

Insider trading in the Swedish market:

- Can mimicking strategies generate abnormal returns?

Babak Mardkhoram (40528)

Gustaf Matsson (21878)

Abstract

In this paper we investigate whether insiders generate abnormal returns over time and whether outsiders can make abnormal returns from mimicking the trades of insiders. We further investigate whether certain trade characteristics can help tell us something about the future returns and which insiders are the most profitable to mimic. We find that corporate insiders generate abnormal returns through short term investments, while only long term investments see abnormal returns when looking at a subsample of buy transactions only. Our results also suggest that an information hierarchy exists where CEO, board members and large shareholders generate higher abnormal returns than other insiders. We also find that the insider himself enjoys more consistent abnormal returns than do his relatives. Furthermore, we show that outside investors can generate abnormal returns by mimicking insiders' trades on the publication date. This information is used to create an investment strategy that continually generates abnormal returns.

Keywords: Insider trading, event study, abnormal returns, mimic, outside investor

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1 Introduction

When a CEO of a publicly traded company buys or sells stock in his own company, analysts are quick to comment and incorporate this information into their analysis. The most probable reason for this is the assumption that people in high managerial positions are better positioned to predict the future of their business than outside investors or analysts. A survey conducted by Bhattacharya and Daouk (2002) found that approximately 85 % of the countries with stock markets have introduced insider trading rules. In Sweden, an insider has to report a trade within five trading days (including transactions made by relatives). All insider transactions are then publically available in a register provided by the Swedish FSA which is updated daily. The main reason for publishing the insider transaction data are to counteract any potential abuse of inside information (Finansinspektionen 2015).

This paper investigates whether insider traders are able to generate abnormal returns and if certain characteristics of the transaction can provide us with valuable information regarding the rate of future abnormal returns. The first characteristic studied is if buy and sell transactions are equally informative when predicting future abnormal returns. Further, we study whether the insiders' position in the firm, the time it takes for an insider to report the transaction and the value of the transaction can provide us with information regarding future abnormal returns. We also study the informativeness of corporate insiders' relatives (e.g. child, wife/husband, legal person). Moreover, we investigate if it is possible for outside investors to generate abnormal returns by mimicking insiders' transactions. Finally, we implement a strategy suggested by Rozeff and Zaman (1988) which requires multiple insiders taking similar positions before returns are included in the portfolios.

Finnerty (1976), Rozeff and Zaman (1988) examined whether insiders could generate abnormal returns with the motivation that this was a way of testing the *efficient market hypothesis* (EMH). The existence of abnormal returns made by corporate insiders would suggest that private information is profitable and thus, one can reject the strong form of EMH. Many papers including Jaffe (1974), Seyhun (1986), Rozeff and Zaman (1988), Lakonishok and Lee (2001), suggest that financial markets in Western countries show semi-strong form efficiency, i.e. that private information is not fully reflected in stock prices. Therefore, an insider should be able to generate abnormal returns by using private information.

Another area of academic interest is the existence of asymmetric information and the effect on equity prices, as insiders possess more information about the future of the firm.

Lakonishok and Lee (2001) found that insiders in small firms had more opportunity to make abnormal returns, one reason being that smaller firms are scrutinized to a lesser extent by analyst resulting in greater information asymmetry. Some studies (Seyhun 1986, Lin and Howe 1990) have found positive correlations between higher positions within the firm and greater abnormal returns, suggesting an information hierarchy (i.e. varying degrees of asymmetric information).

Other papers have examined if outside investors can generate abnormal returns by mimicking insiders (Rozeff and Zaman (1988), Lin and Howe (1990), Bettis et al. 1997). These studies have generated mixed results, partly due to publication dates of insider trades being ambiguous. Kallunki and Nilsson (2009) and Cohen et al. 2012 hypothesized that many insider transactions occur for reasons other than the use of private information, such as portfolio diversification, tax or liquidity purposes.

The first part of the paper performs event studies to test insiders' ability to earn abnormal returns, the possibility for outsiders to generate abnormal returns by mimicking insider transactions and the informativeness of transaction characteristics. These event studies are conducted on five different holding periods (1, 5, 20, 250 and 500 days post trade). Jeng et al. (2003) found that the greatest amount of abnormal returns were generated during the first five days, while by Ke et al. (2003) found evidence that insiders possess significant information about future accounting disclosures two years before the time of disclosure. In the final part we test insiders' ability to generate abnormal returns and whether outsiders can earn abnormal returns by mimicking the transactions of insiders using the *calendar time portfolio approach* where we form six different portfolios.

We first investigate whether insiders are able to generate abnormal returns in general, then we examine the informativeness of buy and sell transactions as other papers have found that buy transactions yields abnormal returns while sell transactions are not (Bettis et al. (1997), Lakonishok and Lee 2001). We measure abnormal returns from sell transactions as if the insider had a short position in the stock, i.e. avoiding negative returns is deemed equivalent to earning abnormal returns.

Then we analyze the informativeness of the insiders' position within in the firm. Previous research conducted on the U.S. market have been able to show that there seems to be an information hierarchy and that insiders in higher positions are better at predicting future

abnormal returns (Seyhun (1986), Lin and Howe 1990). Furthermore, we investigate if trades made by relatives of a corporate insider are equally indicative of future abnormal returns.

We also test if the delay in reporting trades correlates with the rate of abnormal returns that insiders, or mimicking outsiders, earn. Most papers in this area are made on the U.S. market where the publication date and transaction date was not easily available, forcing the estimation of this duration. However, this data is available on the Swedish market through Finansinspektionens insynsregister, allowing us to perform tests without estimates.

Finally, since diversification, as well as tax and liquidity implications are important considerations to all investors, why Kallunki and Nilsson (2009) and Cohen et al. 2012 suggested that some inside trades hold no informative value as they are motivated by other reasons entirely. Therefore we construct portfolios subject to the criteria that 3 insiders must have made similar trades within 30 days of each other (with no transactions in the opposite direction), and approach suggested by Rozeff and Zaman (1988).

We find that insiders' transactions are generating future abnormal returns of 0.13 %, 0.55 % and 0.75 % for a holding period of 1, 5 and 20 trading days respectively. When testing buy and sell transactions separately, we find that buy transactions are more informative, generating abnormal returns of 0.27 %, 0.92 %, 1.43 %, 6.10 % and 7.60 % for holding periods of 1, 5, 20, 250 and 500 trading days, whereas we find negative abnormal returns from sell transactions. Furthermore, we are able to show that the insiders' position within the company affects the rate of abnormal returns. CEOs', board members and large shareholders earn higher abnormal returns than insiders' with other positions within a firm. We did not find any evidence that transaction value or the time for insiders to report their trades had any explanatory value for abnormal returns. Furthermore we find that the corporate insiders' themselves, their wives/husbands and legal persons do better returns in their inside trades than what their children, close relatives and cohabitants. Outside investors who mimic insiders are able to generate abnormal profits during 1, 5, and 20 trading days of 0.24 %, 0.46 % and 0.45 % for all transactions (both buy and sell transactions) in general. For buy transactions, outside investors generate 0.49 %, 0.77 % and 1.14 % over 1, 5 and 20 trading days respectively. Unlike Bettis et al. (1997), we did not find that the interval between the day of transaction and publication affected a mimicking outsider's ability to earn abnormal returns. Finally, Rozeff and Zamans portfolio strategy generates abnormal returns for all portfolios and in contrast to our previous results we find prove that insiders' are generating abnormal returns on their sell transactions. This suggests that using our threshold sorts out

informative transactions. The mimicking portfolios yield positive abnormal returns, suggesting that outsiders can generate a profit by mimicking insiders using this strategy.

