Characteristics of informative insider trades - Evidence from the Swedish Stock Market

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Abstract

In this thesis we have investigated how outside investors can extract informational content from insider trading on the Stockholm Stock Exchange. We estimated abnormal returns using the market model and firm specific portfolios. In general, we found that outside investors could make abnormal returns by mimicking insider deals in the long-run. Furthermore, we noted that the informational value of an insider deal is determined by certain characteristics. First, we found small and mid-cap firms to enjoy abnormal returns, whereas abnormal returns in large-cap companies are nonexistent. Second, deals that change the insider's holding substantially predict future abnormal returns. Third, securities that are bought by two or more insiders forecast future abnormal returns. Fourth, we found neither the SEK value of the transaction nor opportunistic trades to be associated with abnormal returns. Fifth, abnormal returns could not be linked to a specific insider category, except the case of large shareholders who make negative abnormal returns. Thus, we conclude that the characteristics of insider deals are more important than the category of insider who is trading. Our results are in line with recent literature and question the semi-strong efficient market hypothesis.

Keywords: Insider trading, outside investor, trading strategy, market efficiency

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Contents

1 Introduction

Investors struggle in an ever-long battle against the market return, and the crucial weapon in this fight is that of relevant information. The outcome of this battle is a central topic in finance academia, where Fama (1970) developed three hypotheses regarding the efficiency of the markets. According to the strong form of the efficient market hypothesis (EMH), current share prices reflect all possible information, whereas the semi-strong EMH claims that share prices only reflect all publicly available information. Lastly, under the regime of the weak EMH, current share prices only reflect past public information. Investors' behavior implies a strong disbelief in the strong and the semi-strong EMH, since they meticulously seek for information to get an advantage over other investors. The informational content of insider trading is one source that fascinates investors; which is depicted by daily coverage of trades by respected financial newspapers such as the Financial Times or the Wall Street Journal. Moreover, some investment funds acknowledge the informational value of insider trades in their investment strategies, which further strengthens the image of the market to believe in insiders' superior informational advantage. From the perspective of academia there are numerous studies, predominantly examining the American stock market, that find insiders to earn abnormal returns. As stated by the Finansinspektionen (FI), Sweden's financial supervisory authority, insider trading can be conducted in a legal and illegal manner. Thus, we early on in this thesis want to stress the legal definition of insider trading.

Insiders are assumed to be predictive of future stock performance since they have access to superior information. Hence, insiders have classically been assumed to trade for profit. However, as company equity has become an increasing part of insiders' remuneration and wealth, insiders also face incitements to trade for other reasons than for pure profit. Distinguishing between profit reasons and other motives is however not easy to decipher by outside investors. Insiders commonly sell in a routine manner due to diversification or liquidity needs whereas routine purchases can occur when insiders receive large bonuses and are offered beneficial stock discounts, often in the same calendar month each year. Thus, routine trades are not considered to have informational nature, while opportunistic trades could entail significant information about future firm performance.

Consequently, the question arises how outside investors could distinguish between informative and uninformative trades? The vast majority of research on insider trading has focused on questions whether insiders and outside investors can make abnormal returns on average, but few papers have tried to distinguish which trades are actually informative. There are different methods of analyzing whether a trade truly gives information about the firm's future performance. One way to study the informational value of the trade is to distinguish between deals that are recurring in a pattern, and the ones that are not. Cohen et al. (2012) found that recurrent trades are indeed uninformative, whereas opportunistic trades possess informational value of future stock returns. Other literature focusing on the informational value of insider trading has found that heavily traded stocks are informative of future performance (heavily traded stocks are defined as when several insiders buy or sell the same stock in the same month). Another measure of the informational value is the percentage change of the insider's holding as a result of the deal.

To the best of our knowledge, no previous published paper on the Swedish stock market has attempted to distinguish between informative and uninformative insider trades. In this thesis, we complement this existing knowledge gap, and hypothesize that opportunistic trading, heavy trading and large changes of the insider's holding are predictors of future abnormal returns.

In this thesis we will present the results and conclude which insider deals are informative in the case of the Swedish stock market. Our findings suggest that outsiders could earn abnormal returns by mimicking insider deals focusing on an investment horizon of 6-12 months. Also, we found positive abnormal returns to be associated with specific characteristic of the deal and not with a particular insider group. Insider trades in small and mid-cap companies earn on average higher abnormal returns compared to large-cap companies. Such a result could be explained by information asymmetry, as insiders of small firms are more knowledgeable about their companies and thus trade on more valuable information. Moreover, large-cap companies receive more attention from analysts and are thus priced more precisely. For long-run investment horizons, outsiders could earn 4,4%-5,6% on small and 2,8%-4,1% on mid-cap companies when mimicking insider deals. Another predictor of positive abnormal returns is heavy trading deals, defined as stocks that are traded in the same month by several insiders. Insider deals with such characteristics are associated with higher informational value. We also saw that large deals that

highly changed the insiders' holding in the company predicted abnormal returns of 6%-8% annually. Another criteria used to identify informative signals is to separate between opportunistic and routine deals. However, results from our analysis do not support that outsiders could earn positive abnormal returns following these opportunistic deals. Furthermore, among all insider categories we only found large shareholders to be associated with future firm performance. This group consistently earned negative abnormal returns for the period of 6-12 months. These results indicate that outsiders should follow deals with particular characteristics rather than specific insiders. In our thesis, we will expand these findings and explain them in detail.

Our results are robust to the estimation methods of normal returns. In our analyses we have calculated abnormal returns with three methods: the market model, size portfolios as well as size and price-to-book portfolios. Furthermore, apart from firm size, we have controlled for price-to-book and past returns. Additionally we have also controlled for monthly fixed effect since there is monthly variation in insider trading.

2 Literature review

Profits for insiders

The underlying issue of insider trading is that of agency problems, where Berle and Means (1932) point out that the interest of management in publicly traded firms does not always coincide with that of the shareholders'. As Fama (1970) explains, the management may hold significant information about the company which is not publicly available to investors, thus a scenario of asymmetric information arises. Since outside investors can draw inference about the firm from insider trades, the trading therefore becomes a crucial component in reducing the issue of asymmetric information.

The literature on insider trading is rich, and to the best of our knowledge Smith (1940) was the first one to investigate the topic. He compared insider trades to popular indices, and did not find them to beat the index on average. However, as early as 1940, Smith remarked that insiders may trade for other reasons than profit (such as diversification or personal liquidity motives), and thus consequently explains that insiders may still hold superior information. Research temporarily halted during U.S.A's involvement in the Second World War, and was later resumed by Rogoff (1964) who investigated the returns of securities purchased by three or more insiders within a single month, where no insider in the company decided to sell the security, and where at least two of the insiders increased their equity stake by at least 10%. He found the small group of 45 securities meeting these strict criteria on average to outperform the market by 9,5% in the following six months. Glass (1966) investigated 14 calendar months and picked 8 securities with the highest insider buyers-sellers ratio to outperform the market by 10% in the following 7 months. Similarly to Rogoff (1964), Lorie and Niederhoffer (1968) examine months when companies have at least two more buyers than sellers, or vice versa, and find that securities experiencing a heavy buying (selling) month are more likely to gain (lose) in the stock market in the following 6 months.

In a modern context, the aforementioned studies share the drawback of not adjusting the individual stock performance for the market risk. The first asset pricing model to take market risk into consideration, the Capital Asset Pricing Model (CAPM) developed by Sharpe (1964) and

Lintner (1965), motivated researches to reinvestigate previous literature. Applying the CAPM and following the intensive trading intuition of previous research (as that of aforementioned Rogoff, 1964; Glass,1966; Lorie and Niederhoffer,1968), Jaffe (1974) and Finnerty (1976) found intensive insider trading to yield abnormal returns net of trading costs in the consequent 8-11 months.

Following the critique that the CAPM overestimates abnormal returns (for a deeper discussion on the shortcomings of the CAPM, please read the "Methodology section"), the econometric market model was developed which motivated researchers to reinvestigate whether previous findings of abnormal returns were still valid. As a pivotal criticizer of the CAPM in the context of insider trading, Seyhun (1986) applied the market model and found abnormal returns to be 3 % on an annual basis. Since the results using the market model were lower than those of the CAPM, Seyhun's findings were in line with the o pinions of the criticizers. Inspired by the paper of Finnerty (1976), Rozeff and Zaman (1986) made a study where they tried to explain abnormal returns by controlling for firm size and price-to-earnings. They found insiders' abnormal returns to be insignificant after taking the bid-ask spread into consideration.

Lakonishok and Lee (2001) analyzed abnormal returns in the short and the long-run, only finding meaningful results in the long-run. They found this fact to be in line with the previous literature, and concluded that the market initially does not react to insider trading announcements. Jeng et al. (2003) evaluated abnormal returns over a 6 months period using both the CAPM as well as firm specific portfolios. They found that insiders earn abnormal returns of 0,5%-0,8%, that firm size does not significantly affect abnormal returns, and finally that abnormal returns increase with the dollar amount of the deal. In the American stock market, insiders have the possibility of pre-announcing their trades in accordance to the SEC's 10b5-1 rule, so as to clear any possibly suspicions about illegal conduct from the SEC. Jagolinzer (2009) examined whether initiation/termination of purchases/sales 10b5-1 plans were predictive of abnormal returns, and found that insiders initiate purchase (sell) plans when expecting positive (negative) future firm news.

Profits for outside investors

If outsiders could earn abnormal returns by mimicking the actions of insiders, the semi-strong EMH would fail to hold. In the pivotal studies conducted in the 1970-1980's, the central source of insider trading information was the "The Official Summary Of Insider Trading", or simply "the official summary", in which the Securities and Exchange Commission (SEC) on a monthly basis summarized all reported insider trades over 100 shares. Lorie and Niederhoffer (1968) found shares to grow abnormally following publication in the official summary. This finding inspired Jaffe (1974) to also investigate the benefits to outside investors.

Analogously, Jaffe (1974) concluded that outsiders indeed earn abnormal returns by trading on the official summary, but these returns were however economically small and zero post transaction costs. Nevertheless, refining the informational content of insider trades by constructing an investment portfolio consisting of heavy trading, which he defined as a month where there at least three or more insiders purchased than sold, or vice versa, yielded outsiders 2%-3% abnormal returns net of transaction costs during the consequent 8 months. Seyhun (1986) studied the returns to outsiders following the first day insiders report to the SEC as well as the publication date of the official summary. He concluded that outsiders could profit from following insider trades in small firms, but however questioned the economic significance after taking transaction costs into consideration. Rozeff and Zaman (1988) conducted a similar study to Seyhun (1986) where they controlled for firm size and earnings-to-price, and similarly failed to find abnormal returns for outsiders after transaction costs. The findings of Seyhun (1986) as well as Rozeff and Zaman (1988) significantly strengthened the semi-strong EMH, since outsiders could not benefit from publicly available information.

