy transactions performed by both routine and the opportunistic insiders. Meanwhile negative abnormal returns are found when examining the sell transactions performed by both groups of insiders. These results apply regardless of whether the abnormal returns are calculated based on the transaction date or the publication date of the transaction.

Independent samples t-tests show some significant differences between the abnormal returns of the two groups of insiders. Using the first method of classification, the buy transactions of the opportunistic insiders yield a larger abnormal return than the buy transactions of the routine insiders, when looking at the three longest event windows i.e. 21 days, 63 days and 126 days following the publication dates of the

[80] Table 17

transactions. Using the second method of classification, this connection is only significant at the 126 days event window.

The abnormal returns found in connection with sell transactions are somewhat ambiguous using both methods of classification. Both methods show statistically significant difference between the abnormal returns of opportunistic and routine insider transactions at the 63 and 126 days event windows. The ambiguity of this result is that the two significant event windows contradict each other. The 63 days event windows implies that opportunistic insider transactions are associated with 'higher' negative abnormal returns while the 126 days event window implies that routine traders are associated with 'higher' negative abnormal returns.

Although the two methods of classifying insiders show similar results, the first method, used by Cohen et al (2010) produces a few more significant results and is therefore considered slightly better at separating informative from uninformative insider information.

When studying all insider transactions, without separating between routine and opportunistic transactions, this study provides evidence that the trading of corporate insiders in Sweden is associated with abnormal returns. This fact holds regardless if the abnormal returns are measured using the transaction date or the publication date of the transaction as the event date. The one day abnormal return is found to be higher following the publication date compared to the same return following the transaction date, this fact may be due to signaling effects increasing the abnormal returns following the publication.

As a secondary purpose, this study investigates whether the abnormal returns gained by insiders has changed in connection with two major events in Swedish insider legislation; the law enforcement in 2005 and the acquittal of the large scale “Insider case” in 2010.

Our results, regarding the introduction of the law of Penalties for Market Abuse in Trading Financial Instruments in 2005, show some significance according to the independent samples t-tests. The abnormal returns gained by insiders in connection with buy transactions are found to be lower after than before the law is enforced. This relation is however only significant when using the 63 days event window. Regarding the abnormal returns associated with the sell transactions, these are found to be more negative after the date of the law enforcement. Based on these results no

conclusions can be drawn regarding any effect of the law enforcement on the trading behavior of the insiders.

The abnormal return of buy transactions after the acquittal of the "Insidercase" is found to be significantly higher after than before the acquittal. However the returns of sell transactions are also found to be significantly more negative after than before the acquittal. For this reason no conclusions are drawn regarding any effect of the acquittal on the insiders trading behavior.

Our results suggest that it is possible to identify which insider transactions that holds possible price altering implications to its company's stock. The two classification methods tried are not entirely adequate at performing this categorization of transactions but some significant results are found.

The main finding of this study is that insiders classified as opportunistic according the classification method used by Cohen et al (2010) gain significantly higher returns in association with buy transactions during the longer term event windows (one month, three months and half a year). The differences between the abnormal returns gained by routine and opportunistic insiders found in this study are however not by far as large as Cohen et.al. (2010) found them to be on the American market.

7.1 Future Research

Although the field of insider trading is rather well explored, the field of decoding insider information into predictive and non-predictive of the future prices of the firms stock, is rather unexplored. This study has attempted to perform such a "decoding" or "classification" of insiders. However the best way of classifying insiders with this purpose has most certainly not yet been found. This study has shown that the method used by Cohen et al (2010) does not work as well on the Swedish stock market as it does on the American market. A suggestion for a future study is therefore to conduct a more thorough attempt to classify insiders into those whose trading holds predictive power and those whose trading do not.

While this study has classified the insiders solely based on their previous transactions behavior, a suggestion for a future study is also take into consideration the type of industry that firms of the insiders belong to. It is intuitive to assume that the insiders of some industries generally hold more important insider information than insiders in other industries. Another suggestion for a future study, which may well be combined with the one just mentioned, is to perform the classification on a year to year basis. This would imply that new insiders are continuously classified and that the classification of certain insider might change from one year to another.

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Morningstar Finance, www.morningstar.com

OMX Stockholm Historical stock prices, http://www.nasdaqomxnordic.com/aktier/historiskakurser/