Another paper that recently examined insider trading in the Swedish market is Bulatnicov and Zoltek (2015), who investigate whether outsiders can generate abnormal returns by mimicking insiders' transactions. In contrast to this paper that also focuses on the performance of the insiders themselves. They find that it is possible for outside investors to generate abnormal returns by mimicking insider transactions over holding periods of 1, 6 and 12 months. They further investigated whether the insiders' position is informative regarding future abnormal returns but could not find support for information hierarchy which this paper do. One possible reason for the different result is the time windows used. In line with this paper, Bulatnicov and Zoltek (2015) found that the transaction value did not contain any information value regarding future abnormal returns. Unique characterises tested in this paper is, the differences in buy and sell transactions and the duration time between transaction date and publication date. Moreover, Bulatnicov and Zoltek (2015) is only investigating the long term perspective while this paper also test the short-term results of insider trading. This is something we find interesting especially if you are studying the opportunity for outsiders to earn abnormal returns, who are not legally restricted when it comes to the time that they must hold a stock.

Although many papers have examined whether insiders are able to generate abnormal returns, most of these papers study the U.S stock market, as opposed to the Swedish market where better date information is available. Our paper provides useful information about the existence of abnormal returns from insider trading activity in Sweden and the possibility to make abnormal returns from mimicking these trades. Moreover, we conduct useful tests on specific transaction characteristics that have not been studied previously. Characteristics such as what relationship the person who make the transaction has to the corporate insider and the time interval between the transaction and publication date will contribute to this research field.

2 Previous research

Insider trading has been a popular topic in the last decades. Jaffe (1974) is one of the first papers published in this field. This paper found that insiders obtained an abnormal return of 2 % in a two month period and 7 % in a 12 month period. However, this study did not distinguish between buy and sell transactions which implies that one cannot conclude which type of transactions that yielded the abnormal returns. The article further found a relationship between the transaction value and abnormal returns. Seyhun (1986) conducted a study in which over 60 000 insider transactions were analyzed between 1975 and 1981. He found that most of the abnormal returns were generated in the first 100 days. Furthermore, the paper proved that a relationship existed between the size of the firms, the insiders' position within the firm abnormal returns. Insider transactions in smaller firms generated higher abnormal returns and transactions of CEOs and board members yielded higher abnormal returns than for other insiders. As in the first article, no correlation existed between transaction value and abnormal returns. Rozeff and Zaman (1988) analyzed the U.S. market between 1973 and 1982 and also investigated if outside investors could generate abnormal returns by mimicking insiders, by assuming that it would take two months for outside investors to obtain information of an insider transaction. One of the definitions of an insider transaction was that three different insiders would buy or sell a stock, and that no insider did the opposite. The purpose of this definition was to separate transactions based on private information from transactions for other reasons, such as portfolio diversification. When including transaction costs of 2 %, outside investors did not earn any abnormal returns and insiders generated abnormal returns of 3 % in a 12 month period. Lin and Howe (1990) used the same approach when examining transactions between 1975 and 1985. They found that insiders generated abnormal returns whereas outside investors did not yield any abnormal returns by mimicking insiders. Moreover, they found that the position of the insider in the firm did affect the rate of abnormal returns. Their results did not show that the firm size or the transaction value had any effect on abnormal returns. However, regarding outside investors, Bettis et al. (1997) did a study using data from the SEC and found that outsiders made abnormal returns by mimicking insiders. Other findings in this paper was that the opportunity to make a profit for outsiders by mimicking insiders diminished when the interval between the day of transaction and publication increased, and that buy transactions were more profitable. Lakonishok and Lee (2001) analyzed over one million transactions in the U.S market during a 20 year period (1975-1995), and they found that there were no signs that the market reacts to the publication of insider transactions, since they could not observe an increased trading volume for these

events. They also found that buy transactions were more profitable. According to this study, insiders were better at predicting the price movement in small firms. Their explanation was that larger firms are more accurately priced.

A study conducted by Ke et al. (2003) found evidence that insiders possess significant information about future accounting disclosures two years before the time of disclosure. Their results showed an increase in stock sales by insiders three to nine quarters before a break in consistent increases in quarterly earnings. Insider stock sales were greater for growth firms prior to a longer period of declining earnings. Finally, they found that there was little abnormal selling in the two closest quarters prior to a break, which they conclude is consistent with known legal complications that could arise from these kinds of trades. Huddart et al. (2007) examined how insider trades in U.S. are related with quarterly earnings announcements and the Form 10-K or 10-Q filing, which is the annual report containing a more comprehensive summary of a firm's performance. The results from this paper indicates that insider condition their trades on information regarding price-relevant public disclosures prior to the disclosure. Furthermore, they conclude that insiders avoid generating profits from trades when the risk associated with such trades is high, such as immediately prior to earnings announcements.

Fidrmuc et al. (2006) investigated the market's reaction to insider transactions in the U.K. and whether the reaction depended on the firm's ownership. They found larger abnormal returns in the U.K. market compared to the U.S. They believe that one possible reason could be due to differences in regulation between these markets, with emphasis on the speedier reporting of trades in the U.K. Another major finding was the importance to adjust for trades preceded by news on mergers and acquisitions and CEO replacements, which they found to contain less significant information. Kallunki and Nilsson (2009) examined if corporate insiders in the Swedish market had other reasons when trading in insider stock than the use of private information. The results showed that reasons such as portfolio rebalancing and tax purposes were more important in their trading decisions. They also found that insiders with a larger percentage of their wealth allocated to insider stock sold more before bad news earning disclosures. Cohen et al. (2012) exploit the fact that insiders trade for different reasons and find that one kind of insider transactions, which they call routine trades, are not informative about the future prospects of a firm and do not yield any abnormal returns. A portfolio constructed of the remaining transactions yields abnormal returns of 82 basis points per

month. The paper finds that the most informative traders are nonexecutive insiders from poorly governed firms.

3 Data and methodology

In our paper we first conduct an event study in which we investigate insider transactions in stocks on the Swedish stock exchange and whether these trades generate abnormal returns during different time intervals. Furthermore, we also investigate whether outside investors can generate abnormal returns by mimicking insiders. We first search for abnormal returns in general, without differentiating between different characteristics of the transactions. Other tests then look at different characteristics and if these characteristics impact the returns. We separate between buy and sell transactions and furthermore, our paper analyze whether the insiders' position in the firm have impact on the abnormal returns. Other features tested are the time between the transaction and the publication date, the size of the transaction, and whether it makes a difference if the insiders trade themselves or if the trade is made by a relative of the insider. Finally, we construct portfolios consisting of stocks where at least three transactions of the same sort (buy or sell) are conducted during the past month and that no trades have been done in the opposite direction during the same period. This strategy is used by Rozeff and Zaman (1988) in order to separate trades that are considered informative from trades due to reasons such as portfolio diversification. Regarding the outside investors, we test their ability to generate abnormal returns on the time horizons and characteristics where we find abnormal returns for insiders. Further we test if the time between transaction and publication date affects the possibility to generate abnormal returns. Bettis et al. (1997) found that the opportunity to make a profit for outsiders by mimicking insiders diminished when the interval between the day of transaction and publication increased.

We are interested in abnormal returns generated in the short run as well as the long run, and therefore we look at time intervals for 1, 5, 20, 250 and 500 days post trade. In order to conduct the event study, we obtain daily data on all reported insider transactions between March 1995 and April 2015. These transactions consist of shares listed on the Stockholm Stock Exchange (Nasdaq OMX Stockholm). The data on insider trades is gathered from Finansinspektionens insynsregister. Daily stock data are gathered from Datastream.