When new evidence against the semi-strong EMH became popular, researchers hypothesized that extracting patterns from insider deals could indeed benefit outside investors. Seyhun (1988) thus focused on large-volume trades executed by top management and found outsiders to earn abnormal returns net of transaction costs. Outsiders could profitably mimic the behavior of these particular insider deals, but needed however to hold the securities over a longer investment horizon. Bettis et al. (1997) confirmed the finding of Seyhun (1988), as they also found abnormal returns after large deals done by top management to be economically meaningful in small firms. Motivated by the dubious evidence regarding outsiders' profitability and thus the

semi-strong EMH, Lakonishok and Lee (2001) confirmed short-run returns post publication to be small. However, they found outsiders to benefit from insider trades in the long-run. Nevertheless, there exists a clear size component since insider trading is almost only predictive in the small-cap segment whereas large-cap stocks did not display abnormal returns even when applying heavy-trading strategies. In relation to small companies, Lakonishok and Lee (2001) noted that the bid-ask spread of small companies is substantial, and thus concluded that most trading strategies are in fact not profitable when adjusting for transaction costs. Scott and Xu (2004) investigated the informational value of percentage changes in insiders' holdings. They hypothesized that large changes are driven by profit reasons and are thus informative, whereas smaller changes arise due to e.g. personal liquidity needs. They indeed found that outsiders could benefit by mimicking these trades.

In the spirit of the modern literature, Cohen et al. (2012) investigated how to differentiate informative from uninformative trades. They divided insider transactions into opportunistic and routine trades. A routine trade occurs when an insider makes a transaction in the same calendar month for three years in a row, and opportunistic trades are the ones not following this pattern. The intuition behind this classification is that trades made for profit are not following time patterns. As Yermeck (1995) notes, today's insiders are to a large extent compensated with bonuses and are offered favorable equity discount plans, often in the same calendar month each year. Cohen et al. (2012) found that opportunistic trades are truly informative of future abnormal returns, whereas routine trades are not. This rational makes sense in the case of the American stock market since executives receive as much as 133% of their remuneration in bonuses and equity plans as compared to base salary. The Swedish number is considerably lower, where the equivalent ratio is 33% (Georgen and Renneboog, 2011).

Regarding the literature on the Swedish stock market, Kallunki et al. (2009) found the value of insider transactions as a percentage of the personal wealth to be a predictive factor of future stock performance. This kind of analysis requires comprehensive data from the Swedish tax agency, which on the one hand is publicly available, but is not easily accessible as compared to data on insider trading published by the FI.

3 Law and regulation

This section briefly summarizes the Swedish insider legislation and the key differences as compared to the U.S. legislation. The discussion on details of insider regulation is outside the scope of this thesis, however key points and developments are important to stress for understanding our motivation to focus on insider trading in Sweden.

Regulation related to insider trading in Sweden is based on the U.S. regulation. Thus, Swedish laws related to insider trading are similar to the American ones, although there are some differences to outline. According to The Insider Trading and Securities Fraud Enforcement Act of 1988, the maximum sentence for illegal insider trading is ten years in the USA, while the maximum sentence is only four years in Sweden. Another key difference between the Swedish and the U.S. legislation is that Swedish insiders must hold the acquired security for at least 3 months, whereas the holding period is 6 months in the U.S.

There are two regulatory requirements that are important to stress. The first one is that insiders are prohibited from trading on confidential information that is not publicly available. In 1934, by adopting the Securities Exchange Act, the U.S. was the first country to impose restrictions on insider trading. The main target of the act was the management of publicly listed companies. Such individuals possess unique access to company information and their personal decisions may in some cases affect firm performance. Later, other countries introduced similar restrictions on the management group, board members and large shareholders. In Sweden, insiders can trade provided they do not act on material information that is undisclosed to the public (Act Concerning Reporting Obligations for Certain Financial Instruments (2000:1087) and the Market Abuse Penal Act (2005:377).

The second requirement of insider legislation is the disclosure rules for both insiders and companies involved in insider deals. Before 2002, insiders in U.S. companies were obliged to report the insider deals and changes of insiders' holding positions to the SEC on a monthly basis. Later this requirement was changed to two business days. Companies listed on the Stockholm Stock Exchange are also required to report the identity of individuals involved in the insider deals and their holding changes to the FI. The insider involved in the deal should notify the FI within 5

working days post transaction. According to the FI, a penalty of 10% of the transaction should be paid by the insider in case of delayed reporting (minimum SEK 15 000 and maximum SEK 350 000). The FI is also responsible for controlling that companies comply with regulation and report on a timely basis.

In Sweden there are on average 145 cases of suspected illegal conduct per year. However, there are only 2 proven cases of unauthorized use of non-public information during the 2011-2014 period. Thus, the effect of illegal insider trading on the market is not vast. In the case of illegal insider trading, the individual involved in the transaction is subject to a penalty fee or imprisonment and all potential profits from the deal will be seized. The insider deals are registered in the public register with detailed information about the deal, category of insider, change of position and other information.

The Market Abuse Directive (2003/6/EC) implemented in 2005 harmonized the reporting time to 5 business days across the European Union. Hence, insider disclosures became publically available on a timely basis and investors could potentially use this information for their benefit.

4 Motivation

As outlined, the literature on insider trading is rich. However, from a Swedish perspective there are several motives for why investigating insider trading is still meaningful. The literature on informative insider trades in Sweden is limited, where the bulk of research has been conducted on the U.S. stock market. There are two main reasons for why motives behind insider trading could potentially differ between the countries. Corporate compensation structure is one potential reason since American corporate insiders are remunerated substantially more in bonuses and equity plans compared to their Swedish equivalents. Secondly, there are differences in insider regulation. American insiders are allowed to trade less and have stricter disclosure requirements than their Swedish counterparts. Thus, different behavior patterns could be incentivized. By outlining these differences between America and Sweden, we think that American strategies will not necessarily be applicable in the Swedish context.

Insiders have the most comprehensive access to information in their own companies and no research will probably ever erase the informational asymmetry between insiders and outside investors. However, insiders do not only trade for profit reasons, and our motivation for this thesis is to give outside investors an educated hint whether an insider deal is of informational value. To the best of our knowledge, only Kallunki et al. (2009) have investigated on the informational value of insider trades in Sweden, where they combined personal wealth data from the Swedish tax agency. However, as we are more concerned about profits for regular investors, it is beyond of their scope to acquire additional data from the Swedish tax office. We believe that there are more pragmatic methods for identifying informative insider trades in the Swedish stock market by applying publicly available data from the FI and regular stock returns. In this thesis, want to investigate whether outside investors could use these strategies to identify insider deals that are predictive of future abnormal returns.

5 Hypotheses

Before analyzing the characteristics of insider trading, we start by simply investigating whether outside investors could on average benefit from mimicking insider trades. If the insider deals are connected to superior information, we expect the security to react in an abnormal manner.

Hypothesis 1: The market's reaction following insider deals is abnormal.

Furthermore, the literature suggests that the size of the company is a significant factor when assessing insider deals. We therefore question whether the market reacts in a different manner with regard to the size of the company.

Hypothesis 2: Abnormal returns after insider trading are larger in smaller companies, compared to larger ones.

After answering the standard questions of abnormal returns following insider deals, we deepen the analysis and try to distinguish the characteristics of insider deals that lead to abnormal returns, and the ones that do not. Following the approach by Bettis et al. (1997), Scott and Xu (2004), we hypothesize that the change of the insider's holding is an important predictive factor of whether the insider trades for profit reasons, or has other underlying motives (such as diversification or liquidity needs). Specifically, we want to study whether the percentage change of the insider's holding is predictive of future abnormal returns. Based on previous literature (Lin and Howe, 1990), we are also curious whether the absolute volume of the transaction is predictive of future abnormal returns.

Hypothesis 3a: An insider deal with a large percentage change of the insider's holding is predictive of future abnormal returns.

Hypothesis 3b: An insider deal with a large SEK transaction is predictive of future abnormal returns.

Since there are several different insider categories, we examine the informational value of each insider group. Not all insiders possess the same amount and quality of information and it is hence fair to hypothesize that the informational values of their trades differ.

Hypothesis 4: Outsiders can make abnormal returns by following a particular insider category.

We continue the analysis in the spirit of Cohen et al. (2012), and distinguish between deals by corporate insiders that are made in a routine fashion from the ones that are opportunistic. Following their logic, we hypothesize that there are insider trades that occur in a predictable time pattern due to some underlying reason, such as bonuses and beneficial equity plans. If that were the case, we have reasons to believe that the unpredictable trades, i.e. the opportunistic ones, do entail information about the company's future performance.

Hypothesis 5: Opportunistic trades are predictive of future abnormal returns.

6 Data and methodology

6.1 Data Sources

Our data set consists of companies listed on the Stockholm Stock Exchange and insider transactions reported to the FI covering the period between 2005 and 2014. The year 2005 was set as the initial year since the new EU harmonization legislation was then introduced. The original data set contained 71 023 transactions that covered deals of all insider categories. After adjustments and data cleaning as presented below, our sample consists of 16 998 transactions.

From the FI we retrieved a data set that included information on the company's ISIN number, company name, insider name and the insider's position in the company, the type of transaction, the number of shares traded, the type of security traded, the trading date and the publication date. We excluded observations where the insider type was not defined, as well as companies without ISIN numbers. Additionally, we excluded deals that involved share repurchases by the company, convertible securities, American Depositary Receipts, and deals for which the price or the market capitalization was not available for the whole observational period. We also excluded transactions that involved zero stocks traded, since we did not consider such deals to be meaningful. Also, observations with no reasonable information were excluded. We therefore filtered observations with a negative price-to-book ratio or a negative stock price, or if the stock was sold by the insider but the amount of shares owned increased. From Thomson Reuters DataStream we retrieved the firms' market capitalization, weekly and monthly stock prices and price-to-book ratios. In case if the share price was not available at Thomson Reuters Datastream, we complemented the information from Bloomberg.

Like Lakonishok and Lee (2001), we only examined open market operations such as purchases and sales. Options refer to purchase transactions by exercising options using the closing price. All other types of operations were removed from the sample, such as grants or award transactions. Based on the classification of the FI, insiders were divided into CEOs, board members, large shareholders (insiders who own more than 10% of the shares or possess more than 10% of the voting rights), and "others" (investors that are required to report their trades but

do not fall into the management, CEO, or the large shareholder categories). Finally, we got a detailed data set that allowed us to study firm performance in the context of insider trading.