Computer software

IBM SPSS Statistics

Appendix 1: Insider trading at Klövern AB

Insider transactions at Klövern AB, 2003-01-01 - 2005-12-31

Company Name	Insider	Position	Transact	Transaction d	Publication D
KLÖVERN AB (PUBL)	Åfors, Caesar	Other position	Sell	2003-11-21	2003-11-24
KLÖVERN AB (PUBL)	Paulsson, Erik	Board Member	Buy	2003-11-17	2003-11-21
KLÖVERN AB (PUBL)	Hermelin, Gustaf	CEO	Sell	2003-11-14	2003-11-21
KLÖVERN AB (PUBL)	Lundh, Anna-Greta	Board Member	Buy	2003-10-06	2003-10-08
KLÖVERN AB (PUBL)	Hermelin, Gustaf	CEO	Sell	2003-08-29	2003-09-03
KLÖVERN AB (PUBL)	Dahlbo, Stefan	Board Member	Buy	2003-08-28	2003-09-01
KLÖVERN AB (PUBL)	Hermelin, Gustaf	CEO	Buy	2003-07-22	2003-07-29
KLÖVERN AB (PUBL)	Hermelin, Gustaf	CEO	Buy	2003-07-21	2003-07-29
KLÖVERN AB (PUBL)	Hermelin, Gustaf	CEO	Buy	2003-07-21	2003-07-29
KLÖVERN AB (PUBL)	Hermelin, Gustaf	CEO	Buy	2003-07-21	2003-07-29
KLÖVERN AB (PUBL)	Hermelin, Gustaf	CEO	Sell	2003-03-27	2003-03-31
KLÖVERN AB (PUBL)	Hermelin, Gustaf	CEO	Sell	2003-03-27	2003-03-31
KLÖVERN AB (PUBL)	Lundquist, Anders	Other position	Buy	2003-03-12	2003-03-14
KLÖVERN AB (PUBL)	Åfors, Caesar	Other position	Sell	2003-03-10	2003-03-13
KLÖVERN AB (PUBL)	Dahlbo, Stefan	Board Member	Buy	2003-03-07	2003-03-12
KLÖVERN AB (PUBL)	Oftedal, Ole	Board Member	Sell	2003-02-24	2003-03-05
KLÖVERN AB (PUBL)	Paulsson, Erik	Board Member	Sell	2004-10-26	2004-10-27
KLÖVERN AB (PUBL)	Nilsson, Thomas	Other position	Sell	2004-09-17	2004-09-17
KLÖVERN AB (PUBL)	Lundquist, Anders	Other position	Buy	2004-09-02	2004-09-07
KLÖVERN AB (PUBL)	Hermelin, Gustaf	CEO	Buy	2004-05-26	2004-06-02
KLÖVERN AB (PUBL)	Hermelin, Gustaf	CEO	Buy	2004-05-26	2004-06-02
KLÖVERN AB (PUBL)	Hermelin, Gustaf	CEO	Buy	2004-05-26	2004-06-02
KLÖVERN AB (PUBL)	Lundh, Anna-Greta	Board Member	Buy	2004-05-11	2004-05-24
KLÖVERN AB (PUBL)	Pettersson, Bo	Board Member	Buy	2004-04-21	2004-04-23
KLÖVERN AB (PUBL)	Piehl, Johan	Board Member	Buy	2004-03-04	2004-03-05
KLÖVERN AB (PUBL)	Piehl, Johan	Board Member	Buy	2004-03-04	2004-03-05
KLÖVERN AB (PUBL)	Piehl, Johan	Board Member	Buy	2004-03-04	2004-03-05
KLÖVERN AB (PUBL)	Piehl, Johan	Board Member	Buy	2004-03-04	2004-03-05
KLÖVERN AB (PUBL)	Lundh, Anna-Greta	Board Member	Buy	2004-01-23	2004-01-26
KLÖVERN AB (PUBL)	Rosvall, Lars	Board Member	Buy	2005-09-19	2005-09-22
KLÖVERN AB (PUBL)	Hermelin, Gustaf	CEO	Buy	2005-09-05	2005-09-09
KLÖVERN AB (PUBL)	Hermelin, Gustaf	CEO	Buy	2005-09-05	2005-09-09
KLÖVERN AB (PUBL)	Hermelin, Gustaf	CEO	Buy	2005-09-05	2005-09-09
KLÖVERN AB (PUBL)	Lundh, Anna-Greta	Board Member	Buy	2005-03-23	2005-03-24
KLÖVERN AB (PUBL)	Hermelin, Gustaf	CEO	Sell	2005-01-10	2005-01-12

Appendix 2a: Brief data analysis

Explanatory Data Analysis, testing for normality and extreme values

Data set	N, Number of values		Normality assumpltion, both classifications	Number of outliers (bach leaf)	
Complete data set, Method 1	219941		Normal	202	
Subsamples	N, Routine	N, Opportunistic	Normal	N, Routine	N, Oppotunistic
PB0neBuy	2673	9869	Normal	4	12
PBFive Buy	2670	9848	Normal	3	11
PBTen Buy	2661	9815	Normal	5	15
PB21Buy	2656	9745	Normal	3	9
PB63Buy	2637	9553	Normal	5	13
PB126Buy	2595	9260	Normal	4	11
TDOneBuy	2673	9869	Normal	4	12
TDFiveBuy	2670	9848	Normal	4	11
TDTenBuy	2661	9815	Normal	3	9
TD21Buy	2656	9745	Normal	4	13
TD63Buy	2637	9553	Normal	4	10
TD126Buy	2595	9260	Normal	3	10
PB0neSell	1328	4770	Normal	2	6
PBFive Sell	1328	4762	Normal	2	6
PBTen Sell	1326	4750	Normal	2	7
PB21Sell	1323	4704	Normal	2	5
PB63Sell	1305	4606	Normal	2	5
PB126Sell	1277	4385	Normal	2	5
TDOneSell	1328	4770	Normal	3	7
TDFiveSell	1328	4762	Normal	2	5
TDTenSell	1326	4750	Normal	3	4
TD21Sell	1323	4704	Normal	2	6
TD63Sell	1305	4606	Normal	2	5
TD126Sell	1277	4385	Normal	2	5