3.1 Event study

When conducting the event study, we follow the methods described by MacKinlay (1997). Examining insiders' own performance the event day (t_0) is the day that the transaction occurred and when studying the mimicking strategy the event day (t_0) is that the transaction was published. We have event windows from t_0 to 1, 5, 20, 250 and 500 post-event trading days. The estimation window, which is the time prior to the event, is set at 250 trading days. The selection criteria for our sample are all insider transactions available through Finansinspektionens insynsregister. Since we investigate to what extent insiders' transactions are profitable, we look at whether abnormal returns are generated from these trades. The returns are defined as the actual ex post return of a stock minus the expected return of the stock over a specific time interval (event window). The abnormal return (AR) from a stock in the sample is thus calculated as:

$$AR_{it} = R_{it} - E(R_{it}|X_t)$$

Where

AR_{it} : Abnormal returns

R_{it} : Realized returns

$E(R_{it}|X_t)$: Expected returns (normal returns)

X_t : Explanatory variables determining expected returns

We use the market model to estimate the expected return variable $E(R_{it}|X_t)$, and thus X_t is the market return. The market model relates the return of a security to the return of the market portfolio, and is defined as:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$$

Where

R_{it} : The return of the security

R_{mt} : The return of the market portfolio

ε_{it} : The zero mean disturbance term with variance $\sigma_{\varepsilon_i}^2$

The parameters of the market model, α_i and β_i , are estimated using OLS regression for an estimation window of 250 trading days.

$$\hat{\beta}_i = \sum_{t=-250}^{-1} \frac{(R_{it} - \bar{R}_i)(R_{mt} - \bar{R}_m)}{\sum_{t=-250}^{-1} (R_{mt} - \bar{R}_m)^2}$$

$$\alpha = \bar{R}_i - \hat{\beta}_i \bar{R}_m$$

Where \bar{R}_i and \bar{R}_m are the means of security and market returns for the estimation window. By using the market model to estimate expected returns for any given security i , abnormal returns are thus calculated as:

$$\widehat{AR}_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt})$$

Since our sample consists of shares from all categories traded on the Stockholm Stock Exchange we use OMX Stockholm PI as our market portfolio. The index consists of all shares listed on the Stockholm Stock Exchange.

Next, we aggregate the abnormal returns in order to draw overall inferences for the event of interest. First, we aggregate abnormal returns in time and these cumulative abnormal returns (CAR) are generated as:

$$CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it}$$

Furthermore, we aggregate cumulative abnormal returns in a cross-sectional analysis, with the purpose of calculating average CARs (ACAR). This method assumes that there is not any overlap in the event windows of the stocks in our sample, i.e. that no clustering exists. The implication of the assumption of no clustering is that the ARs and CARs will be independent across stocks. Average cumulative abnormal returns and their variance are calculated as:

$$\overline{CAR}(t_1, t_2) = \sum_{t=t_1}^{t_2} \overline{AR}_t$$

$$Var(\overline{CAR})(t_1, t_2) = \sum_{t=t_1}^{t_2} var(\overline{AR}_t) = \frac{1}{N^2} \sum_{i=1}^N \sigma_i^2(t_1, t_2)$$

Inferences about the CARs can be calculated by the following assumption:

$$\overline{CAR}(t_1, t_2) \sim N(0, var(\overline{CAR})(t_1, t_2))$$

The test statistic to test the null hypothesis equals:

$$\theta_1 = \frac{\overline{CAR}(t_1, t_2)}{\sqrt{Var(\overline{CAR})(t_1, t_2)}} \rightarrow N(0,1)$$

When testing for abnormal returns in general as well as for certain characteristics of the transaction, our null hypothesis is that the transactions do not generate abnormal returns with the alternative hypothesis that the transactions yield abnormal returns:

$$H_0: \overline{CAR}(t_1, t_2) = 0$$

$$H_1: \overline{CAR}(t_1, t_2) \neq 0$$

3.2 Portfolio approach

We furthermore use the calendar time portfolio approach to evaluate the insiders' and mimicking outsiders' ability to generate abnormal returns. By means of this method, we construct portfolios by executing transactions in stocks that are exclusively sold or bought three times in the past month (e.g. three insider buy transactions and no sell transaction are registered in the past month, hence the portfolio buys that stock). The portfolios are equally weighted, rebalanced each week and each position is hold for two months as suggested by Rozeff and Zaman (1988). This strategy aims to sort out informative transactions and hence tries to disregard transactions that are executed for other reasons that the insider might have e.g. portfolio diversification, liquidity needs, tax purposes. Portfolios are constructed with mixed portfolios (consisting of both buy and sell transactions), short portfolio (consisting of short positions in stocks that have been sold by insiders) and a long portfolio (consisting of long positions in stocks that have been bought by insiders). To test if the strategy is effective in sorting out successful insider investments we first form portfolios that measures the returns

of the chosen insiders' transactions. Next we form the mimicking portfolios with returns measured from the publication date, in order to test whether the strategy is prosperous for outside investors.

We use the calendar time portfolio approach to estimate abnormal returns generated from these transactions. This approach enable us to generate calendar time portfolio returns for transactions meeting our criteria and if the returns are abnormal in different regression models. The two regression models that we use are the Capital Asset Pricing Model (CAPM) and the Fama-French three-factor model, which is an expanded version of CAPM by also including firm size and firm value in addition to the market risk used in CAPM. The portfolio returns generated are equally weighted on a daily basis and then regressed using CAPM and the Fama-French three-factor models. Our first regression will test for abnormal returns using CAPM:

$$R_{pt} - R_{ft} = \alpha_p + \beta(R_{mt} - R_{ft})$$

Where

R_{pt} : the equally weighted return of the portfolio per month.

R_{ft} : the risk free rate (10 year Swedish government bonds).

R_{mt} : the return of the market portfolio (OMX Stockholm PI).

α_p : the average daily abnormal return of the portfolio.

Then we use the Fama-French three-factor model to test for abnormal returns:

$$R_{pt} - R_{ft} = \alpha_p + \beta(R_{mt} - R_{ft}) + b_sSMB_t + b_vHML_t$$

Where

SMB_t : the difference between the return on the portfolio of small stocks and big stocks.

HML_t : the difference between the return on the portfolio of high and low book to market stocks.

Our null hypothesis for the tests is that the transactions meeting our criteria do not generate abnormal returns with the alternative hypothesis that the transactions yield abnormal returns.

$$H_0: \alpha_p = 0$$

$$H_1: \alpha_p \neq 0$$

4 Results

4.1 Insiders' ability to generate abnormal returns

First, we investigate if insiders are making abnormal returns studying all transactions, including both sell and buy decisions together. Displayed in table 1 are the average cumulative abnormal returns made by insiders. Examining the results we find that insiders on average generate statistically significant AR of 0.13 % over one day, and that they generate average CARs of 0.55 % and 0.75 % over five and 20 days respectively. However, for the longer holding periods of 250 and 500 days the results are reversed with negative average CAR. The results for the 250 days holding period is statistically insignificant and with an average CAR of -0.55 % while the 500 days holding period reports a statistically significant negative average CAR of -5.15 %. Insiders are better at predicting future abnormal returns than the market in general for shorter holding periods. These results are in line with those of Jeng et al. (2003) who find that insiders are generating abnormal returns on a one day and five days horizon. This results suggest that the insider are good at judging the near-term performance of the company and/or that investors who trail the insider actions are affecting the market. However, Ke et al. (2003) found evidence that insiders' possess significant information about future accounting disclosures two years before the time of disclosure and that they were trading more three to nine quarters before a break in consistent increases in quarterly earnings. And Lakonishok and Lee (2001) found that insiders where able to generate abnormal returns with a one year holding period, findings that this paper is not able to support since our results show negative average CARs over 250 and 500 trading days. Regarding the negative long run results, we find that they are due to the sell transactions made by insiders, see table 2.

Displayed in Figure 1 is a graph over the average cumulative abnormal return over a time interval between -15 trading days pre-transaction and 25 trading days post transaction. As displayed in figure 1 we find that insiders conduct their transactions in the middle of a trend when their stock has generated an average CAR of 0.5 % over 15 trading days. However, the positive CARs decrease and cease to exist 20 trading days post the transaction day.