6.2 Descriptive statistics

Table 1 summarizes descriptive statistics for the total sample of insider trades, as well as the subdivision of small, mid and large-cap companies. Based on the information collected, we could see that the amount of transactions related to insider trading was growing from year to year until 2007. However, in 2009 the amount of deals decreased drastically as well as the average transaction amount in SEK, which dropped almost eight times as compared to 2008. Hence, insiders seemed to be more cautious during the period of financial distress, reducing their trading activity.

Another interesting observation is that the maximum transaction value of the whole period almost always corresponds to the maximum transaction in small or mid-cap companies, where large-cap companies only stood for the largest deal in 2013 and 2014. Thus, this observation is in line with our accent to study insider deals in small and medium companies, and hence consider the size factor in relation to insider trading. Also, based on the amount of deals performed by insiders for each capitalization class, we observe that insiders are most active in mid-cap companies.

Table 1

Descriptive Statistics of Insider Trades

For the period February 2005 –December 2014, Table 1 summarizes descriptive statistics of insider trades for small-cap firms (below 500 mln SEK), mid-cap firms (500 – 8000 mln SEK) and large-cap firms (more than 8000 mln SEK). The average, maximum and the standard deviation of the deals are reported in thousand SEK.

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Combined Sample										
Number of Transactions	2667	3187	3360	2995	288	230	202	126	1921	2091
Avg. Transaction Value	13 292	47 965	60 830	8 667	985	2 227	2 106	1 176	2 369	1 295
Max. Transaction Value	11 229 408	40 398 221	62 386 000	6 873 827	34 594	109 250	165 587	31 205	1 584 000	181 688
St. Dev of Transaction Value	265 208	991 622	1 242 141	162 806	3 638	9 654	15 669	4 137	37 077	8 530
Small-Cap										
Number of Transactions	714	803	835	695	105	52	70	20	300	260
Avg. Transaction Value	43 497	123 086	204 937	23 270	1 309	1 930	591	120	775	602
Max. Transaction Value	11 229 408	40 398 221	62 386 000	6 873 827	34 594	35 700	9 470	840	38 724	99 151
St. Dev of Transaction Value	509 572	1 664 962	2 435 884	330 935	4 892	5 386	1 479	184	2 983	6 162
Mid-Cap										
Number of Transactions	1 168	1 360	1 613	1 416	152	136	87	71	925	888
Avg. Transaction Value	2 999	36 838	19 492	5 276	804	2 230	3 906	932	1 430	1 040
Max. Transaction Value	748 679	23 418 189	11 577 679	955 307	25 158	109 250	165 587	31 205	159 893	166 666
St. Dev of Transaction Value	31 856	813 208	356 440	42 801	2 563	10 761	23 764	3 960	9 598	8 208
Large-Cap										
Number of Transactions	785	1 024	912	884	31	42	45	35	696	943
Avg. Transaction Value	1 134	3 834	2 001	2 618	773	2 584	982	2 274	4 304	1 726
Max. Transaction Value	157 000	756 080	224 412	550 400	17 030	64 906	7 890	28 500	1 584 000	181 688
St. Dev of Transaction Value	7 045	37 427	10 039	22 681	3 040	10 111	1 705	5 349	60 542	9 334

Studies on the U.S. market, such as Lakonishok and Lee (2001) and Sehun (1986), detected more sales than purchases, and explained it as changes due to corporate remuneration structures. In the U.S.A., the management receives a substantial part of their remuneration in bonuses, options and equity plans in their own companies. Thus, they accumulate a significant part of their equity portfolio in their own companies, and will sooner or later start selling these stocks for diversification benefits or liquidity needs. Based on the information presented in Table 2, we could see that the Purchase/Sale ratio for the studied period is always more than one, implying that insiders in Sweden are more involved into purchase than sale transactions. According to Goergen and Renneboog (2011), option, bonus and equity compensation for management groups in Sweden is prevalent to a lesser extent than in other economies such as the U.S.A. or the UK. This could be one of the potential explanations for why the amount of purchase transactions is higher than sale transactions in our sample.

Table 2

Distribution of purchase and sale transactions per year

This table summarizes the chronological distribution of insider purchases and sales for each year. The Purchase/Sale ratio is computed by dividing the amount of purchase transactions by sales transactions for each year.

Year	#Transactions	# Purchase deals	#Sale Deals	Purchase/Sale Ratio
2005	2693	1537	1156	1,33
2006	3249	1743	1506	1,16
2007	3365	2187	1178	1,86
2008	2995	2200	795	2,77
2009	290	171	119	1,44
2010	232	118	114	1,04
2011	203	126	77	1,64
2012	126	67	59	1,14
2013	1927	1137	790	1,44
2014	2095	1319	776	1,70
Total	**17175**	**10605**	**6570**	**1,61**

Table 3 represents the chronological distribution of insider transactions for each month. One observation that could be made from this table is that insiders trade more frequently in May and December. Thus, it would be reasonable to control for monthly fixed effects.

Table 3

Chronological distribution of insider trades per month.

Month	# Of Deals	# Purchase Deals	# Sale Deals
1	833	477	356
2	1589	922	667
3	1702	919	783
4	819	464	355
5	2349	1516	833
6	1702	1092	610
7	856	522	334
8	1064	736	328
9	1385	899	486
10	1036	708	328
11	1733	1077	656
12	2107	1270	837
Total	**17175**	**10602**	**6573**

Table 4 reports the difference between the trading day and the day when the trade became publicly available at the FI. Based on the information collected, almost 72% of the deals were reported within the first 5 days, and 94% within the first ten days after the trade occurred. Also, the median of the difference between the publication and trading date was approximately three days. The delay between the trading and the publication date is rather short, which gives outside investors reasonable time to take the insider trade into consideration.

Table 4

Difference between the trading and the publication date in days

Days	**0**	**1**	**2**	**3**	**4**	**5**	**6-10**	**>10**
# Of deals	1105	3320	2034	2199	2000	1659	3835	1023
Percentage	6,4%	19,3%	11,8%	12,8%	11,6%	9,7 %	22,3%	6,0%
Cumulative	6,4%	25,8%	37,6%	50,4%	62,1%	71,7 %	94,0%	100,0%

6.3 Methodology

Event study

In order to investigate the informative value of insider transactions, we first need to estimate the market's reaction after these trades. We do so by generating abnormal returns using the event study methodology as outlined by MacKinlay (1997). Roughly, the event study could be described as the investigation of a firm's deviation from its expected performance during a defined time period due to a hypothesized causal event. We will investigate the market effects in the 1, 6 and 12 months investment horizons. Similarly to Lakonishok and Lee (2001), we focus primarily on the long-run effects since the previous literature strongly indicates that insider trades are predominantly to be detected after several months. A second important parameter in the event study is the actual event date, which we will set as the publication date by the FI. We chose to study the publication date since the overwhelming majority of the literature finds strong support for the trading date, i.e. the date the insider herself made the transaction, to be predictive of future abnormal return. If we were to study the trading date, we believe not to contribute considerably to the existing literature. The debate on the other hand is much stronger whether outside investors could profit by following announced insider trades. This consequently motivates us to contribute with new insights to this question.

Continuing, perhaps the most crucial technical component of an event study is that of the normal return estimator on which the normal return and thus the abnormal return will be dependent on. There are many different normal return estimators, which can be roughly categorized into formal asset pricing models or firm-specific portfolios. The first sophisticated asset pricing model was the Capital Asset Pricing Model derived by Sharpe (1964) and Lintner (1965) which enjoyed great popularity by scholars in the 1970-1980, serving as the normal return estimator of studies conducted by e.g. Jaffe (1974) or Finnerty (1976). The nature of the model is economic, and is thus derived from assumptions about rational investors' willingness to incur excess risk.

The CAPM has served a pivotal role in finance and is still used by many practitioners today. However, based on the findings of Banz (1981) and Reinganum (1981), discussed by

Seyhun (1986), Fama and French (1992), the model has received substantial critique since it faces problems when explaining expected returns of small stocks. Since the model's residuals are on average positive (negative) for small (large) firms, issues arise in scenarios where insiders in small firms predominantly purchase than sell, as the residuals would thus be significantly associated with purchases. This in turn would mean overestimation of the abnormal returns. To overcome this issue in the context of insider trading, Seyhun (1986) proposed the market model which in contrast to the CAPM, is a statistical model that assumes joint normality distribution and thus expects the prediction errors to be zero. To avoid the shortcomings of the CAPM, we will accordingly choose the market model as proposed by recent scholars.

The market model is however not flawless. The underlying idea of an event study is that the adjustment of stock prices to a particular event is spread over a long period. A major imperfection of the market model is the estimation period of normal returns. Reports show that stock prices often in the pre-event window begin to display abnormal behavior, which naturally will bias the estimation parameter. Yet, as Fama (1998) acknowledges, there is no optimal normal return model, and consequently there does not exist a gold standard method to estimate the "correct" normal returns. The firm specific portfolio methodology developed by Fama and French (1992), Daniel (1997) avoids the problems of the market model since it is not dependent on a pre-event estimation period. Furthermore, the firm specific portfolios have been proven to be reliable where Metrick (1999) reports that this method significantly increases the precision of abnormal returns, and Fama (1998) states that sorting portfolios on size and book-to-market are important factors in explaining the cross-sectional variation of stocks. In the case of insider trading, the size component becomes an even more relevant factor, since small firms receive less attention from analysts and insiders of small firms tend to have better access to information, compared to their equivalents in large firms. Thus, insider deals of small firms could potentially be rich in information where the size factor becomes an important explanatory variable. Thus, this is another motivation to incorporate the size effect when estimating abnormal returns.

The firm-specific portfolios have consequently enjoyed great success in recent insider trading literature and have been widely applied by many scholars (such as Lin and How 1990; Scott and Xu, 2004; Lakonishok and Lee, 2001; Cohen et al., 2012 to name a few). Two popular portfolio methods used are the size characteristic and the one of size and book-to-market

characteristics. Although similar at first glance, Fama (1998) reports that abnormal returns can differ substantially between these two models. Consequently, to limit the drawbacks of relying on a single model, the normal returns in this thesis were estimated using the market model, size portfolios and finally size and book-to-market portfolios. However, due to the limitations of Thomson Reuters DataStream on the Swedish stock market, we used the price-to-book ratio instead of book-to-market in order to extract more observations for our sample.