Appendix 2b: Brief data analysis, events

Data Analysis	Number of values, N	Normality assumpltion	Number of outliers (bach leaf)
Before 2005-06-01		Normal	
1 day buy	2291	Normal	3
5 day buy	2291	Normal	4
10 day buy	2291	Normal	3
21 day buy	2291	Normal	3
63 day buy	2291	Normal	4
126 days buy	2291	Normal	4
1 day sell	1360	Normal	2
5 day sell	1360	Normal	2
10 day sell	1360	Normal	2
21 day sell	1360	Normal	2
63 day sell	1360	Normal	2
126 days sell	1360	Normal	2
After 2005-06-01			
1 day buy	10263	Normal	13
5 day buy	10239	Normal	11
10 day buy	10197	Normal	8
21 day buy	10122	Normal	9
63 day buy	9911	Normal	14
126 days buy	9547	Normal	11
1 day sell	4745	Normal	6
5 day sell	4734	Normal	3
10 day sell	4723	Normal	3
21 day sell	4574	Normal	2
63 day sell	4557	Normal	3
126 days sell	4308	Normal	3
Before 2010-06-01			
1 day buy	11468	Normal	15
5 day buy	11458	Normal	14
10 day buy	11457	Normal	9
21 day buy	11455	Normal	11
63 day buy	11447	Normal	16
126 days buy	11424	Normal	12
1 day sell	5388	Normal	7
5 day sell	5387	Normal	5
10 day sell	5387	Normal	6
21 day sell	5387	Normal	6
63 day sell	5386	Normal	6
126 days sell	5378	Normal	6
After 2010-06-01			
1 day buy	1093	Normal	1
5 day buy	1073	Normal	1
10 day buy	1032	Normal	1
21 day buy	959	Normal	1
63 day buy	756	Normal	1
126 days buy	442	Normal	1
1 day sell	715	Normal	1
5 day sell	708	Normal	1
10 day sell	694	Normal	1
21 day sell	645	Normal	1
63 day sell	529	Normal	1
126 days sell	288	Normal	1

Appendix 3a: T-test results of buy transactions using insider classifying method 1

Method 1: Original method of classifying insiders

Levine T-Test (equal variances not assumed)

comparing the abnormal returns of routine and opportunistic insiders using the original classification method

Buy transactions

Event date defined as publication date — *Event window length*

Method 1, Original method	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of routine transactions	2673	2670	2661	2656	2637	2595
Number of opportunistic transactior	9869	9848	9815	9745	9553	9260
Mean abn ret, routine transactions	0,00230395	0,00668787	0,00525019	0,00349179	0,01333712	0,01327159
Mean abn ret, opportunistic transac	0,00228768	0,00576279	0,0090518	0,01036603	0,02563546	0,02843432
Std. Deviation, routine transactions	0,033185786	0,128734472	0,191257961	0,140809836	0,259454355	0,312996741
Std. Deviation, opportunistic transac	0,039032223	0,073164284	0,098591831	0,141148213	0,236523569	0,315667397
t	-0,022	-0,356	0,99	2,229	2,195	2,177
df	4864,527	3150,386	3052,785	4222,05	3927,096	4188,212
Mean difference	-0,000016	-0,000925	0,003802	0,006874238*	0,012298337*	0,015162731*
Significance (two-tailed)	0,983	0,722	0,322	0,026	0,028	0,03
95 % Confidence intevals of difference:						
Upper boundary	0,001459129	0,00416921	0,01132864	0,012920023	0,023281687	0,02881809
Lower boundary	-0,001491677	-0,006019366	-0,003725422	0,000828453	0,001314987	0,001507373

Buy transactions

Event date defined as transaction date — *Event window length*

Method 1, Original method	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of routine transactions	2673	2670	2661	2656	2637	2595
Number of opportunistic transactior	9869	9848	9815	9745	9553	9260
Mean abn ret, routine transactions	0,00379075	0,00678682	0,01327394	0,01150333	0,02000954	0,01498199
Mean abn ret, opportunistic transac	0,0009825	0,00742744	0,01002856	0,01220002	0,02825642	0,03332978
Std. Deviation, routine transactions	0,043808589	0,069607562	0,101542344	0,138788705	0,21948177	0,29595637
Std. Deviation, opportunistic transac	0,035283601	0,072383953	0,097203165	0,140361941	0,228998241	0,310847284
t	-3,057	0,418	-1,476	0,229	1,692	2,76
df	3662,765	4361,79	4077,664	4251,534	4349,843	4329,835
Mean difference	-0,00280825**	0,000640619	-0,003245388	0,000696694	0,00824688	0,018347787**
Significance (two-tailed)	0,002	0,676	0,14	0,819	0,091	0,006
95 % Confidence intevals of difference:						
Upper boundary	-0,001006899	0,003643921	0,001066679	0,006667144	0,017802673	0,031380137
Lower boundary	-0,004609601	-0,002362683	-0,007557456	-0,005273755	-0,001308913	0,005315437

Appendix 3b: T-test results of sell transactions using insider classifying method 1