Table 1: Insiders' abnormal returns

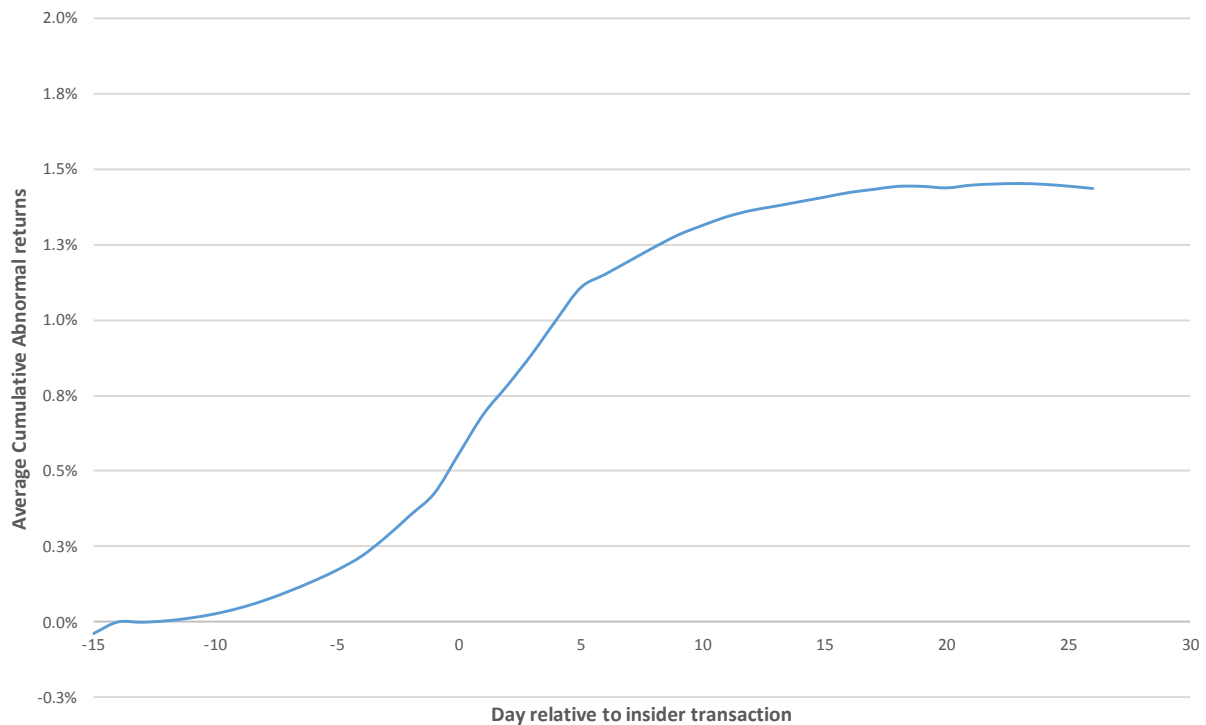
The table reports insider transactions average commulative abnormal returns. The transactions took place between the January 1995 and Mars 2015. Tests are performed on each of the five different event windows periods (1, 5, 20, 250 and 500 trading days).

Insider abnormal returns					
Interval	t (0, 1)	t (0, 5)	t (0, 20)	t (0, 250)	t (0, 500)
Average CAR	0.0013***	0.0055***	0.0075***	-0.0055	-0.0515***

* indicates a significance at the 10 % level, ** at the 5 % level and *** at the 1 % level.

Figure 1: Average cumualitve abnormal returns surrounding insider transactions

Average cumulative abnormal returns for the sample of insider transactions over a period of 41 days, from 15 trading insider transactions days before to 25 trading days after the insider transaction. Each day's average abnormal returns are added to the next days abnormal returns and gives the next day's Average cumulative abnormal return



4.2 Insiders' abnormal returns to buy and sell transactions respectively

We next examine if insiders make equally good decisions when selling and buying shares. Most previous research suggests that insiders are making abnormal returns from their buy transactions but that their sell transactions are uninformative of future abnormal returns. To mention some of the previous research, Jeng et al. (2003) found that buy transaction generated abnormal returns of more than 50 basis points per month but found no abnormal returns when studying sell transactions. Scott et al (2004) found that insider sales generates negative abnormal returns.

Displayed in table 2 are the average CARs of insiders while controlling for type of transaction (sell or buy). Buy transactions exhibits positive and statistically significant average CARs on a one percent level for all transactions intervals. However, the average CARs for the sell transactions are all negative. Insiders are generating an average CAR of 0.27 %, 0.92 %, 1.43 %, 6.10 % and 7.6 % over 1, 5, 20, 250 and 500 trading days respectively. Sell transactions displays an insignificant average CAR of -0.12 % over five trading days, while the sell transaction generates -0.29 %, -0.51 %, -13.05 % and -16.85 % over 1, 20, 250 and 500 trading days. The results suggest that insiders on average are able to generate abnormal returns from their buy transactions but that their sell transactions are not producing positive CARs. These results offer an exploitation to the negative long term abnormal returns found in table 1. The poor performance of the sell transactions explains why we find negative long term results when testing the overall (testing both sell and buy transactions) performance of insiders (table 1).

There could be many possible explanations for negative abnormal returns from sell transactions. Insiders might have to sell stocks for many personal reasons such as liquidity need due to e.g. a divorce. Huddart et al. (2007) and Kallunki et al (2009) find that insiders on average avoid selling before bad news earnings announcements due to expected legal and political costs of these trades. Huddart et al. (2007) further finds proof that insiders tend to sell positions year end for tax reasons. Another explanation why we find that the buy decisions are more successful than sell transactions is presented by Frazzini (2006). He finds that the disposition effect, which states that investors' tend to hold on to losses too long and realize gains too early, is a behavioural pattern not only among common investors but also present among mutual fund managers. Kallunki et al (2009) finds this to be true also for insiders. Together these explanations could help to explain why we do not find that insiders sell transactions generates abnormal returns. Scott et al. (2004) tries to explain their negative

CARs for sell transactions by referring to the fact that options and stocks compensations became common during their research period of 1987-2002. In conclusion sell transactions in general do not seem to be executed information about the future and because of this this transactions miss the market return leading to negative abnormal returns.

Table 2: Insiders' abnormal returns to buy and sell transactions respectively

Insider transactions average commulative abnormal returns, split into two subsamples; insiders' buy and sell transaction. The transactions took place between the January 1995 and Mars 2015. The returns are measured through five different holding periods (1, 5, 20, 250 and 500 trading days).

PANEL I: Insiders' abnormal retruns buy transactions					
Interval	t (0, 1)	t (0, 5)	t (0, 20)	t (0, 250)	t (0, 500)
Average CAR	0.0027***	0.0092***	0.0143***	0.0610***	0.0760***
PANEL II: Insiders' abnormal retruns sell transactions					
Interval	t (0, 1)	t (0, 5)	t (0, 20)	t (0, 250)	t (0, 500)
Average CAR	-0.0029***	-0.0012	-0.0051***	-0.1305***	-0.1685***

* indicates a significance at the 10 % level, ** at the 5 % level and *** at the 1 % level.

4.3 Informative value of duration between insider transaction and publication

Bettis et al. (1997) finds that the opportunity to make a profit for outsiders by mimicking insiders diminished when the interval between the day of transaction and publication increased. These effects are investigated on our sample later in the text. When studying mimicking portfolios, we also find it interesting to test whether the difference between when a transaction is reported and the actual transaction date contains any valuable information regarding the return of the transaction itself. As displayed in table 3 the test only show one statistically significant beta of -0.09 % over 500 trading days suggesting that every day the insider has waited to report transactions their CAR are negatively affected with the same number. This number however, is low and over such a long holding period it is to be considered economically insignificant since the difference between date reported and transaction date would have to be extremely large to make economical difference. To conclude, our results suggest that the time between insiders' transaction date and publication date do not contain any useful information regarding future abnormal returns and do not support the findings by Bettis et al. (1997).

Table 3: OLS regression of insider CARs on the number of days between the transaction and publication

OLS regression of insider CARs on the number of days between the transaction and publication. The transactions took place between the January 1995 and Mars 2015. The returns are measured through five different holding periods (1, 5, 20, 250 and 500 days).

$$CAR = \alpha + \beta (Report-Trans)$$

Report-Trans = is the difference between when the trade is reported and actual transaction date

Informativness of the number of days between transaction and publication date					
Interval	t (0, 1)	t (0, 5)	t (0, 20)	t (0, 250)	t (0, 500)
Report-Trans	-0.0000	-0.0000	0.0000	0.0001	-0.0009***
Intercept	0.0013***	0.0055***	0.0074***	-0.0071	-0.0038***
R Square	0.0002	0.0000	0.0000	0.0001	0.0030

* indicates a significance at the 10 % level, ** at the 5 % level and *** at the 1 % level.