The return metric

Once the normal returns have been estimated, another issue is that of the proper return metric. As the previous literature is clearly congruent in that abnormal returns are detectable in the long-run, we accordingly chose to examine the longer effects of insider trading. However, studying long-run abnormal returns is not straightforward (Kothari and Warner, 1997), As far as cumulative abnormal returns (CARs) prevail when analyzing abnormal returns during short-run event windows, the current literature has not established a gold standard for measuring the abnormal returns in the longer run. The two most popular long-run return metrics are the CAR and the buy-and-hold abnormal return (BHAR) estimators, which are going to be discussed below.

From an investor's perspective, the BHAR is the most intuitive metric since it exactly measures the investor's experience. From the statistical point of view, the most extensive comparison between the CAR and the BHAR has been done by Barber and Lyon (1997). Regarding the CAR, Barber and Lyon found it to be a biased estimator of the BHAR, and hence advocated the use of BHARs. However the BHAR is not free from limitations, where Barber and Lyon (1997) show that long-horizon BHARs are positively skewed, which in turn increases the probability of a type-1 error since the p-values would be too low. They solve this issue by applying the Johnson standard error when testing the statistical significance of the BHAR. In a follow up study, Barber and Lyon (1999) tested the sensitivity of the return metric with respect to the normal return estimator and identify that bias can arise due to rebalancing, new-listing issues and skewness. They accordingly suggest to solve the rebalancing and new-listing biases by benchmarking security returns with adequate portfolios based on firm specific characteristics. We follow the insights of Barber and Lyon, and adopt the BHAR methodology and correct for

skewness issues with the Johnson standard errors. Furthermore, we apply two portfolio normal return models which solve the issues concerning rebalancing and new-listing. In this way, we reduce the statistical drawbacks of the BHAR metric.

The market model

As mentioned, the market model is a statistical model and rests on the assumption that returns are jointly multivariate normal, and independently and identically distributed through time. These assumptions may seem to be strong; but the market has however proven not to deviate from them substantially. As MacKinly (1997) outlines, the strength of the market model lies within its ability to reduce the variance of the abnormal return by controlling for market movements. An important factor is that of the market return, which can be calculated from an equally or value-weighted index. Since equally-weighted indices give larger weight to small stocks, we therefore prefer to use a value-weighted index. MacKinlay (1997) and Fama (1998) also note that adding additional factors to the market model and thus constructing multifactor models to reduce the abnormal return's variance is possible, but the gains are marginal. We will therefore satisfy with the market return as the sole risk factor, and consider it as stated in equation 1:

$$R_{i,t} = \alpha_i + \beta_i R_{mt} + \varepsilon_{i,t} \quad (1)$$

Where

$R_{i,t}$= Realized return

E ($\varepsilon_{i,t}$) =0

V ($\varepsilon_{i,t}$) =$\sigma^2{}_{\varepsilon,i}$

Equation (1) states that the expected return of a security for a given time-period is explained by the sensitivity to the market return multiplied by the market's return. Hence, to assess what a given security is expected to perform at a future predefined time period t, the sensitivity of the security to the market return, the beta, must be previously estimated. The beta is estimated in the estimation window, which measures the given security's co-movement with the market, which we set to a 6 months period less one week before the event date (less one week in order not to let

the event itself influence the estimation parameter). The estimated sensitivity, which is expressed as $\widehat{\beta_i}$ (covariance of the security's return and the market return, divided by the market return's variance), is then in combination with the market return at time t used to estimate the expected return of a given security at time t, which is described in equation (2):

$$E\left(R_{i,t}\middle|X_t\right) = \widehat{\alpha_i} + \widehat{\beta_i}R_{m,t} \quad (2)$$

Where

$E\left(R_{i,t}\middle|X_t\right)$= Expected return of a security in time t, given the market return in time t

The last step in order to calculate the abnormal return is to deduct the expected return from the realized return, which is described in equation (3) by the buy-and-hold abnormal return (BHAR).

$$BHAR_{i,t} = R_{i,t} - E\left(R_{i,t}\middle|X_t\right) \quad (3)$$

Equation (3) states that for a given security at a given time, the abnormal return is the difference between the actual return and the expected return. Since we study abnormal returns during the 1, 6 and 12 months investment horizons, the t we consider are therefore the aforementioned investment horizons.

Firm specific characteristics portfolios: Size

In order to account for the size effect when estimating abnormal returns, we construct a set of diversified portfolios for companies based on different market capitalization classes. In total we created 8 size based groups for each year that were used to estimate normal returns. Firms from the Stockholm Stockholm Stock Exchange were then placed in the appropriate group based on their market capitalization as of April. Similarly to Lakonishok and Lee (2001), we took the market capitalization of the firm for each company in April every year because we assumed a

four months lag in accounting reporting. Since we constructed portfolios based on the April market capitalization, each firm could change the size group once per year. In the next step, we calculated the 1 month, 6 months and 12 months normal returns for each portfolio by averaging returns across firms in each size group. Then, each insider deal was matched with the appropriate portfolio in order to calculate the abnormal return for the selected time period. Table 5 presents the distribution of insider deals for each size portfolio in our sample. Insiders have on average more purchases than sales and are also more active in trading small and medium-cap companies as compared to large-cap companies.

Table 5

Distribution of Insider Deals per Size Portfolio

Size portfolios	# Total Deals	# Purchase Deals	# Sale Deals
1 (smallest)	744	435	309
2	1067	586	481
3	1448	991	457
4	1970	1347	623
5	2012	1153	859
6	2774	1692	1082
7	3259	1954	1305
8 (largest)	3901	2458	1443
Total	*17067*	*10616*	*6559*
		Purchase	**Sale**
Firm size average		23 200,77	24 575,11
Min firm size		2,64	4,29
Max firm size		427 976,80	438 774,80

We denote $R_{i,t}$ as the return for the insider company i in month t, and $E\left(R_{i,t}\middle|size_t\right)$ as the normal return of the matching bin based on size in month t. The BHAR is then calculated as following:

$$BHAR_{i,t} = \prod_{t=1}^{\tau} \left[1 + R_{i,t}\right] - \prod_{t=1}^{\tau} \left[1 + E\left(R_{i,t}\middle|size_t\right)\right] \quad (4)$$

Also, in order to calculate the abnormal returns correctly, we deduct the insider company's return from the portfolio return before calculating the abnormal returns.

Firm specific characteristics portfolios: Size and price-to-book

We also choose to calculate normal returns based on the size and price-to-book characteristic. In total, we created 8 portfolios that were based on size and price-to-book parameters as of April in each year. Also, we excluded all observations that had negative price-to-book ratios. The portfolios were constructed in two steps. First, we ranked all companies according to the market capitalization, using 4 cutoff levels. Second, within each size group, companies were sorted into two groups based on price-to-book criteria. There were more cutoffs for the market capitalization than for price-to-book since it displayed more dispersion. Thus, we received a 4x2 matrix based on size and price-to-book characteristic with average returns for each group for the 1, 6 and 12 months period. Following the same logic of the size portfolios, we denote $R_{i,t}$ as the return of insider company i in month t and $E\left(R_{i,t}\middle|size_t, p/b_t\right)$ as the normal return to the matching bin based on size and price-to-book in month t. The BHAR is then calculated as following:

$$BHAR_{i,t} = \prod_{t=1}^{\tau} \left[1 + R_{i,t}\right] - \prod_{t=1}^{\tau} \left[1 + E\left(R_{i,t}\middle|size_t, p/b_t\right)\right] \quad (8)$$

Also, as in the case of the size model, we deduct the return of the insider company involved in the insider deal from the portfolio return before calculating the abnormal return.

Testing the statistical significance of buy-and-hold abnormal returns

In accordance to Barber and Lyon (1999), the t statistic for the BHAR is calculated as following:

$$t_{BHAR} = \overline{BHAR}_t / (\sigma(BHAR_t)/\sqrt{n}) \quad (5)$$

Where

$\overline{BHAR_t}$ = sample average BHAR

$\sigma(BHAR_t)$ = the cross-sectional sample standard deviation abnormal returns for the sample of n firms.

Complementing the regular t-statistic, we also calculated the Johnson t-statistic as following:

$$t_{sa} = \sqrt{n}(S + \frac{1}{3}\hat{y}S^2 + \frac{1}{6n}\hat{y}) \quad (6)$$

Where

$$S = \frac{\overline{BHAR}_\tau}{\sigma(BHAR_\tau)}, \text{ and } \hat{y} = \frac{\sum_{i=1}^{n}(BHAR_{i\tau} - \overline{BHAR}_{i\tau})^3}{n\sigma(BHAR_\tau)^3} \quad (7)$$

Variable definitions

Before discussing the multivariate regression analyses, we start with describing how we constructed the variables. We firstly created the variable that captures opportunistic trades, OPPORT, by distinguishing between trades that are done in the same calendar month for two consecutive years (which we call routine trades), and the ones that do not follow this pattern (which we call opportunistic trades) as following:

$$OPPORT_{j,i,t} = \begin{cases} 1, & opportunistic\ trader\ j, company\ i\ at\ time\ t \\ 0, & routine\ trader\ j, at\ company\ i\ at\ time\ t \end{cases}$$

A heavy trading deal is defined as a deal where two different insiders make a transaction in the same company. The transactions have to be of the same kind (i.e. buy+buy, or sell+sell, e.g. sell+buy does not imply a heavy trading deal). The variable is constructed as following:

$$HTRAD_{i,t} = \begin{cases} 1, & heavy\ trading\ deal\ in\ company\ i\ at\ time\ t \\ 0, & no\ heavy\ trading\ deal \end{cases}$$

Regarding insider categories; CEOs, board members and "others" were simply constructed as dummy variables where "BRDM" denotes board member and "OTHR" denotes "others", as following:

$$BRDM_{j,i,t} = \begin{cases} 1, & if\ boardmember j, company\ i\ at\ time\ t \\ 0, & else \end{cases}$$

$$CEO_{j,i,t} = \begin{cases} 1, & if\ CEO\ j, company\ i\ at\ time\ t \\ 0, & else \end{cases}$$

$$OTHR_{j,i,t} = \begin{cases} 1, & else\ j, company\ i\ at\ time\ t \\ 0, & if\ CEO, BRDM, LRGSH \end{cases}$$

Following the definition from the FI, a large shareholder is defined as one that holds more than 10% of either equity or voting rights, and is constructed as following:

$$LRGSH_{j,i,t} = \begin{cases} 1, & if\ shareholder\ j \geq 10\%\ equity/voting\ rights, company\ i\ \ at\ time\ t \\ 0, & else \end{cases}$$

Ultimately, the size of the company and the value of the transaction were calculated as their logarithms, as following:

$LSIZE_{i,t}$= logarithm market capitalization company i, at time t

$LTRANS_{i,t}$= logarithm SEK amount of insider deal for insider i, at time t

Multivariate regressions

We will finally examine what factors explain abnormal returns related to insider trading transactions by executing two Ordinary Least Squares (OLS) regression which will be run with and without monthly fixed effects. Jegadeesh and Titman (1993) have described that stocks with prior good or poor performance during the past months tend to continue in the same direction. Therefore, in order to understand if insider trades are predictive of future returns we control for past returns. Past return is defined as the performance of the stock during the last 24 months before the event. We also control for price-to-book, since insiders are reported to present contrarian behavior (Lakonishok and Lee, 2001). Although not explicitly stated in the regression specifications below, we control for these two factors in all the regressions.