Method 1: Original method of classifying insiders

Levine T-Test (equal variances not assumed)

comparing the abnormal returns of routine and opportunistic insiders using the original classification method

Sell transactions

Event date defined as publication date — *Event window length*

Method 1, Original method	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of routine transactions	1328	1328	1326	1323	1305	1277
Number of opportunistic transactior	4770	4762	4750	4704	4606	4385
Mean abn ret, routine transactions	-0,00236037	-0,00620839	-0,0075433	-0,00743493	-0,0140518	-0,12366207
Mean abn ret, opportunistic transac	-0,0035921	-0,00734781	-0,00969062	-0,01310335	-0,03110958	-0,04617341
Std. Deviation, routine transactions	0,033694321	0,077164738	0,094892137	0,152515988	0,245763743	0,431957194
Std. Deviation, opportunistic transac	0,054527152	0,078910855	0,101069744	0,138408219	0,231666337	0,307565831
t	-1,013	-0,473	-0,718	-1,218	-2,241	5,984
df	3456,237	2162,606	2234,582	1975,549	2007,199	1670,007
Mean difference	-0,001231728	-0,001139417	-0,002147317	-0,005668419	-0,017057788*	0,077488666***
Significance (two-tailed)	0,311	0,636	0,473	0,223	0,025	0,000
95 % Confidence intevals of difference:						
Upper boundary	0,001152067	0,003579926	0,003716539	0,00345776	-0,002130457	0,102887387
Lower boundary	-0,003615523	-0,00585876	-0,008011173	-0,014794597	-0,031985118	0,052089946

Sell transactions

Event date defined as transaction date — *Event window length*

Method 1, Original method	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of routine transactions	1328	1328	1326	1323	1305	1277
Number of opportunistic transactior	4770	4762	4750	4704	4606	4385
Mean abn ret, routine transactions	0,00341609	-0,00527493	-0,01373342	-0,01926576	-0,01751676	-0,11947135
Mean abn ret, opportunistic transac	0,00005392	-0,0064345	-0,01106248	-0,01497743	-0,03243273	-0,04828696
Std. Deviation, routine transactions	0,041721105	0,075351435	0,0972734	0,146240184	0,242796982	0,435674375
Std. Deviation, opportunistic transac	0,048090013	0,093636069	0,112332561	0,146834913	0,236116002	0,30532194
t	-2,509	-0,469	0,854	0,941	-1,971	5,461
df	2398,932	2582,516	2402,294	2129,837	2054,659	1657,236
Mean difference	-0,003362169*	-0,001159575	0,00267094	0,004288324	-0,014915972*	0,071184385***
Significance (two-tailed)	0,012	0,639	0,393	0,347	0,049	0,000
95 % Confidence intevals of difference:						
Upper boundary	-0,000734518	0,00369006	0,008807304	0,013221108	-0,00007396	0,096750216
Lower boundary	-0,005989819	-0,006009209	-0,003465424	-0,00464446	-0,029757984	0,045618554

Appendix 4a: T-test results of buy transactions using insider classifying method 2

Method 2: Alternative method of classifying insiders						
Levine T-Test (equal variances not assumed) comparing classification method						
the abnormal returns of routine and opportunistic insiders using the alternative						
Buy transactions						
Event date defined as publication date	Event window length					
Method 2, Alternative method	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of routine transactions	6063	6056	6039	6024	5964	5846
Number of opportunistic transactions	6503	6486	6461	6401	6250	6031
Mean abn ret, routine transactions	0,00241309	0,00631985	0,00768327	0,00811778	0,02104623	0,01993547
Mean abn ret, opportunistic transactions	0,0021718	0,00582215	0,00904999	0,00998694	0,02531782	0,03055329
Std. Deviation, routine transactions	0,028883718	0,099878062	0,143527146	0,140145636	0,241253319	0,294337009
Std. Deviation, opportunistic transactions	0,044621081	0,075286516	0,103218621	0,14221425	0,242409313	0,335056898
t	-0,362	-0,313	0,608	0,738	0,976	1,836
df	11227,261	11232,118	10904,805	12396,694	12190,426	11762,177
Mean difference	-0,000241297	-0,000497701	0,001366725	0,001869164	0,004271594	0,01061782
Significance (two-tailed)	0,717	0,754	0,543	0,461	0,329	0,066
95 % Confidence intevals of difference:						
Upper boundary	0,001064499	0,002614673	0,00577611	0,006835778	0,012851861	0,021951877
Lower boundary	-0,001547093	-0,003610075	-0,00304266	-0,00309745	-0,004308674	-0,000716237
Buy transactions						
Event date defined as transaction date	Event window length					
Method 2, Alternative method	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of routine transactions	6063	6056	6039	6024	5964	5846
Number of opportunistic transactions	6503	6486	6461	6401	6250	6031
Mean abn ret, routine transactions	0,00242751	0,00719699	0,0131553	0,01455091	0,02383459	0,02310759
Mean abn ret, opportunistic transactions	0,00074978	0,00736608	0,00859336	0,00990386	0,0293598	0,03560484
Std. Deviation, routine transactions	0,040798857	0,072971701	0,100641487	0,142361228	0,224435329	0,287219457
Std. Deviation, opportunistic transactions	0,033664716	0,070748576	0,095827924	0,13796322	0,229713648	0,327335888
t	-2,504	0,132	-2,592	-1,846	1,344	2,213
df	11776,572	12417,083	12330,854	12318,638	12205,202	11759,537
Mean difference	-0,001677722**	0,000169089	-0,004561938**	-0,00464705	0,005525214	0,012497249*
Significance (two-tailed)	0,01	0,895	0,01	0,065	0,179	0,027
95 % Confidence intevals of difference:						
Upper boundary	-0,000364532	0,002687709	-0,001111555	0,000287682	0,013580682	0,023564412
Lower boundary	-0,002990911	-0,00234953	-0,008012321	-0,009581782	-0,002530254	0,001430087