4.4 Abnormal returns in relation to insiders position within the firm

Previous research made by Seyhun (1986) finds that the insiders position within the firm effects the abnormal returns, where CEOs and members of the board are more successful investors than other insiders. However Cohen et al. (2012) finds no evidence that more senior insiders (defined as insider is either CEO, CFO, or chairman of the board) perform any better than other insiders. Similar to Seyhun this paper finds that insiders' position within the firm affects the success of their investments. According to our results the CEO (VD) is a well performing investor with statistically significant positive CARs of 0.50 %, 1.94 %, 3.01 % and 10.87 % over 1, 5, 20 and 250 trading days respectively. Large shareholders (Större Innehavare) are a group that are making good investments in their companies, performing CARs of 0.27 %, 1.07 %, and 1.67 % for the 1, 5, and 20 trading day period. Board members (Styrelseledamot) and deputy board member (Styrelsesuppleant) are another group of insiders that are generating statistically significant positive CARs, with board members (Styrelseledamot) making CARs of 0.18 %, 0.95 %, 1.57 % over 1, 5 and 20 trading days, and deputy board members (Styrelsesuppleant) producing CARs of 2.12 % over 5 days and 5.14 % over 20 days. Further, board members of a subsidiary company are also generating abnormal returns; they generate CARs of 0.54 %, 1.92 % and 3.52 % over 1, 5, and 20 trading days. However, CEOs of subsidiary companies generate poor CARs with a statistically negative number of -0.57 % over a five day period. Other groups of insiders that perform poor are other public companies (Aktiemarknadsbolag) and insiders that are registered as board member, CEO and large shareholder at the same time (Styrelseledamot, VD, Större innehavare). Public companies (Aktiemarknadsbolag) produce negative CARS of -0.26 %, -1.02% and -3.34% over 1, 5, and 20 trading days. Insiders holding the following three positions at once; board member, CEO and large shareholder (Styrelseledamot, VD, Större innehavare) are generating statistically negative CARs of -0.68 % over a one day holding period and statically insignificant CARs over the rest of the measured periods. To be registered as more than one position in a company seem to have negative effect on CARs even though insiders that are registered as both CEO and board member or board member and large shareholder still generate statistically positive CARs but the numbers are much lower than what the positions generate separately/ by themselves.

Table 4: Abnormal returns in relation to insiders position within the firm

List of average transaction commulative abnormal returns for insiders in different positions. The transactions took place between the January 1995 and Mars 2015. The returns are measured through five different holding periods (1, 5, 20, 250 and 500 trading days).

Interval	Insiders' positions within the firm				
	t (0, 1)	t (0, 5)	t (0, 20)	t (0, 250)	t (0, 500)
Annan befattning	0.0005	0.0021**	0.0005	-0.00160	-0.0136
Styrelseledamot	0.0018***	0.0095***	0.0157***	0.0062	-0.0047
Styrelseledamot, Större Innehavare	0.0018*	0.0071***	0.0017	-0.0867**	-0.1459**
Större Innehavare	0.0027***	0.0107***	0.0167***	-0.0049	-0.0781**
Aktiemarknadsbolag	-0.0026*	-0.0102**	-0.0334**	-0.2217**	-0.5979**
Annan befattn dotterbolag	-0.0011	0.0005	0.0001	-0.0170	-0.0300
VD dotterbolag	-0.0021	-0.0058**	-0.0036	-0.0223	-0.0744**
VD	0.0050***	0.0194***	0.0301***	0.1087***	0.1291
Styrelseledamot, VD	-0.0008	0.0057**	0.0110*	-0.0165	-0.1237**
Vice VD	0.0022	0.0004	-0.0018	-0.0734**	-0.0299
Styrelseledamot, VD, Större Innehav	-0.0068*	-0.0028	0.0035	0.0470	-0.1909**
Styrelsesuppleant	0.0002	0.0212**	0.0514**	0.1086	0.0292
VD, Större Innehavare	-0.0041	0.0063	0.0125	0.1346	0.0856
Styrelseledamot, Styrelseledamot do	-0.0014	-0.0074	-0.0017	0.0575	-0.1363*
Styrelseledamot dotterbol, VD dotte	0.0032	0.0109	0.0644	0.0916	-0.0345
Styrelseledamot dotterbol	0.0054*	0.0192***	0.0352**	-0.2582**	-0.1903**

* indicates a significance at the 10 % level, ** at the 5 % level and *** at the 1 % level.

4.5 Abnormal returns to relatives of corporate insiders

Close relatives to a corporate insider in Sweden have to report their transactions to the Financial Supervisory Authority. Hence, we find it interesting to investigate whether different types of relatives/insiders have different ability to predict future abnormal returns, an area where this paper contributes with something new to the research field of insider trading. Studying table 5 we can observe that insider themselves (Eget) are the most consistent in generating statistically positive CARs with numbers of 0.13 %, 0.51 % , 0.7 % and 1.26 % over 1, 5, 20 and 250 trading days. Children (Barn) do not display any statistically significant numbers. Legal persons (Jur Person) generate the best returns over the 5 and 20 days period with CARs of 0.65% and 0.79 %. However, their long term performance is weak with CARs of -2.49 % and -10.79 % over 250 and 500 trading days. Similar to the group of legal persons, Wives/Husbands (Maka/Make) generate good returns over 5 and 20 days with CARs of 0.53 % and 1.37 % but for the 250 and 500 day period the returns are poor with CARs of -10.03 % and -14.97 %. Close relative (närstående) and cohabitant (Sambo) are two groups that perform poorly both with insignificant CARs for all periods except the 500 trading days period where they both produce significantly negative CARs. These results suggest that returns of corporate insiders themselves outperform their relatives.

Table 5: Abnormal returns to relatives of corporate insiders

List of average transaction commulative abnormal returns for individuals related to insiders. The transactions took place between the January 1995 and Mars 2015. The returns are measured through five different holding periods (1, 5, 20, 250 and 500 trading days).

Informativeness of transaction conducted by relatives to corporate insiders					
Interval	t (0, 1)	t (0, 5)	t (0, 20)	t (0, 250)	t (0, 500)
Eget	0.0013***	0.0051***	0.0070***	0.0126*	-0.0001
Barn	0.0010	0.0011	0.0091	-0.0425	0.0039
Jur Person	0.0005	0.0065***	0.0079***	-0.0249***	-0.1079***
Maka/Make	0.0009	0.0053*	0.0137**	-0.1003***	-0.1497***
Närstående	-0.0021	-0.0037	-0.0004	-0.0300	-0.0752*
Sambo	0.0025	0.0064	0.0019	-0.0872	-0.2049**

* indicates a significance at the 10 % level, ** at the 5 % level and *** at the 1 % level.

4.6 Informative value of insider transaction value

Next we examine whether the value of the transaction can explain differences in future abnormal returns. One could expect that larger transactions would be more informative regarding future abnormal returns than smaller transactions, since typically more effort would be assumed to be put into a large investment compared to a smaller investment. However, as displayed in table 7, the betas for Transaction Value is economically and statistically insignificant for all event windows. We can conclude that our findings are in line with the findings of Jaffe (1974), Seyhun (1986) and Lin and Howe (1990) who cannot identify any economical or statistically significant relationship between the transaction value and future abnormal returns.

Table 6: Transaction value

OLS regression of CARs on transactional value. The transactions took place between the January 1995 and Mars 2015. The returns are measured through five different holding periods (1, 5, 20, 250 and 500 days).

$$CAR = \alpha + \beta (Transaction\ Value)$$

Transaction value= Is the value of the transaction

Informativeness of transaction value					
Interval	t (0, 1)	t (0, 5)	t (0, 20)	t (0, 250)	t (0, 500)
Transaction value	0.0000	0.0000	0.0000	-0.0000	-0.0000
Intercept	0.0013***	0.0056***	0.0075***	-0.0041	-0.0454***

* indicates a significance at the 10 % level, ** at the 5 % level and *** at the 1 % level.