In the first regression (equation 9) we test whether abnormal returns can be predicted by the size of the company, the SEK value of the transaction, the insider category (CEO, board member, large shareholders or "other"), or heavy trading deals. The regression is specified as following:

$$BHAR_{i,t}=\alpha_i + \beta_1(LSIZE_{i,t}) + \beta_2(LTRANS_{i,t}) + \beta_3(OTHR_{i,t}) + \beta_4(BRDM_{i,t}) + \beta_5(LRGSH_{i,t})+\beta_6(CEO_{i,t}) + \beta_7(HTRAD_{i,t})+\varepsilon_{i,t} \quad (9)$$

In order to test whether opportunistic or routine deals are predictive of abnormal returns, we run a separate regression since we restrict the sample to corporate insiders and thus exclude large shareholders and "others" from the data set. We do so since the underlying idea of routine trading is that corporate insiders receive bonuses and equity plans, and are hence to a larger extent motivated to trade for other reasons than for profit (such as diversification or personal liquidity). Including large shareholders or "others" would thus not be meaningful in the analysis. When testing opportunistic trades, we also included the logarithm of the market capitalization (LSIZE), the logarithm of the transaction value in SEK (LTRANS) and Heavy Trading Deals (HTRAD). The regression is specified as in equation (10):

$$BHAR_{i,t}=\alpha_i + \beta_1(LSIZE_{i,t}) + \beta_2(LTRANS_{i,t}) + \beta_3(HTRAD_{i,t})+\beta_4(OPPORT_{i,t})+\varepsilon_{i,t} \quad (10)$$

7 Results

Abnormal returns to outside investors

The results section is going to start with describing the profits of outsiders following insider trading deals in the general case. Outsiders earn abnormal returns if the stock price increases abnormally after the publication of a purchase transactions, or if the stock price declines abnormally after the publication of a sale transaction. Therefore, in order to make abnormal returns of purchase and sale deals comparable, the abnormal returns of sale deals were multiplied by -1. Since three different normal return models were used, abnormal returns will be reported as ranges between the lowest and the highest abnormal return. A general comment regarding the significance test should be in place. We found the Johnson t-statistics to be virtually identical to the regular t-values, hence we chose to only report regular t-values in this paper.

Table 6 reports abnormal returns estimated by the market model, the size portfolios as well as the size and price-to-book portfolios, for the investment horizons of 1 month, 6 months and 12 months. For the 1 month investment horizon, the abnormal returns are between 0,22% and 0,40% ($p<0,01$). The rather low magnitude is in line with the previous literature which is consistent in that abnormal returns related to insider deals are to be detected in the longer run. The 6 months abnormal returns grow in magnitude, ranging between 1,31%-1,85% ($p<0,01$). The trend of increasing abnormal returns with the time horizon is consistent, where the 12 months period yields the highest abnormal returns between 2,65% and 3,18% ($p<0,01$).

Table 6

Abnormal Returns for the Total Sample

The table reports average buy-and-hold abnormal returns for the investment horizons 1, 6 and 12 months. Abnormal returns were calculated based on three normal return models (p/b and size model, size model and the market model). The sample covers the period of February 2005-December 2014 and contains 14420-16928 insider deals depending on the normal return model.

Investment horizon	P/B, Size Model	Size Model	Market Model
0-1 month	0,39%***	0,22%***	0,40%***
	(4.71)	*(2.58)*	*(4.19)*
0-6 months	1,85%***	1,90%***	1,31%***
	(7.53)	*(7.77)*	*(5.08)*
0-12 months	3,18%***	3,33%***	2,65%***
	(8.33)	*(8.77)*	*(6.38)*

Abnormal returns pertaining sales deals were multiplied by -1 before combining with abnormal returns pertaining purchase transactions. Abnormal returns were tested if different from zero where ***, **, and * denote statistical significant at the 1%, 5%, and 10% respectively. T-values are reported in parentheses.

We continue the results section by presenting the effects of insider trading with respect to the size of the company. Table 7 presents abnormal returns calculated using the three normal return estimators for small, mid and large–cap companies. The abnormal returns of small and mid-cap companies are increasing with the investment horizon. For the 1 month period, all normal return models report significant results, and the abnormal returns are between 0,43% and 0,98% for the small-cap companies. In the same investment horizon, mid-cap companies experienced somewhat lower abnormal returns, ranging between 0,31% and 0,61%. During the 6 month investment horizon, this difference between small and mid-cap companies disappears where both groups on average experience abnormal returns of approximately 2,5%. The equality between small and mid-cap companies also prevails in the 12 months investment horizon where the abnormal returns are around 4,5%. Large-cap firms behave differently, where the abnormal returns are statistically insignificant and around zero for most of the investment horizons and normal return models. These results indicate that insider deals are profitable in small and mid-cap companies, however not in large-cap companies.

Table 7

Abnormal returns for Small, Mid and Large-cap firms

Table 7 reports average buy-and-hold abnormal returns for small-cap firms (market capitalization below 500 mln SEK), mid-cap firms (market capitalization 500 – 8000 mln SEK) and large cap firms (market capitalization more than 8000 mln SEK). Average buy-and-hold abnormal returns were calculated based on three models (p/b and size model, size model and the market model). The sample covers the period February 2005 –December 2014.

	Small-Cap			***Mid-Cap***			***Large-Cap***		
Investment horizon	**P/B, Size Model**	**Size model**	**Market model**	**P/B, Size Model**	**Size model**	**Market model**	**P/B, Size Model**	**Size model**	**Market model**
0-1 month	0,87%***	0,43%*	0,98%***	0,31%**	0,36%***	0,61%***	0,20 %	-0,12 %	-0,20%**
	(4.22)	*(1.69)*	*(3.65)*	*(2.36)*	*(2.93)*	*(5.07)*	*(1.34)*	*(-1.11)*	*(-2.00)*
0-6 months	2,72%***	2,76%***	2,45%***	2,30%***	2,45%***	1,88%***	0,54%**	0,45%*	-0,35%
	(3.39)	*(3.46)*	*(4.27)*	*(7.41)*	*(7.87)*	*(5.51)*	*(2.20)*	*(1.88)*	*(-1.40)*
0-12 months	4,41%***	4,64%***	5,68%***	4,16%***	4,32%***	2,81%***	0,69%	0,75%*	0,13%
	(4.04)	*(4.27)*	*(4.56)*	*(7.83)*	*(8.14)*	*(4.90)*	*(1.57)*	*(1.75)*	*(0.29)*

Abnormal returns pertaining sales deals were multiplied by -1 before combining with abnormal returns pertaining purchase transactions. Abnormal returns were tested if different from zero where ***, **, and * denote statistical significant at the 1%, 5%, and 10% respectively. T-values are reported in parentheses.

Table 8 investigates the informational value of large and small trades. The deals are described with the total amount of shares traded as well the relative change of the insider's holding position. The horizontal categories display the percentage change of the insider's position in the firm due to the particular deal, and the vertical categories show the absolute amount of shares traded in that deal. Most transactions involved less than 30,000 shares (82% of all deals), where transactions that also changed the insider's position by less than 10% (36% of all deals) was the most common insider deal. The overall trend of this table illustrates that the absolute amount of shares is an important complement to the percentage change of shares owned. The data supports this statement, since almost all normal return models consistently report higher abnormal returns for deals involving more than 30,000 shares than compared to the ones involving less than 30,000 shares. The only case when deals involving less than 30,000 shares outperform the ones of more than 30,000 is when the relative change of the holding is less than 10% for the 6 months period.

For the 6 months investment horizon, consistent for all normal return models, the highest abnormal returns were reported in the scenario when the insider changed her amount of shares by more than 50% in a large transaction involving more than 30,000 shares. For these particular deals, the abnormal returns are consistently high for all normal return models, ranging between 6,21%-6,92% ($p<0,01$). The lowest returns were obtained when the insider changed the amount of shares between 10-50% in a small transaction involving less than 30,000 shares. These kind of trades yielded between 0,40% - 0,70% abnormal returns, but were however not significantly different from zero.

When analyzing the same scenarios in the 12 months investment horizon, similar conclusions are to be reached. Trades less than 30,000 shares that changed the amount of shares between 10% and 50% yielded the smallest abnormal returns, ranging between 0,41%-0,63%, but were insignificant from zero in all models. Perhaps a bit surprisingly, trades involving more than 30,000 shares but changing the amount of shares by only 10%-50% yielded the highest abnormal returns in the 12 months setting. These kind of trades were highly profitable, yielding abnormal returns between 5, 69% and 8,14% ($p<0,01$).

Finally, we want to say that no particular insider group is overrepresented in any kind of transaction. This means that no particular insider group predominantly made transactions that were especially profitable. The exception of large shareholders must however be noted, since it appears that almost 60% of them made transactions in bins with very low returns (i.e. deals below 30,000 shares and less than 10% holding changes). For more details about the distribution of the insiders, please see Table 9.

Table 8

Abnormal Returns on Shares Traded as a Percentage of Shares Owned

For the 6 and 12 months investment horizon, Table 8 shows average buy-and-hold abnormal returns on shares traded as a percentage of shares originally owned (less than 10%, 10-50% and more than 50%). Abnormal returns for selected periods were calculated based on three models (price-to-book, size and market model). The sample covers the period February 2005 –December 2014. Abnormal returns pertaining sales deals were multiplied by -1 before combining with abnormal returns pertaining purchase transactions. Abnormal returns were tested if different from zero where ***, **, and * denote statistical significant at the 1%, 5%, and 10% respectively. T-values are reported in parentheses.