Appendix 4b: T-test results of sell transactions using insider classifying method 2

Method 2: Alternative method of classifying insiders						
Levine T-Test (equal variances not assumed) comparing classification method						
the abnormal returns of routine and opportunistic insiders using the alternative						
Sell transactions						
Event date defined as publication date	Event window length					
Method 2, Alternative method	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of routine transactions	3255	3254	3252	3241	3206	3134
Number of opportunistic transactions	2856	2849	2837	2799	2717	2540
Mean abn ret, routine transactions	-0,00223766	-0,00629303	-0,00755317	-0,01092799	-0,02015828	-0,07934422
Mean abn ret, opportunistic transactions	-0,00455715	-0,00804159	-0,01117348	-0,01303651	-0,0361666	-0,0443702
Std. Deviation, routine transactions	0,028780477	0,071089678	0,094875856	0,137510437	0,227723212	0,35174345
Std. Deviation, opportunistic transactions	0,067447761	0,086115897	0,105089894	0,146232551	0,242794185	0,326204822
t	-1,707	-0,858	-1,403	-0,574	-2,601	3,877
df	3755,988	5535,225	5761,713	5788,163	5625,589	5570,248
Mean difference	-0,002319491	-0,00174856	-0,003620305	-0,002108515	-0,016008315**	0,034974019***
Significance (two-tailed)	0,088	0,391	0,161	0,566	0,009	0,000
95 % Confidence intevals of difference:						
Upper boundary	0,000345285	0,002247991	0,001439125	0,005087474	-0,003944117	0,052657926
Lower boundary	-0,004984266	-0,005745111	-0,00867973	-0,009304504	-0,028072513	0,017290112
Sell transactions						
Event date defined as transaction date	Event window length					
Method 2, Alternative method	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of routine transactions	3255	3254	3252	3241	3206	3134
Number of opportunistic transactions	2856	2849	2837	2799	2717	2540
Mean abn ret, routine transactions	0,00132872	-0,004559	-0,01002987	-0,01592352	-0,02239739	-0,07778253
Mean abn ret, opportunistic transactions	0,00021107	-0,00802977	-0,01351785	-0,0159894	-0,03737571	-0,04779104
Std. Deviation, routine transactions	0,042872179	0,075667431	0,099767781	0,139785068	0,22822843	0,355191462
Std. Deviation, opportunistic transactions	0,050865499	0,103775209	0,119017348	0,154400259	0,248041485	0,320090044
t	-0,922	-1,475	-1,229	-0,017	-2,402	3,341
df	5610,768	5141,209	5557,049	5696,318	5578,135	5608,591
Mean difference	-0,001117641	-0,003470775	-0,003487982	-0,000065876	-0,014978313*	0,029991486***
Significance (two-tailed)	0,357	0,14	0,219	0,986	0,016	0,001
95 % Confidence intevals of difference:						
Upper boundary	0,001259682	0,00114334	0,002075441	0,007410885	-0,002752742	0,047590612
Lower boundary	-0,003494964	-0,00808489	-0,009051405	-0,007542637	-0,027203885	0,012392361

Appendix 5: T-test results of the effect of the law enforcement in 2005

T-test analysing insiders abnormal return before and after the law enforcement, 2005-06-01

Levine T-Test (equal variances not assumed)

	Event window length					
Buy transactions	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of transactions before date	2291	2291	2291	2291	2291	2291
Number of transactions after date	10263	10239	10197	10122	9911	9574
Mean before date	0,00122473	0,00602339	0,01233842	0,01363765	0,03659145	0,03220631
Mean after date	0,00164887	0,00756335	0,01044527	0,01177792	0,02440942	0,02878483
Std. Deviation before date	0,037729989	0,069237492	0,095796981	0,149538536	0,224437996	0,260033336
Std. Deviation after date	0,037202951	0,072435434	0,098788903	0,137966265	0,227801077	0,318900582
t	-0,488	-0,954	0,85	0,545	2,335	0,54
df	3356,612	3502,002	3470,516	3230,269	3465,122	4107,695
Mean difference	-0,000424144	-0,001539965	0,001893145	0,001859723	0,012182032*	0,003421476
Significance (two-tailed)	0,626	0,34	0,395	0,586	0,02	0,589
95 % Confidence intevals of difference:						
Upper boundary	0,00128088	0,001624454	0,006260935	0,008549479	0,022411851	0,015842185
Lower boundary	-0,002129169	-0,004704385	-0,002474645	-0,004830033	0,001952213	-0,008999232