4.7 Abnormal returns from mimicking insider transactions

Above we have studied whether insiders are able to generate abnormal returns and if different characteristics of the transactions contains information value regarding the trades' future return. We now investigate whether it is possible for an outsider to mimic insiders' transactions in order to generate abnormal returns. Since we could not find any support for long term abnormal returns we now only investigate abnormal returns for shorter holding periods.

There seems to be no consensus in the previous literature if mimicking insiders is a successful strategy in terms of generating abnormal returns. Howe (1990) showed that outside investors did not achieve any abnormal returns by mimicking insiders. In opposite to this finding, Bettis et al. (1997) found that outsiders can earn abnormal returns by mimicking insiders. As displayed in table 7 we find that outsiders mimicking insiders' transactions are able to generate CARs over all the three time horizons investigated. A mimicking investor generates CARs of 0.24 %, 0.46 % and 0.45 % over 1, 5 and 20 trading days. We can conclude that piggybacking on insiders' by mimicking their insider investments is a successful investment strategy.

Table 7: Abnormal retruns from mimicking insider transactions

Average commulative abnormal returns of strategy *mimicking insiders transactions on the publication day*. The transactions took place between the January 1995 and Mars 2015. The returns are measured through five different holding periods (1, 5, 20, 250 and 500 trading days).

Insider abnormal returns			
<i>Interval</i>	t (0, 1)	t (0, 5)	t (0, 20)
Average CAR	0.0024***	0.0046***	0.0045***

* indicates a significance at the 10 % level, ** at the 5 % level and *** at the 1 % level.

4.8 The strategy of mimicking insiders' buy and sell transactions separately

In this section we test the strategy of mimicking insiders buy and sell transaction separately. As one could expect the average CARs for the buy transactions displayed in table 8 are statistically significant and positive. With ACARs of 0.49 %, 0.77% and 1.14% over 1, 5 and 20 trading days. All ACARs are statistically significant on a one percent level. By short selling a stock on the publication date of an insiders' sell transaction, negative ACARs are generated. Mimicking sell transactions generates -0.26 %, -0.21 % and -0.49 % over 1, 5 and 20 trading days. In conclusion, an insiders' buy transactions are in general the most valuable transactions to mimic. These results are in line with previous literature about insider trading and by the results earlier in this paper, insiders *buy* transactions contain more information value regarding future abnormal returns than *sell* transactions. The results are also in line with Bettis et al (1997) that found that mimicking buy transactions is generating abnormal returns for holding periods between 2 and 52 weeks while mimicking sales transactions generate negative abnormal returns for holding periods of 2 to 4 weeks.

Table 8: Abnormal retruns from mimicking insider buy and sell transactions

Average commulative abnormal returns from strategy *mimicking insiders transactions on the publication day*, for buy and sell transactions respectively. The transactions took place between the January 1995 and Mars 2015. The returns are measured through five different holding periods (1, 5, 20, 250 and 500 trading days).

PANEL I: Insiders' abnormal retruns buy transactions			
Interval	t (0, 1)	t (0, 5)	t (0, 20)
Average CAR	0.0049***	0.0077***	0.0114***
PANEL II: Insiders' abnormal retruns sell transactions			
Interval	t(0, 1)	t(0, 5)	t(0, 20)
Average CAR	-0.0026***	-0.0021**	-0.0049***

* indicates a significance at the 10 % level, ** at the 5 % level and *** at the 1 % level.

4.9 Informative value of duration between insider transaction and publication for mimicking strategy

One could expect that the possibility to generate abnormal returns from mimicking insiders' would decrease for each day that he or she delays the reporting of their transactions, why we in this section test whether there is a relationship between the CAR that an outside investor can generate from mimicking insider transactions and the number of days it takes for the insider to report their transactions. However, as displayed in table 9 we can observe that none of the event windows exhibits statistically significant betas. Hence, we do not find proof that the opportunity to earn excess returns by mimicking insiders diminish when the time interval between transaction and publication date increases as found by Bettis et al. (1997).

Table 9: OLS regression of mimicking CARs on the number of days between the transaction and publication

OLS regression of mimicking CARs on the number of days between the transaction and publication. The transactions took place between the January 1995 and Mars 2015. The returns are measured through five different holding periods (1, 5, 20, 250 and 500 days).

$$CAR = \alpha + \beta (Report-Trans)$$

Report-Trans = is the diffrence between when the trade is reported and actual transaction date

The reporting times effect on outsider investors' CAR			
Interval	t (0, 1)	t (0, 5)	t (0, 20)
Report-Trans	0.0000	0.0000	0.0000
Intercept	0.0030***	0.0074***	0.0038***
R Square	2.10E-03	0.0002	0.0003

* indicates a significance at the 10 % level, ** at the 5 % level and *** at the 1 % level.

4.10 Mimicking the transaction of insiders with different positions within in the firm

We find in table 4 that insiders with different positions within a firm generates altered abnormal returns. In this section we investigate how these results effect the mimicking outsider. As displayed in table 10 the information hierarchy proves to be important for the mimicking outsider, with larger and more consistent abnormal returns when mimicking the transactions of CEOs' (VD), members of the board (Styrelseledamot) and large shareholder (Större innehavare). To mimic the transactions conducted by CEOs' is proven a good strategy throughout all the holding periods tested, with average CARs of 0.36 %, 0.71 % and 1.51 % over 1, 5 and 20 trading days. By mimicking large shareholders the outside investor is also able to generate positive average CARs throughout all three holding periods with ACARs of 0.18 % (1 day), 0.53 % (5 days) and 0.77% (20 days). The strategy of mimicking members of the board (Styrelseledamot) returns average CARs ranging from 0.20 % to 0.60 % for the holding periods of 1 to 5 days. Mimicking deputy board member (Styrelsesuppleant) proves a very effective strategy for a 20 trading days holding period with average CARs of 4.99 %; for the other holding periods the results are statistically insignificant. When examining the returns of insiders' that are registered as both CEOs and large shareholders the reported average CARs was high but statistically insignificant but when mimicking these insiders we receive statistically significant average CARs of 0.44 % and 4.99 % for the holding periods of 1 and 20 trading days. With the exception of the previous strategy, mimicking insiders' registered in more than one category proves an unsuccessful strategy. To mimic public companies (Aktiemarknadsbolag) proves to be a poor strategy with negative average CARs of -0.26 %, -1.07 % and -5.58 %.

Table 10: Mimicking insiders in different positions

List of average transaction commulative abnormal returns for mimicking insiders in different positions. The transactions took place between the January 1995 and Mars 2015. The returns are measured through five different holding periods (1, 5, 20, 250 and 500 trading days).

<i>Interval</i>	t(0, 1)	t(0, 5)	t(0, 20)
Annan befattning	0.0024***	0.0027***	-0.0007
Styrelseledamot	0.0020***	0.0060***	0.0042
Styrelseledamot, Större Innehavare	0.0018***	0.0053***	0.0039
Större Innehavare	0.0018***	0.0053***	0.0077***
Aktiemarknadsbolag	-0.0026*	-0.0107**	-0.0558***
Annan befattn dotterbolag	0.0019**	0.0020	-0.0004
VD dotterbolag	0.0030	0.0007	-0.0016
VD	0.0036***	0.0071**	0.0151***
Styrelseledamot, VD	0.0035**	0.0011	0.0126**
Vice VD	0.0028*	0.0062*	-0.0042
Styrelseledamot, VD, Större Innehavare	0.0035	0.0074	-0.0001
Styrelsesuppleant	0.0005	-0.0013	0.0454**
VD, Större Innehavare	0.0044**	0.0056	0.0499***
Annan befattning, Större Innehavare	0.0029	0.0048	-0.0159*
Styrelseledamot, Styrelseledamot dotterbol	0.0085***	0.0069	0.0094
Styrelseledamot dotterbol, VD dotterbolag	-0.0025	0.0062	0.0740*
Styrelseledamot dotterbol	0.0004	0.0154*	0.0207

* indicates a significance at the 10 % level, ** at the 5 % level and *** at the 1 % level.