6 months investment horizon

	P/B, Size Model			**Size Model**			**Market Model**		
Shares traded	*Less than 10 %*	*10-50 %*	*More than 50 %*	*Less than 10 %*	*10-50 %*	*More than 50 %*	*Less than 10 %*	*10-50 %*	*More than 50 %*
0- 30,000 shares	1,52%***	0,40 %	2,53%***	1,49%***	0,70 %	2,54%***	0,97%**	0,60 %	*1,39%****
#of obs	*5700*	*3390*	*3896*	*5700*	*3390*	*3896*	*5309*	*3169*	*3711*
	(3.67)	(0.79)	(6.07)	(3.61)	(1.41)	(6.15)	(2.15)	(1.14)	*(3.03)*
Over 30,000 shares	0,57 %	2,71%*	6,56%***	0,63 %	2,95%*	6,21%***	-0,86 %	3,11%*	*6,92%****
#of obs	*997*	*652*	*1049*	*991*	*652*	*1049*	*952*	*614*	*1012*
	(0.45)	(1.78)	(6.12)	(0.51)	(1.92)	(5.86)	(-0.62)	(1.80)	*(6.13)*

12 months investment horizon

	P/B, Size Model			**Size model**			**Market model**		
Shares traded	*Less than 10 %*	*10-50 %*	*More than 50 %*	*Less than 10 %*	*10-50 %*	*More than 50 %*	*Less than 10 %*	*10-50 %*	*More than 50 %*
0- 30,000 shares	3,04%***	0,50 %	3,66%***	3,18%***	0,63%	3,93%***	2,72%***	0,41 %	1,54%***
#of obs	*5229*	*3031*	*3603*	*5229*	*3031*	*3603*	*5126*	*3075*	*3617*
	(4.88)	(0.62)	(5.52)	(5.15)	(0.79)	(5.91)	(3.99)	(0.49)	(2.20)
Over 30,000 shares	4,52%**	8,81%***	5,69%***	4,37%**	9,07%***	5,74%***	3,94%**	8,93%***	8,14%***
#of obs	*960*	*598*	*999*	*960*	*598*	*999*	*925*	*597*	*981*
	(2.46)	(4.03)	(3.21)	(2.39)	(4.13)	(3.24)	(1.95)	(3.33)	(3.98)

Table 9

Distribution of insider groups

For the 6 and 12 months investment horizon, Table 9 reports the distribution of "others", board members, large shareholders (Large) and CEOs across bins. For each bin and insider category, the number of insiders was divided by the total amount of insiders respective to their category.

6 months investment horizon

Shares traded	Less than 10 %				10-50 %				More than 50 %			
0- 30,000 shares												
	33,2%	38,7%	56,9%	36,9%	24,6%	17,5%	7,7%	22,8%	32,4%	17,9%	4,5%	13,6%
Category of insider	*"Others"*	*Board*	*Large*	*CEO*	*"Others"*	*Board*	*Large*	*CEO*	*"Others"*	*Board*	*Large*	*CEO*
Over 30,000 shares												
	3,4%	10,0%	10,5%	8,9%	2,1%	6,8%	7,3%	5,9%	4,4%	9,0%	11,9%	11,8%
Category of insider	*"Others"*	*Board*	*Large*	*CEO*	*"Others"*	*Board*	*Large*	*CEO*	*"Others"*	*Board*	*Large*	*CEO*

12 months investment horizon

Shares traded	Less than 10 %				10-50 %				More than 50 %			
0- 30,000 shares												
	33,4%	37,6%	58,9%	36,7%	23,6%	17,5%	7,2%	22,3%	29,6%	18,1%	4,5%	13,1%
Category of insider	*"Others"*	*Board*	*Large*	*CEO*	*"Others"*	*Board*	*Large*	*CEO*	*"Others"*	*Board*	*Large*	*CEO*
Over 30,000 shares												
	14,2%	10,4%	11,0%	9,8%	2,2%	6,7%	7,0%	5,5%	4,6%	9,1%	11,4%	12,6%
Category of insider	*"Others"*	*Board*	*Large*	*CEO*	*"Others"*	*Board*	*Large*	*CEO*	*"Others"*	*Board*	*Large*	*CEO*

Multivariate regressions analyses

Continuing the analysis of the returns to outside investors, the exposition now turns to the regression analyses, where multivariate OLS sets were run for the 6 and 12 months investment horizons. As seen in the data description, the trading activity stands out in some months, and we therefore ran regressions with and without monthly fixed effects. However, as the outcome is virtually the same in most of the cases, we will only comment on the monthly fixed effects regressions when differences are substantial (for fixed effects regressions, please see the Appendix).

Two regression sets were run as specified by equation (9) and (10), where (9) is presented in table 10 below. This regression tests whether the logarithm of the firm's market capitalization (LSIZE), the logarithm of the transaction value in SEK (LTRANS), the category of insider, and Heavy Trading Deals (HTRAD) are predictive of abnormal returns. The second regression, as specified by equation (10), is presented in table 11 where we test whether opportunistic trading is informative for future abnormal returns. For this test we chose to run a separate regression since we exclude large shareholders and "others" from the sample as they are not beneficiaries of bonuses or equity remuneration plans.

Testing firm size, the transaction value, the insider category and Heavy Trading Deals

6 months investment horizon

For the 6 months setting, all normal return models find the firm's market capitalization to be a predictor of abnormal returns. The logarithm of firm size is negative and highly statistically significant in all estimation models, implying that insiders of small stocks have an informational advantage. The logarithm of the SEK value of the deal is not significant in any model, suggesting that the transaction amount itself is not informative of future returns. To a large extent, the data supports Heavy Trading to be informative of future abnormal returns. All three normal return models yield highly statistically significant results ranging between 1,17%-1,64%. Furthermore, not all types of insiders predict future performance. The coefficient of CEOs is not significantly different from zero in any regression, except for the size portfolios when controlling for monthly fixed effects. We further find that board members and "others" are insignificant in the firm characteristics models, but significant in the market model. In the latter case, board members and

"others" earn negative abnormal returns of -2,9% and -2,4 respectively. Based on the results from the regressions, it seems to be the case that CEOs, board members and "others" are not consistently associated with future abnormal returns. However, trades by large shareholders consistently show significant results of large negative abnormal returns between -7% and -3,2%.

12 months investment horizon

Widening the time horizon to 12 months, we find comparable results to those of 6 months. Firm size is still a highly significant predictor of abnormal returns, further strengthening the informational advantage of insiders in small firms. As in the case of the 6 months period, the logarithm of the SEK value of the deal is not significant in any model. The Heavy Trading variable was also significant in all regressions in the 12 months setting, except for when abnormal returns were estimated with the portfolios based on size. However, when controlling for monthly fixed effects, this variable now also reports a statistically significant effect. The 12 months effect of Heavy Trading is comparable to that of 6 months, ranging between 1,4% and 2,04% (as compared to 1,17% and 1,64% in the 6 months period).

Regarding the effect of particular insiders, the results have changed somewhat in the longer run. In the 6 month setting, there was little evidence supporting that CEO transactions lower the firm's abnormal returns. However, after 12 months both of the firm characteristics models suggest a negative effect of CEO trades on firm performance, reporting that transactions by CEOs to yield negative abnormal return between -4,7% and -5,15%. The market model on the other hand shows that the CEO effect is insignificant from zero. However, when controlling for monthly fixed effects, the negative effect of CEOs is only prevailing in the size and price-to-book model. Regarding board members and "others", again as in the 6 months horizon, only the market model reports significant abnormal returns, which in the 12 month setting is also negative. We can yet again observe that CEOs, board members and "others" are not consistently associated with abnormal returns. Again, large shareholders show consistent negative results. As in the case of 6 months, transactions of large shareholders are heavily negatively predictive of future abnormal returns.

Table 10

Cross-Sectional Regressions for Six and Twelve Months

Regressions of abnormal returns over the period of 6 and 12 months on log of firm market capitalization (LSIZE), log of SEK value of transaction (LTRANS), the insider category and heavy trading stocks(HTRAD).The insider categories are: "others" (OTHR), board members (BRDM), large shareholders (LRGSH) and CEOs. Insider categories and HTRAD are constructed as dummy variables. HTRAD denotes stocks that were bought or sold by 2 or more different insiders at the same month. Abnormal returns were calculated using three methods (P/B and size, size and market model). We control for price-to-book and past returns. Robust T-values are presented in parenthesis. ***, **, and * denotes statistically significant difference from zero at the 1%, 5%, and 10% level respectively. N is between 14 420 and 16 928 depending on the model used to calculate abnormal returns.

A. Six Months Investment Horizon

	Intercept	LSIZE	LTRANS	OTHR	BRDM	LRGSH	CEO	HTRAD	F-statistics	R-squared
P/B, Size Model	0,0527***	-0,0091***	-0,00145	0,0008	-0,00062	-0,0321**	-0,0074	0,0163***	2,83***	0,00
	(2,91)	(-2,57)	(-0,49)	(0,11)	(-0,09)	(-2,04)	(-0,56)	(3,11)		
Size model	0,0140***	-0,0106***	-0,0019	-0,0044	-0,0083	-0,0421***	-0,0159	0,0140***	3,35***	0,00
	(3,77)	(-3,01)	(-0,67)	(-0,64)	(-1,14)	(-2,76)	(-1,2)	(2,68)		
Market model	0,0797***	-0,01032***	-0,0029	-0,0240***	-0,0291**	-0,0704***	0,0102	0,0117**	6,39***	0,00
	(3,98)	(-2,74)	(-0,85)	(-3,04)	(-2,22)	(-4,09)	(0,77)	(2,07)		

B. Twelve Months Investment Horizon

	Intercept	LSIZE	LTRANS	OTHR	BRDM	LRGSH	CEO	HTRAD	F-statistics	R-squared
P/B, Size Model	0,1156***	-0,0166***	-0,0036	-0,0138	-0,0067	-0,0801***	-0,0477**	0,01556*	4,00***	0,00
	(3,96)	(-3,45)	(-0,82)	(-1,26)	(-0,57)	(-3,55)	(-2,33)	(1,89)		
Size model	0,1281***	-0,0181***	-0,0041	-0,0163	-0,0101	-0,0877***	-0,0515***	0,0138	4,69***	0,00
	(4,42)	(-3,79)	(-0,95)	(-1,48)	(-0,86)	(-3,96)	(-2,54)	(1,69)		
Market model	0,1555***	-0,0274***	-0,0018	-0,0353***	-0,0358***	-0,1363***	0,0015	0,0204**	8,67***	0,01
	(4,81)	(-5,18)	(-0,37)	(-2,81)	(-2,65)	(-5,64)	(0,07)	(2,28)		

Testing opportunistic trades: 6 and 12 months investment horizon

In table 11 we provide a new perspective to capture the informational content of insider trading by focusing on opportunistic and routine deals. As outlined in the introduction, insiders trade for various of reasons such as tax, liquidity or diversification needs. These motives are clearly not related to profit. Therefore, in order to expand our analysis we distinguish between insiders that trade in a routine or opportunistic fashion. Following the methodology of Cohen et al. (2012), we define the routine transaction as when a corporate insider trades in the same month for two years in a row. If the insider does not follow this pattern, he is considered to be opportunistic. Corporate insiders are defined as CEOs and board members, which means that large shareholders and "others" were excluded from the analysis. As a result our sample of insider deals is reduced by almost two times and we could thus expect that some coefficients and respective t-values in the previous regression (as presented in table 10) would change.