Levine T-Test (equal variances not assumed)

	Event window length					
Sell transactions	*1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of transactions before date	1360	1360	1360	1360	1360	1360
Number of transactions after date	4745	4737	4723	4674	4557	4308
Mean before date	0,00328033	-0,00085214	-0,00573275	-0,01352371	-0,03408458	-0,05571782
Mean after date	0,00010384	-0,00768465	-0,01334417	-0,01662283	-0,02778052	-0,06713983
Std. Deviation before date	0,037747208	0,074136179	0,105543653	0,148849454	0,230599034	0,296588973
Std. Deviation after date	0,04906601	0,09393823	0,110197572	0,146195789	0,239819074	0,35307193
t	2,547	2,812	2,32	0,678	-0,877	1,18
df	2805,502	2733,948	2281,412	2179,056	2306,247	2677,874
Mean difference	0,003176488*	0,006832514**	0,00761142*	0,003099124	-0,006304065	0,01142201
Significance (two-tailed)	0,011	0,005	0,02	0,498	0,381	0,238
95 % Confidence intevals of difference:						
Upper boundary	0,005621655	0,01159704	0,014044568	0,01205667	0,007798842	0,030394386
Lower boundary	0,000731322	0,002067987	0,001178273	-0,005858421	-0,020406971	-0,007550367

Appendix 6: T-tests results of the effect of the acquittal of the "Insider case" in 2010

T-test analysing insiders abnormal return before and after the acquittal of the "Insider case", 2010-06-01

Levine T-Test (equal variances not assumed)

Buy transactions	Event window length: *1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of transactions before date	11462	11458	11457	11455	11447	11424
Number of transactions after date	1093	1073	1032	959	756	442
Mean before date	0,00139977	0,00677921	0,01010357	0,01097161	0,02339657	0,02511504
Mean after date	0,00321497	0,01279741	0,01826002	0,02661908	0,07561569	0,13850494
Std. Deviation before date	0,038289701	0,07331118	0,100692622	0,143513416	0,23013601	0,308488868
Std. Deviation after date	0,024607362	0,05364082	0,064723705	0,090165667	0,170683186	0,285190879
t	-2,198	-3,391	-3,668	-4,881	-7,948	-8,176
df	1646,101	1475,605	1523,025	1402,189	946,283	481,794
Mean difference	-0,001815205*	-0,0060182***	-0,008156448***	-0,015647471***	-0,052219117***	-0,113389906***
Significance (two-tailed)	0,028	0,001	0,000	0,000	0,000	0,000
95 % Confidence intevals of difference:						
Upper boundary	-0,000195518	-0,002536397	-0,003794883	-0,009359319	-0,039326073	-0,086139108
Lower boundary	-0,003434892	-0,009500003	-0,012518014	-0,021935622	-0,065112161	-0,140640704

Levine T-Test (equal variances not assumed)

Sell transactions	Event window length: *1 day*	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of transactions before date	5388	5387	5387	5387	5386	5378
Number of transactions after date	715	708	694	645	529	288
Mean before date	0,00051618	-0,00715486	-0,01333529	-0,01814045	-0,0339417	-0,07422905
Mean after date	0,0029756	0,00143099	0,00133795	0,00233403	0,01757929	0,11406112
Std. Deviation before date	0,048456256	0,093976833	0,113758801	0,152622791	0,245402495	0,343899518
Std. Deviation after date	0,031677247	0,048964399	0,062595479	0,081738958	0,128870007	0,192354288
t	-1,814	-3,83	-5,172	-5,343	-7,896	-15,35
df	1210,787	1510,797	1376,148	1267,474	959,15	393,047
Mean difference	-0,002459427	-0,008585856***	-0,01467324***	-0,020474486***	-0,051520986***	-0,18829017***
Significance (two-tailed)	0,07	0	0	0	0	0
95 % Confidence intevals of difference:						
Upper boundary	0,000201285	-0,004188449	-0,009108093	-0,012957141	-0,038716099	-0,164174279
Lower boundary	-0,00512014	-0,012983264	-0,020238387	-0,027991831	-0,064325873	-0,212406062

Appendix 7a: Mann-Whitney test results using classifying method 1

Mann-Whitney test comparing abnormal returns gained by routine and opportunistic insiders, Method 1, Original classification

Buy transactions

Event defined as publishing date	Event window length					
	1 day	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of routine transactions	2673	2670	2661	2655	2637	2595
Number of opportunistic transactions	9869	9847	9815	9745	9553	9260
U, Mean rank of abn ret after routine transactions publ	**6376,42**	**6271,34**	6069,95**	**6117,35**	5988,21	5845,07
U, Mean rank of abn ret after opportunistic transactions publ	6243,08	6255,65	**6284,2****	6223,15	**6125,12**	**5951,24**
Mann-Whitney U	1,29E+07	1,31E+07	1,26E+07	1,27E+07	1,23E+07	1,18E+07
Wilcoxon W	6,16E+07	6,16E+07	1,62E+07	1,62E+07	1,58E+07	1,52E+07
Z-value	-1,689	-0,199	-2,722	-1,35	-1,769	-1,397
2-tailed significance	0,091	0,842	0,006	0,177	0,077	0,163