4.11 Mimicking insiders' relatives

As displayed in table 5 it is the corporate insiders' themselves (Eget) that most consistently generate abnormal returns with wives'/husbands (Make/Maka) and legal persons' (Jur person) generating positive abnormal returns for some of the holding periods. When outsiders mimic transactions made by these different groups of insiders we can conclude that it is also these three groups of investors whose transactions it is most profitable to mimic. Examining table 11 we can conclude that to mimic transactions made by legal persons (Jur Person) proves the most profitable strategy with abnormal returns of 0.26 %, 0.58 % and 0.69 % for the three holding periods of 1, 5 and 20 trading days. To mimic the corporate insider generates slightly lower abnormal returns of 0.23 %, 0.39 % and 0.20 % over 1, 5 and 20 trading days. Further, wives'/husbands generate positive abnormal returns over 5 and 20 trading days of 0.52% and 1.27 % (which is the highest abnormal return generated by any of the groups in this sample) respectively.

Table 11: Mimicking Insiders relatives

List of average transaction commulative abnormal returns for mimicking insiders relatives. The transactions took place between the January 1995 and Mars 2015. The returns are measured through five different holding periods (1, 5, 20, 250 and 500 trading days).

Mimicking Insiders relatives			
Interval	t (0, 1)	t (0, 5)	t (0, 20)
Eget	0.0023***	0.0039***	0.0020*
Barn	-0.0023	0.0038	0.0091
Jur Person	0.0026***	0.0058***	0.0069***
Maka/Make	0.0025	0.0052**	0.0127**
Närstående	0.0040*	-0.0014	0.0090
Sambo	-0.0020	0.0070	0.0077

* indicates a significance at the 10 % level, ** at the 5 % level and *** at the 1 % level.

4.12 Informative value of insider transaction value in mimicking strategy

In part 4.6 we examined the transaction value informativeness on future average CARs of insider transactions and found no correlation between value of the transaction and future abnormal returns. In this section we study whether the transaction value is informative for a mimicking outside investor. However, as displayed in table 12 we cannot prove any relationship between transaction value and future CAR values.

Table 12: OLS regression of mimicking CARs on the transaction value

OLS regression of mimicking CARs on the transaction value. The transactions took place between the January 1995 and Mars 2015. The returns are measured through five different holding periods (1, 5, 20, 250 and 500 days).

$$CAR = \alpha + \beta (Transaction\ Value)$$

Transaction value= Is the value of the transaction

Transaction values effect on outsider investors' CAR			
<i>Interval</i>	t(0, 1)	t(0, 5)	t(0, 20)
Transaction value	0.0000	0.0000	0.0000
Intercept	0.0030***	0.0074***	0.0038***
R Square	2.10E-03	0.0002	0.0003

* indicates a significance at the 10 % level, ** at the 5 % level and *** at the 1 % level.

4.13 Informative value of consecutive insider transactions

We next examine if insiders are generating abnormal returns by constructing portfolios. As displayed in table 13, insider transactions passing the threshold, which is that three consecutive transactions are made in the same direction and with no transactions in the other direction during one month, are generating weekly abnormal returns of 0.3 %, including both buy and sell transactions. This supports the results of previous event study results and suggests that insiders are able to predict future abnormal returns. The long portfolio, only taking long positions, generates weekly abnormal returns of 0.4 %. Interesting to note is the weekly alphas of 0.53 % generated by the short portfolio, suggesting that insiders' *sell* transactions are informative. This is in opposite to our earlier results and to most previous literature, suggesting that the use of our threshold has proven successful in sorting out informative sell transactions. The strategy is successful in sorting out insider transactions generating positive cumulative abnormal returns.

Table 13: Insider portfolios

The table displays the coefficients from the calendar time portfolio regression of weekly abnormal returns on Fama French three factor model and CAPM. The sample period is January 1995 and Mars 2015. Three portfolios are formed, the first portfolio contains both long and short positions in stocks, the second contains only long positions and the third only short positions. The portfolios short sells or buy a stock on the insiders' transaction date and exits the position after two months. The criteria for being included in the portfolios is that at least three transactions of the same sort (buy or sell) are conducted in a specific stock during the past month and that no transactions have been done in the opposite direction during the same period. The portfolios are rebalanced each week. The alphas measures the weekly abnormal returns. The following regression is estimated:

$$R_{pt} - R_{ft} = \alpha_p - \beta(R_{mt} - R_{ft}) + \beta_p(SMB_t) + \beta_p(HML_t)$$

R_m = is the return of the market portfolio, OMX Stockholm PI

SMB = is the difference between the return on the portfolio of small and big stocks

HML = is the difference between the return on the portfolio of high and low book to market stocks

PANEL I: CAPM					
Holding strategy	α	β (Rm-Rf)	R-Square		
Long and short	0.00280***	0.25163***	0.08253		
Long	0.00422***	0.50220***	0.22661		
Short	0.00532***	-1.54651***	0.47837		
PANEL II: CAPM & SMB					
Holding strategy	α	β (Rm-Rf)	β (SMB)	R-Square	
Long and short	0.00280***	0.25215***	0.08933	0.08293	
Long	0.00421***	0.50436***	0.39941***	0.23213	
Short	0.005349***	-1.55004***	-0.81991***	0.48379	
PANEL III: FAMA FRENCH 3 FACTOR					
Holding strategy	α	β (Rm-Rf)	β (SMB)	β (HML)	R-Square
Long and short	0.00251***	0.25489***	0.12239	0.27874**	0.08773
Long	0.00382***	0.50803***	0.44448***	0.37852***	0.23823
Short	0.00526***	-1.54910***	-0.80927***	0.0879	0.48387

* indicates a significance at the 10 % level, ** at the 5 % level and *** at the 1 % level.

4.14 Portfolio strategy using a three consecutive insider transaction threshold

We next construct the outsiders mimicking portfolios in order to test if outsiders are able to generate abnormal returns from mimicking insiders' transactions by following our strategy. Displayed in table 14 we can observe a weekly abnormal return of 0.27 % for the general portfolio, containing both short and long positions. Hence we can conclude that it is possible for outside investors to generate abnormal returns by mimicking insiders' transactions. Furthermore, we can observe a weekly alpha of 0.34 % for the mimicking long portfolio. This suggests that a mimicking outsider could generate weekly abnormal returns of 0.34 % from the mimicking long portfolio strategy. Moreover, a mimicking outsider is able to generate abnormal returns by following the mimicking short position portfolio strategy, with weekly abnormal returns of 0.54 %. The mimicking strategy proves successful in generating weekly abnormal returns on both insiders' buy and sell transactions results that are in opposite to most previous research that does not find insider sell transactions informative.

Table 14: Mimicking portfolios

The table displays the coefficients from the calendar time portfolio regression of weekly abnormal returns on Fama French three factor model and CAPM. The sample period is January 1995 and Mars 2015. Three portfolios are formed, the first portfolio contains both long and short positions in stocks, the second contains only long positions and the third only short positions. The portfolios short sells or buy a stock on the publication date of the transaction and exits the position after two months. The criteria for being included in the portfolios is that at least three transactions of the same sort (buy or sell) are conducted in a specific stock during the past month and that no transactions have been done in the opposite direction during the same period. The portfolios are rebalanced each week. The alphas measures the weekly abnormal returns. The following regression is estimated:

$$R_{pt} - R_{ft} = \alpha_p - \beta(R_{mt} - R_{ft}) + \beta_p(SMB_t) + \beta_p(HML_t)$$

R_m = is the return of the market portfolio, OMX Stockholm PI

SMB = is the difference between the return on the portfolio of small and big stocks

HML = is the difference between the return on the portfolio of high and low book to market stocks

PANEL I: CAPM					
Holding strategy	α	β (Rm-Rf)	R-Square		
Long and short	0.00270***	-0.79524***	0.48469		
Long	0.00341***	0.42816***	0.16197		
Short	0.00542***	-0.47753***	0.08155		
PANEL II: CAPM & SMB					
Holding strategy	α	β (Rm-Rf)	β (SMB)	R-Square	
Long and short	0.00270***	-0.79377***	0.25310*	0.48660	
Long	0.00339***	0.43113***	0.53373***	0.17175	
Short	0.00543	-0.48218***	-0.76650***	0.08955	
PANEL III: FAMA FRENCH 3 FACTOR					
Holding strategy	α	β (Rm-Rf)	β (SMB)	β (HML)	R-Square
Long and short	0.00233***	-0.79025***	0.29588*	0.35673***	0.49122
Long	0.00293***	0.43562***	0.58789***	0.44968***	0.18022
Short	0.00535***	-0.48125***	-0.75635***	0.08002	0.08966

* indicates a significance at the 10 % level, ** at the 5 % level and *** at the 1 % level.