As Table 11 presents, the results do not support opportunistic deals to be predictive of future abnormal returns in Sweden. For the 6 months period, no normal return model shows significant coefficients. For the 12 months period, only the market model shows a slightly statistically significant coefficient. This coefficient is however negative, which is not in line with the rational that unexpected trades of corporate insiders should be associated with profit motives. However, since all other normal return models show insignificant results from zero, we do not put too much emphasis on this finding. As expected, the other variables included in this reduced regression have changed as compared to results in table 10. For the 6 months period, the size factor is consistently negative for all normal return models, but is not significantly different from zero in this limited regression. However, for the 12 months period, the size factor is again negative and statistically significant in the market model and the size portfolios, which is also the case when testing the full sample (Table 10). Similarly, the Heavy Trading variable has in this regression lost its predictive power since it is insignificant from zero in all investment horizons and normal return models. For the 6 months investment horizon, the logarithm of the transaction value in SEK, is marginally statistically significant in the market model and the size portfolios where the coefficient is negative. However, during the 12 months investment horizon, this variable becomes insignificant in all normal return models. Finally, we want to comment that the findings are virtually the same when controlling for monthly fixed effects (Appendix Table 12).

Table 11

Opportunistic Trading- Cross-Sectional Regressions

Regressions of abnormal returns over the period of 6 and 12 months on log of firm market capitalization (LSIZE), log of SEK value of transaction (LTRANS), heavy traded stocks (HTRAD) and opportunistic trades (OPPORT). HTRAD denotes stocks that were bought or sold by 2 or more different insiders in the same month and is constructed as a dummy variable. Opportunistic trades are those trades that are not routine. By routine we define trades by an insider that occur in the same calendar month for two consecutive years. Abnormal returns were calculated using three methods (P/B and size, size and market model). We control for price-to-book and past returns. Robust T-values are presented in parenthesis. ***, **, and * denotes statistically significant difference from zero at the 1%, 5%, and 10% level respectively. N is between 7050 and 7701 depending on the model used to calculate abnormal returns.

A. Six Months Investment Horizon

	Intercept	LSIZE	LTRANS	HTRAD	OPPORT	F-statistics	R-squared
P/B, Size Model	0,0717***	-0,0061	-0,006	0,0082	-0,0093	1,7	0,00
	(2,94)	(-1,24)	(-1,43)	(-1,43)	(-1,18)		
Size model	0,0831***	-0,0067	-0,0075*	0,0064	-0,01	2,22**	0,00
	(3,42)	(-1,36)	(-1,78)	(0,83)	(-1,28)		
Market model	0,1066***	-0,0095*	-0,0105**	0,0092	-0,00709	3,33***	0,00
	(3,92)	(-1,82)	(-2,1)	(1,13)	(-0,81)		

B. Twelve Months Investment Horizon

	Intercept	LSIZE	LTRANS	HTRAD	OPPORT	F-statistics	R-squared
P/B, Size Model	0,1098***	-0,0134	-0,0046	0,0062	-0,0194	1,63	0,00
	(2,77)	(-1,80)	(-0,74)	(0,49)	(-1,62)		
Size model	0,1324***	-0,0142**	-0,0077	0,0048	-0,0215*	2,31**	0,00
	(3,41)	(-1,94)	(-1,25)	(0,39)	(-1,8)		
Market model	0,1939***	-0,0298***	-0,0105	0,02	-0,0199	5,22***	0,00
	(4,52)	(-3,57)	(-1,52)	(1,44)	(-1,43)		

8 Conclusions and future research

The evidence presented in this thesis indicates that outside investors could profit from mimicking insider deals. When examining the whole sample, we found that outside investors cannot net of transaction costs earn economically meaningful abnormal returns in either the short or the long-run investment horizon. However, we found some features of insider trades to be predictive of abnormal returns in the long-run. The size of the firm, large deals with significant percentage changes of the insider's holding, and Heavy Trading were found to signal informational value of the insider deal.

We found that insider trades in small and mid-cap companies are associated with economically meaningful abnormal returns, whereas abnormal returns are almost non-existent in large-cap companies. In the 6 month investment horizon, the abnormal returns for small and mid-cap companies are around 2,5%, which is not impressive after taking transaction costs into account. However, the abnormal returns increase in the 12 month period where they are approximately 4,5% and thus interesting from an economic perspective. The importance of the size factor is supported by a large body of literature (Seyhun, 1986,1988; Rozeff and Zaman, 1988; Lakonishok and Lee, 2001). Furthermore, Seyhun (1986), as well as Rozeff and Zaman (1988) consider outsiders' abnormal returns from insider trading to be insignificant from zero post transaction costs, however our findings suggest economically significant abnormal returns 12 months post transaction. A potential explanation for these differences is the data source of insider trading, where the aforementioned studies relied on the "official summary" which was published by the SEC on a monthly basis. This often meant delays of several weeks between the trading and the publication date. In the modern setting, information is rapidly published in the internet and the delay is thus substantially smaller (median 3 days delay in our sample) which is a reasonable amount of time for outside investors to trade on.

Furthermore, we find support that abnormal returns are followed by large deals that significantly change the insider's holding. These large deals were economically significant and earned 6%-8% annually. Moreover, these particular transactions were not linked to any specific insider category, which is also in line with the regression analyses that did not find any particular

insider to predict abnormal returns in general. The only exception noted is that of large shareholders, who are consistently associated with negative abnormal returns. We also found that large shareholders were predominantly involved in small trades that changed their holding positions slightly and thus yielding low returns. These findings indicate that large shareholders trade on less valuable information and are less familiar with the companies' operations. One potential scenario could be that once large shareholders have bought a significant equity stake and are considered as insiders, they further predominantly trade for others reasons than profit. Concluding, the absolute amount of shares traded and the relative holding change on average predict the informational content of the deal, which is in line with previous research such as Bettis et al. (1997) and Scott and Xu (2004).

We found Heavy Trading (i.e. deals involving several insiders) to be informative since this factor is associated with 1.5%-2% abnormal returns in the long-run horizon. Although the magnitude of such deals is not economically impressing, this variable could be seen as a complementing signal for other trading strategies. This result is consistent with Lin and Howe (1990), who also found heavy trading to be predictive of future abnormal returns.

There are two methods in this thesis that have not been proven to be informative. Firstly, the transaction amount in SEK was consistently not predictive of abnormal returns. This result is also in line with the previous literature, where Jaffe (1974) notes that large dollar transactions are not informative. Furthermore, Seyhun (1986) found this variable to hold some predictive power, which was however not economically meaningful when taking transaction costs into consideration. Secondly, unlike Cohen et al. (2012), our data does not find support for opportunistic trades to be predictive of future stock performance. Assuming that recurrent trades in time are driven by other reasons than profit motives is highly intuitive. However, the data of Cohen et al. (2012) is restricted to the American stock market, and is therefore specific to the corporate remuneration culture of that country. We conclude that opportunistic trades based on patterns in calendar months is not predictive of abnormal returns in Sweden. Therefore it is unwise for outside investors to distinguish between opportunistic and routine trades for informational inferences.

Preferably, as Kallunki (2009) has shown, the personal wealth of the insider is an important factor to consider but requires comprehensive data from the tax agency. This strategy

could be feasible for professional asset management firms, but is however too complex for most outside investors. By analyzing simple publicly available data from the Finansinspektionen, this thesis has shown that regular outsiders can distinguish which insider deal characteristics are truly informative for future abnormal returns. We have found support for that the category of insider per se is not essential, but what the insider actually does is determining future firm performance. The results from this thesis could be implemented by anyone. Outside investor should examine the deal based on the size of the company, the number of insiders involved in the transaction and if these deals were large and thus changing the insider's position substantially. The aforementioned strategies associated with abnormal returns are easy to implement, but are nevertheless powerful in their informational content.

Furthermore, these results mark a violation against the semi-strong efficient market hypothesis since outside investors could earn abnormal returns by applying the aforesaid strategies using publicly available data. These results are however not astonishing in an international perspective, where Bettis et al, (1997), Scott and Xu (2004) and Cohen et al. (2012) also successfully distinguish between informative and uninformative insider trades that outside investors could profitably benefit from. Our results are also economically meaningful, which indicates that outside investors are in general not familiar with these strategies. If outside investors would be informed about the abnormal returns related to insider trading, we could expect the returns of these strategies to decline in the long-run, and the Stockholm stock market would thus become more efficient.

A limitation of this thesis is that the investigated methods for identifying informative insider trades have been inspired from the American literature. Although modified to the Swedish context, we believe that qualitative as well as quantitative research could identify more motives and behavioral patterns of insiders. If Swedish insiders were better known, future research could investigate tailor made strategies for identifying informative insider trades in the Swedish setting.

9 References

Banz, 1981, The Relationship Between Return and Market Value of Common Stock, Journal of Financial Economics.

Barber, Lyon, 1997, Detecting Long-Run Abnormal Stock Returns: The Empirical Power and Specification of test statistics, Journal of Financial Economics (43), 341-372.

Berle, Means, 1932, The Modern Corporation and Private Property (Macmillan, New York).

Bettis, Vickrey, Vickrey, 1997, Mimickers of Corporate Insiders Who Make Large Volume Trades, Financial Analyst Journal (53), 57-66.

Cohen, Malloy, Pomorski, 2012, Decoding Inside Information, The Journal of Finance(67), 1009-1043.

Daniel, Grinblatt, Titman, Wermers, 1997, Mesuring Mutual Fund Performance with Characteristic-Based Benchmarks, The Journal of Finance (52), 1035-1038

Fama, 1970, Efficient Capital Markets: A Review of Theory and Empirical Work, The Journal of Finance (25), 387-417.

Fama, 1988, Market Efficiency, long-term returns, and behavioral finance, Journal of Financial Economics (49), 283-306.

Fama, French, 1992, The Cross Section of Expected Stock Returns, The Journal of Finance (47), 427-465.

Finnerty, 1976, Insiders and Market Efficiency, The Journal of Finance (31), 1141-1148.

Gary Glass, "Extensive Insider Accumulation as an indicator of near term stock price performance" (ph.D. diss.., Ohio State University, 1966).