Event defined as transaction date	Event window length					
	1 day	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of routine transactions	2673	2670	2661	2656	2637	2595
Number of opportunistic transactions	9869	9848	9815	9745	9553	9260
U, Mean rank of abn ret after routine transactions	**6426,94***	**6286,2**	**6311,65**	6192,14	**6109,18**	5877,4
U, Mean rank of abn ret after opportunistic transactions	6229,4*	6252,26	6218,67	**6203,41**	6091,72	**5942,18**
Mann-Whitney U	1,28E+07	1,31E+07	1,29E+07	1,29E+07	1,26E+07	1,19E+07
Wilcoxon W	6,15E+07	6,16E+07	6,10E+07	1,65E+07	5,82E+07	1,53E+07
Z-value	-2,502	-0,43	-1,181	-0,144	-0,225	-0,852
2-tailed significance	0,012	0,667	0,237	0,886	0,822	0,394

Sell transactions

Event defined as publishing date	Event window length					
	1 day	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of routine transactions	1328	1328	1326	1323	1305	1277
Number of opportunistic transactions	4770	4762	4750	4704	4606	4385
U, Mean rank of abn ret after routine transactions publ	**3062,45**	3015	2999,03	**3035,4**	**3118,71*****	2733,89*
U, Mean rank of abn ret after opportunistic transactions publ	3045,89	**3054,01**	**3049,52**	3007,98	2909,9***	**2859,92***
Mann-Whitney U	3150084	3121462	3096908	3083387	2793079	2675180
Wilcoxon W	1,45E+07	4003918	3976709	1,42E+07	1,34E+07	3491183
Z-value	-0,303	-0,715	-0,927	-0,506	-3,902	-2,425
2-tailed significance	0,762	0,475	0,354	0,613	0	0,015

Event defined as transaction date	Event window length					
	1 day	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of routine transactions	1328	1328	1326	1323	1305	1277
Number of opportunistic transactions	4770	4762	4750	4704	4606	4385
U, Mean rank of abn ret after routine transactions	**3096,02**	3025,05	2982,37	3012,2	**3105,17*****	2736,76*
U, Mean rank of abn ret after opportunistic transactions	3036,55	**3051,2**	**3054,17**	**3014,51**	2913,74***	**2859,09***
Mann-Whitney U	3105498	3134812,5	3074826,5	3109316,5	2810747	2678845
Wilcoxon W	1,45E+07	4017268,5	3954627,5	3985142,5	1,34E+07	3494848
Z-value	-1,089	-0,479	-1,318	-0,043	-3,577	-2,353
2-tailed significance	0,276	0,632	0,188	0,966	0	0,019

Appendix 7b: Mann-Whitney test results using classifying method 2

Mann-Whitney test comparing abnormal returns gained by routine and opportunistic insiders, Method 2, Alternative classification

Buy Transactions

Event defined as publishing date	Event window length					
	1 day	5 days	10 days	21 days	63 days	126 days
Number of routine transactions	6063	6056	6039	6024	5964	5846
Number of opportunistic transactions	6503	6486	6461	6401	6250	6031
U, Mean rank of abn ret after routine transactions publ	**6366,14***	**6289,8**	**6256,33**	**6252,51**	**6114,81**	**5939,16**
U, Mean rank of abn ret after opportunistic transactions publ	6206,45*	6254,41	6245,05	6175,82	6100,53	5938,84
Mann-Whitney U	1,92E+07	1,95E+07	1,95E+07	1,90E+07	1,86E+07	1,76E+07
Wilcoxon W	4,04E+07	4,06E+07	4,04E+07	3,95E+07	3,81E+07	3,58E+07
Z-value	-2,466	-0,547	-0,175	-1,191	-0,224	-0,005
2-tailed significance	0,014	0,584	0,861	0,234	0,823	0,996

Event defined as transaction date	Event window length					
	1 day	5 days	10 days	21 days	63 days	126 days
Number of routine transactions	6063	6056	6039	6024	5964	5846
Number of opportunistic transactions	6503	6486	6461	6401	6250	6031
U, Mean rank of abn ret after routine transactions publ	**6399,09*** **	**6331,25**	**6366,93*** **	**6323,12*** **	**6134,98**	**5956,12**
U, Mean rank of abn ret after opportunistic transactions publ	6175,73***	6215,71	6141,67***	6109,37***	6081,28	5922,41
Mann-Whitney U	1,90E+07	1,93E+07	1,88E+07	1,86E+07	1,85E+07	1,75E+07
Wilcoxon W	4,02E+07	4,03E+07	3,97E+07	3,91E+07	3,80E+07	3,57E+07
Z-value	-3,449	-1,786	-3,488	-3,32	-0,841	-0,536
2-tailed significance	0,001	0,074	0	0,001	0,4	0,592