5 Conclusion

In this paper, we have investigated if insider transaction can predict future abnormal returns and if outside investors can generate abnormal returns by mimicking the insiders' transactions. Furthermore, we control if different transaction characteristics contain information value regarding abnormal returns.

We find that insiders' transactions are generating future abnormal returns of 0.13 %, 0.55 % and 0.75 % for a holding period of 1, 5 and 20 trading days respectively, suggesting that the insider are good at judging the near-term performance of the company and/or that investors who trail the insider actions are affecting the market. Moreover, we find that insiders' *buy* transactions are generating positive abnormal returns while *sell* transactions in general yields negative abnormal returns. *Buy* transactions are generating positive abnormal returns of 0.27 %, 0.92 %, 1.43 %, 6.10 % and 7.60 % in 1, 5, 20, 250 and 500 trading days. We can conclude that insiders' are better at predicting the close future than the long term returns. However, insiders' are able to generate positive abnormal returns in the long run on their purchases of stocks while their selling of stocks are not able to generate positive abnormal returns. Previous research has produced many different explanations to this fact, where Kalunki et al. (2009) finds one explanation being the disposition effect, Scott et al. (2004) refers to options and stocks program and Huddart et al. (2007) finds that that insiders on average avoid selling before bad news earnings announcements due to expected legal and political costs of these trades.

We also find that outside investor are able to mimic insiders' transactions and generate abnormal returns. Mimicking insiders' transaction yields a positive abnormal return of 0.24 %, 0.46 % and 0.45 % over holding periods of 1, 5 and 20 trading days, however if the outsider only mimics the *buy* positions of the insider they are able to generate a one day abnormal return of 0.49 %, a five days abnormal return of 0.77 % and a 20 days abnormal return of 1.14 %. Unlike Jeng et al. (2003) but in line with Lin and Howe (1990), we find support for the existence of information hierarchy which suggest that CEOs and board members are better at predicting future abnormal returns. Further, we find that these findings are useful for the outside investor; by replicating transactions of CEOs or board members, outside investor are able to generate significantly higher abnormal returns than if replicating transactions from insiders with other positions within the firm. We further find that corporate insiders' are generating higher returns over a one year period than what his/her relatives are generating over the same period of time. In line with previous studies Jaffe (1974), Seyhun (1986) and

Lin and Howe (1990) we cannot find any statistically significant relationship between the transaction value and abnormal returns.

Finally, we construct portfolios consisting of stocks where at least three transactions of the same sort (buy or sell) are conducted during the past month and that no trades have been done in the opposite direction during the same period. Using our threshold we are able to extract information from *sell* transactions as well, generating weekly abnormal returns of 0.5 %. We can conclude that insiders in our portfolio sample are generating weekly abnormal returns of 0.4 % on their buy transactions and weekly abnormal returns of 0.3 % when controlling both for buy and sell transactions. Similar results are achieved by the mimicking portfolios with weekly alphas of 0.3 %, 0.5 % and 0.2 % for the long portfolio, short portfolio and the portfolio containing both long and short positions.

6 Potential limitations

The choice of the weighting scheme has an effect on the results when conducting an empirical study using asset-pricing models. We use equally weighted portfolios for our portfolio strategy. A benefit from this approach is that potential pricing errors have a smaller effect on the results. One disadvantage is that no distinction is made between the relative or absolute valuation of the stocks included in our portfolios.

Using our portfolio strategy (portfolios consisting of stocks where at least three transactions of the same sort (buy or sell) are conducted during the past month and that no trades have been done in the opposite direction during the same period), there is a risk that we exclude informative transactions from our sample. However, we consider the sample used in this study to be of sufficient size (3674 transactions) to test our hypothesis.

We use one benchmark portfolio (OMX Stockholm PI) as the market proxy when we estimate the abnormal returns. The index consists of all shares listed on the Stockholm Stock Exchange. The reason for choosing this index is that we believe that it reflects our sample of insider transactions, since our sample consists of shares from all categories traded on the Stockholm Stock Exchange. However, the estimated abnormal returns, and therefore the results, are only as accurate as the market proxy that we use.

7 References

- Bettis, Carr, Don Vickrey, and Donn W. Vickrey. "Mimickers of corporate insiders who make large-volume trades." *Financial Analysts Journal* 53.5 (1997): 57-66.
- Bhattacharya, Utpal, and Hazem Daouk. "The world price of insider trading." *The Journal of Finance* 57.1 (2002): 75-108.
- Bulatnicov Veaceslav and Maximilian Zoltek, "Characteristics of informative insider trades - Evidence from the Swedish Stock Market", SSE Master Thesis (2015)
- Cohen, Lauren, Christopher Malloy, and Lukasz Pomorski. "Decoding inside information." *The Journal of Finance* 67.3 (2012): 1009-1043.
- Etebari, Ahmad, Alireza Tourani-Rad, and Aaron Gilbert. "Disclosure regulation and the profitability of insider trading: Evidence from New Zealand." *Pacific-Basin Finance Journal* 12.5 (2004): 479-502.
- Fidrmuc, Jana P., Marc Goergen, and Luc Renneboog. "Insider trading, news releases, and ownership concentration." *The Journal of Finance* 61.6 (2006): 2931-2973.
- Finansinspektionen 2015. Available: <http://www.fi.se/Regler/Borsbolag/Insynsstallning>
- Finnerty, Joseph E. "Insiders and market efficiency." *The Journal of Finance* 31.4 (1976): 1141-1148.
- Frazzini, Andrea. "The disposition effect and underreaction to news." *The Journal of Finance* 61.4 (2006): 2017-2046.
- Jaffe, Jeffrey F. "Special information and insider trading." *Journal of business* (1974): 410-428.
- Jeng, Leslie A., Andrew Metrick, and Richard Zeckhauser. "Estimating the returns to insider trading: A performance-evaluation perspective." *Review of Economics and Statistics* 85.2 (2003): 453-471.
- Huddart, Steven, Bin Ke, and Charles Shi. "Jeopardy, non-public information, and insider trading around SEC 10-K and 10-Q filings." *Journal of Accounting and Economics* 43.1 (2007): 3-36.

Ke, Bin, Steven Huddart, and Kathy Petroni. "What insiders know about future earnings and how they use it: Evidence from insider trades." *Journal of Accounting and Economics* 35.3 (2003): 315-346.

Lakonishok, Josef, and Immoo Lee. "Are insider trades informative?." *Review of financial studies* 14.1 (2001): 79-11.

Lin, Ji-Chai, and John S. Howe. "Insider trading in the OTC market." *The Journal of Finance* 45.4 (1990): 1273-1284.

Kallunki, Juha-Pekka, Henrik Nilsson, and Jörgen Hellström. "Why do insiders trade? Evidence based on unique data on Swedish insiders." *Journal of Accounting and Economics* 48.1 (2009): 37-53.

MacKinlay, A. Craig. "Event studies in economics and finance." *Journal of economic literature* (1997): 13-39.

Rozeff, Michael S., and Mir A. Zaman. "Market efficiency and insider trading: New evidence." *Journal of Business* (1988): 25-44.

Scott, James, and Peter Xu. "Some insider sales are positive signals." *Financial Analysts Journal* 60.3 (2004): 44-51.

Seyhun, H. Nejat. "Insiders' profits, costs of trading, and market efficiency." *Journal of Financial Economics* 16.2 (1986): 189-212.