Georgen, Renneboog, Renneboog, 2011, Managerial Compensation, Journal of Corporate Finance (17), 1068-1077.

Jegadeesh, Titman, 1993, Returns to Buying Winners and Selling Losers: Implications for Market Efficiency, The Journal of Finance (48), 65-91.

Jagolinzer, 2009, SEC Rule 10b5-1 and Insiders' Strategic Trade, Management Science.

Jaffe, 1974, Special Information and Insider Trading, The Journal of Business (47),410-428.

Jeng, Metrick, Zeckhauser,2003, Estimating the Returns to Insider Trading: A Performance-Evaluation Perspective, The Review of Economics and Statistics, (85), 453-471.

Kallunki, Nilsson, Hellström, 2013, Why do Insiders Trade? Evidence Based on Unique Data on Swedish Insiders, Journal of Accounting and Economics, Forthcoming.

Kothari, Warner, 1997, Measuring Long-Horizon security price performance, Journal of Financial Economics (43), 301-339.

Lakonishok and Lee, 2001, Are Insider Trades Informative?, Review of Financial Studies, (14), 79-111.

Lin, Howe, 1990, Insider Trading in the OTC Market, The Journal of Finance (45), 1237-1284.

Lorie, Niederhoffer, 1968, Predictive and Statistical Properties Of Insider Trading, Journal of Law and Economics (11), 165-194.

Lintner, 1965, The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets, The Review of Economics and Statistics (47), 13-37.

Lyon, Barber, Tsai,1999, Improved Methods of Long-Run Abnormal Stock Returns, The Journal of Finance (54), 165-201.

MacKinlay , 1997, Event Studies in Economics and Finance, Journal of Economic Literature (35), 13-39.

Metrick,1999, Performance Evaluation with Transactions Data: The Stock Selection of Investment Newsletters, The Journal of Finance (56),45-86.

Reinganum, 1981, Misspecification of Capital Asset Pricing: Empirical Anomalies based on earnings' yields and market values, Journal of Financial Economics (9), 19-46.

Rogoff 1964, The Forecasting Properties of Insiders' Transactions', The Journal of Finance (19), 697-698.

Rozeff, Zaman, 1988, Market Efficiency and Insider Trading: New Evidence, The Journal of Business (61),25-44.

Scott, Xu, 2004, Some Insider Sales Are Positive Signals, Financial Analyst Journal (60), 44-51.

Seyhun, 1986, Insiders' Profits, Costs of Trading, and Market Efficiency, Journal of Financial Economics (16), 189-212.

Seyhun, 1988, The Informational Content of Aggregate Insider Trading, Journal of Business (61), 1-24.

Sharpe, 1964, Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk, The Journal of Finance (19), 425-442.

Smith,1940, Management Trading and Stock Market Profits, The Journal of Business of the University of Chicago (13), 103-117.

Yearmack, 1995, Do Corporations award CEO stock options effectively?, The Journal of Finance (39), 237-269.

Finansinspektionen. Available at: www.finansinspektionen.se. (Accessed: February 2015)

U.S. Securities and Exchange Commission. Available at: www.sec.gov. (Accessed: February 2015)

Databases

Thomson Reuters DataStream. (2015) [Online]. Available at: Subscription Service. (Accessed: February 2015)

Bloomberg Professional. (2015) [Online]. Available at: Subscription Service (Accessed: February 2015)

Finansinspektionen. (2015) [Online]. Available at: www.finansinspektionen.se (Accessed: February 2015)

10 Appendix

Table 11

Cross-Sectional Regressions With Monthly Fixed Effects

Monthly fixed effects regressions of abnormal returns over the period of 6 and 12 months on log of firm market capitalization (LSIZE), log of SEK value of transaction(LTRANS), the insider category and heavy trading stocks(HTRAD). Insider categories are: "others" (OTHR), board members (BRDM), large shareholders (LRGSH) and CEOs. Insider categories and HTRAD are constructed as dummy variables. HTRAD denotes stocks that were bought or sold by 2 or more different insiders at the same month. Abnormal returns were calculated using three methods (P/B and size, size and market model). We control for price-to-book and past returns. Robust T-values are presented in parenthesis. ***, **, and * denotes statistically significant difference from zero at a level of 1%, 5%, and 10% respectively. N is between 14 420 and 16 928 depending on the model used to calculate abnormal returns

A. Six Months

	Intercept	LSIZE	LTRANS	OTHR	BRDM	LRGSH	CEO	HTRAD	F-statistics	R-squared
P/B, Size Model	0,0458***	-0,0088***	-0,0013	0,0008	-0,0008	-0,0315**	-0,0074	0,01640***	2,56***	0,00
	(2,36)	(-2,48)	(-0,46)	(0,12)	(-0,11)	(-2,01)	(-0,56)	(3,12)		
Size model	0,0961***	-0,0168***	-0,0037	-0,0161	-0,0109	-0,0851***	-0,0851***	0,0144*	5,29***	0,00
	(3,21)	(-3,53)	(-0,85)	(-1,47)	(-0,94)	(-3,86)	(-2,56)	(1,76)		
Market model	0,0747***	-0,0101***	-0,0028	-0,0239***	-0,0189**	-0,0700***	0,0101	0,0118**	5,69***	0,00
	(3,5)	(-2,68)	(-0,83)	(-3,03)	(-2,23)	(-4,05)	(0,77)	(2,08)		

B. Twelve months

	Intercept	LSIZE	LTRANS	OTHR	BRDM	LRGSH	CEO	HTRAD	F-statistics	R-squared
P/B, Size Model	0,0857***	-0,0154***	-0,0032	-0,0137	-0,0074	-0,0777***	-0,0479**	0,0161**	4,53***	0,00
	(2,83)	(-3,21)	(-0,73)	(-1,25)	(-0,64)	(-3,45)	(-2,35)	(1,97)		
Size model	0,0615***	-0,0103***	-0,0019	-0,0043	-0,0084	-0,0416***	-0,0159	0,0141***	3,06***	0,00
	(3,19)	(-2,92)	(-0,64)	(-0,63)	(-1,16)	(-2,72)	(-1,21)	(2,69)		
Market model	0,1497***	-0,0271***	-0,0017	-0,0352***	-0,0359***	-0,1359***	0,0014	0,0204**	7,60***	0,01
	(4,45)	(-5,11)	(-0,36)	(-2,8)	(-2,66)	(-5,61)	(0,07)	(2,29)		

Table 12

Opportunistic Trading: Cross-Sectional Regressions with Monthly Fixed Effects

Monthly fixed effects regressions of abnormal returns over the period of 6 and 12 months on log of firm market capitalization (LSIZE), log of SEK value of transaction (LTRANS), heavy traded stocks(HTRAD) and opportunistic trades (OPPORT). HTRAD denotes stocks that were bought or sold by 2 or more different insiders at the same month and is constructed as a dummy variable. Opportunistic trades are those trades that are not routine. By routine we define trades by an insider that occur in the same calendar month for two consecutive years. Abnormal returns were calculated using three methods (P/B and size, size and market model). We control for price-to-book and past returns. Robust T-values are presented in parenthesis. ***, **, and * denotes statistically significant difference from zero at a level of 1%, 5%, and 10% respectively. N is between 7050 and 7701 depending on the model used to calculate abnormal returns.

A. Six Months

	Intercept	LSIZE	LTRANS	HTRAD	OPPORT	F-statistics	R-squared
P/B, Size Model	0,0671***	-0,006	-0,006	0,0083	-0,0093	1,37	0,00
	(2,65)	(-1,22)	(-1,42)	(1,08)	(-1,18)		
Size model	0,0803***	-0,0066	-0,0075*	0,0064	-0,01	1,78	0,00
	(3,19)	(-1,35)	(-1,78)	(0,83)	(-1,28)		
Market model	0,1004***	-0,0092*	-0,0104**	0,0093	-0,007	2,71**	0,00
	(3,51)	(-1,77)	(-2,09)	(1,14)	(-0,8)		

B. Twelve Months

	Intercept	LSIZE	LTRANS	HTRAD	OPPORT	F-statistics	R-squared
P/B, Size Model	0,0909**	-0,0129*	-0,0045	0,0065	-0,0193	1,66	0,00
	(2,23)	(-1,73)	(-0,72)	(0,52)	(-1,61)		
Size model	0,1118***	-0,0136*	-0,0136	0,0052	-0,0214*	2,26**	0,00
	(2,8)	(-1,87)	(-1,23)	(0,42)	(1,67)		
Market model	0,1989***	-0,0299***	-0,0106	0,0199	-0,0199	4,26***	0,00
	(4,45)	(-3,59)	(-1,52)	(1,43)	(-1,43)		

Table 13

Correlation matrix for 6 and 12 months regressions

For different investment horizons, Table 13 table presents correlation coefficients between the independent explanatory variables used in the regressions.

A. Total sample: 6 Months Investment Horizon

	LSIZE	LTRANS	OTHR	BRDM	LRGSH	CEO	HTRAD
LSIZE	**1**						
LTRANS	0.0594	**1**					
OTHR	0.2243	-0.1770	**1**				
BRDM	-0.1794	0.1331	-0.6522	**1**			
LRGSH	-0.1329	0.0340	-0.1781	0.1284	**1**		
CEO	-0.0962	0.0184	-0.2197	-0.1584	-0.0432	**1**	
HTRAD	0.2738	-0.0007	0.2273	-0.1789	-0.0869	-0.0612	**1**

B. Total sample: 12 Months Investment Horizon

	LSIZE	LTRANS	OTHR	BRDM	LRGSH	CEO	HTRAD
LSIZE	**1**						
LTRANS	0.0494	**1**					
OTHR	0.2113	-0.1761	**1**				
BRDM	-0.1706	0.1332	-0.6477	**1**			
LRGSH	-0.1351	0.0266	-0.1799	-0.1323	**1**		
CEO	-0.0950	0.0188	-0.2156	-0.1586	-0.0440	**1**	
HTRAD	0.2708	0.0027	0.2234	-0.1735	-0.0898	-0.0598	**1**

C. Reduced sample for testing opportunistic trades: 6 Months Investment Horizon

	LSIZE	LTRANS	HTRAD	OPPORT
LSIZE	**1**			
LTRANS	0.0414	**1**		
HTRAD	0.1953	0.0018	**1**	
OPPORT	-0.0417	0.0034	-0.0150	**1**

D. Reduced sample for testing opportunistic trades: 12 Months Investment Horizon

	LSIZE	LTRANS	HTRAD	OPPORT
LSIZE	**1**			
LTRANS	0.0271	**1**		
HTRAD	0.1963	-0.0015	**1**	
OPPORT	-0.0297	0.0033	-0.0171	**1**