Sell Transactions

Event defined as publishing date	Event window length					
	1 day	5 days	10 days	21 days	63 days	126 days
Number of routine transactions	3255	3254	3252	3241	3206	3134
Number of opportunistic transactions	2856	2849	2837	2799	2717	2540
U, Mean rank of abn ret after routine transactions publ	**3070,74**	**3056,78**	**3053,23**	**3026,1**	**3051,87*** **	2827,62
U, Mean rank of abn ret after opportunistic transactions publ	3039,21	3046,54	3035,56	3014,01	2855,96***	**2849,69**
Mann-Whitney U	4600174,5	4619760,5	4586182,5	4517623,5	4067239	3949226
Wilcoxon W	8679970,5	8679585,5	8611885,5	8436223,5	7759642	8861771
Z-value	-0,697	-0,227	-0,391	-0,269	-4,394	-0,504
2-tailed significance	0,486	0,821	0,696	0,788	0	0,614

Event defined as transactions date	Event window length					
	1 day	5 days	10 days	21 days	63 days	126 days
Number of routine transactions	3255	3254	3252	3241	3206	3134
Number of opportunistic transactions	2856	2849	2837	2799	2717	2540
U, Mean rank of abn ret after routine transactions publ	**3065,11**	**3065,13**	**3067,77**	**3035,81**	**3055,51*** **	**2840,98**
U, Mean rank of abn ret after opportunistic transactions publ	3045,62	3037,01	3018,9	3002,77	2851,66***	2833,21
Mann-Whitney U	4618482	4592611	4538927	4486159,5	4055556	3969278,5
Wilcoxon W	8698278	8652436	8564630	8404759,5	7747959	7196348,5
Z-value	-0,431	-0,622	-1,082	-0,734	-4,572	-0,178
2-tailed significance	0,666	0,534	0,279	0,463	0	0,859

Appendix 8: Mann-Whitney test results of the effects of the law enforcement in 2005 and the acquittal in 2010

Mann-Whitney Test comparing the abnormal returns before and after the day of law enforcement, 2005-06-01

Buy transactions	Event window length					
	1 day	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of transactions before date	2291	2291	2291	2291	2291	2291
Number of transactions after date	10263	10239	10197	10122	9911	9574
U, Mean rank before date	**6472,7****	**6327,6**	**6439,14****	**6317,31**	**6430,98*****	**6172,95*****
U, Mean rank after date	6233,93**	6251,61	6200,77**	6182,03	6025,34***	5875,58***
Mann-Whitney U	1,13E+07	1,16E+07	1,12E+07	1,13E+07	1,06E+07	1,04E+07
Wilcoxon W	6,40E+07	6,40E+07	6,32E+07	6,26E+07	5,97E+07	5,63E+07
Z-value	-2,851	-0,909	-2,86	-1,632	-4,968	-3,733
2-tailed significance	0,004	0,363	0,004	0,103	0,000	0,000

Sell transactions	Event window length					
	1 day	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of transactions before date	1360	1360	1360	1360	1360	1360
Number of transactions after date	4745	4737	4723	4674	4557	4308
U, Mean rank before date	**3117,36**	**3123,98**	**3144,28***	**3046,42**	**3030,03**	**2964,54****
U, Mean rank after date	3034,55	3027,47	3012,55*	3009,09	2937,8	2793,45**
Mann-Whitney U	3139070	3119181	3072539	3138995,5	3002161,5	2752580,5
Wilcoxon W	1,44E+07	1,43E+07	1,42E+07	1,41E+07	1,34E+07	1,20E+07
Z-value	-1,528	-1,782	-2,438	-0,696	-1,747	-3,362
2-tailed significance	0,127	0,075	0,015	0,487	0,081	0,001

Mann-Whitney Test comparing the abnormal returns before and after the day of acquittal of the "Insider case", 2010-06-01

Buy transactions	Event window length					
	1 day	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of transactions before date	11462	11458	11457	11455	11447	11424
Number of transactions after date	1093	1073	1032	959	756	442
U, Mean rank before date	6248,39**	6232,84**	6197,03***	6159,29***	6034,24***	5873,94***
U, Mean rank after date	**6588,53****	**6620,1****	**6777,57*****	**6783,36*****	**7128,03*****	**7472,89*****
Mann-Whitney U	5924571	5767267,5	5362199,5	4940427,5	3551289	1844293,5
Wilcoxon W	7,16E+07	7,14E+07	7,10E+07	7,06E+07	6,91E+07	6,71E+07
Z-value	-2,965	-3,353	-4,954	-5,18	-8,268	-9,629
2-tailed significance	0,003	0,001	0,000	0,000	0,000	0,000

Sell transactions	Event window length					
	1 day	*5 days*	*10 days*	*21 days*	*63 days*	*126 days*
Number of transactions before date	5388	5387	5387	5387	5386	5378
Number of transactions after date	715	708	694	645	529	288
U, Mean rank before date	3037,1	3022,5**	3003,93***	2975,64***	2904,93***	2768,02***
U, Mean rank after date	**3164,3**	**3242****	**3328,75*****	**3357,74*****	**3498,33*****	**4056,31*****
Mann-Whitney U	1845912,5	1769645,5	1669588,5	1517209	1138762	422262
Wilcoxon W	1,64E+07	1,63E+07	1,62E+07	1,60E+07	1,57E+07	1,49E+07
Z-value	-1,814	-3,12	-4,588	-5,266	-7,627	-13,021
2-tailed significance	0,07	0,002	0,000	0,000	0,000	0,000