



UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

How to yield abnormal return by replicating insider trades

A study on the Swedish stock market

Bachelor thesis in Industrial and Financial Management

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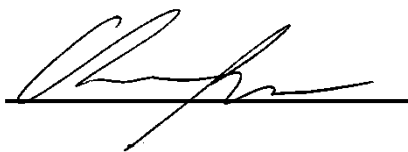
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Thank You!

Göteborg, May 2014
Sundling Christopher

A handwritten signature in black ink, appearing to be 'Chris Sundling', written over a solid horizontal line.

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A handwritten signature in black ink, appearing to be 'Christoffer Verschuur', written over a solid horizontal line.

Abstract

The objective of the study is to verify if it is possible to replicate insider trades in order to yield an abnormal return. The objective will be reached by investigating previous research within the field of insider trading in order to examine under which condition replication of insider trades can be profitable for outsiders. Further, to determine if previous researchers have identified a theory where replication of insider trades actually is possible. The theory will then be tested on current market data from the AFXG index.

The course of action is within accordance to an event study presented by MacKinlay (1997), where assumptions and conditions are based upon the meta-analysis of previous research; hence the data has been calculated with the adjusted market model. But also examined within a 90 days event window, where both single insider- as well as cluster transactions has been analyzed. Further the research qualifies as a quantitative study where a deductive procedure has been used. All data has been gathered from the AFGX index, where 40 random firms have been selected; five from each of the eight sectors. Lastly, the data has been statistically tested with the student t-test in order to examine if the result is of statistical significance.

The result of the study shows that one can yield an abnormal return between 1,96% to 2,45% by replicating single insider trades. This is with 99,95% significance. By replicating insider cluster transactions one can also yield an abnormal return, however, the return is lower than for single insider trades and no significance were found. As for the meta-analysis of previous research, it was found that a security is to be held for approximately 90 days in order to achieve the desired positive effect of the insider trade. Further, small firms seems to yield the highest abnormal return, clusters transactions increases the possible abnormal return and when higher executives in different positions trade, a stronger buying signal for the stock is given.

Key words: Insider cluster, Abnormal return, Market model, Meta-analysis, Insider

Definitions

Following word descriptions are obtained from nationalencyklopedin, www.ne.se - a national encyclopedia.

- Abnormal return** - a value that is unnatural by not behaving as expected as it exceeds or falls below the reference value, in this case the AFGX index.
- AFGX index** - an index that is one of the oldest in Sweden and created by the former Swedish newspaper company, Affärsvärlden
- Index** - a value that represent the average return of groups of stocks, often based on the relation of a specific date and a reference date.
- Insider** - a person that has valuable information / insider information that is not known by the public, insider and insider information
- Insider transaction** - a security is bought or sold by an insider
- Insider information** - a set of valuable information that is not yet known to the public, see insider and insider information
- NASDAQ A-List** - an earlier list at the Swedish stock market which includes companies with a value exceeding 300 million SEK, had a fair return and had been listed for more than 3 years.
- Official Summary** - a list that contains name, date and transactions amount etc. of people that has done insider trades the last five years. It is published by the Swedish Financial Supervisory Authority (FSA), called Finansinspektionen.
- Stock** - a security, which represent a share of a public and/or private holding company that can be traded on a market.
- CAAR** - Abnormal return that put equal weight in companies, e.g. 2 transactions weigh 1000 SEK combined in company X, while 1 transaction weighs 1000 SEK in company Y.
- Weighted CAAR** - Abnormal return that put equal weight in each transaction, e.g. 1 transaction in company X weighs 1000 SEK and 2 transactions in company Y weigh 2000 SEK.

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1. Introduction

In the end of February 2014 the CEO and CFO of Scania Group purchased more than 30 000 shares in Scania. Three weeks later the Volkswagen Groups makes an offer to purchase Scania for a premium of more than 30%, (Östlund, 2014). In just three weeks the two leaders of the company could see their investments grow by 2.2 million Swedish Kronor. Additionally these acquisitions were published to the public just a few days after the transactions, so an investor following these insiders would have yielded 30% on their investment, (Östlund, 2014). Does this imply that by following insiders, one would yield higher returns than the market portfolio?

1.1 Background

Investors trade with the objective to make a profit on the volatility of the market, by forecast the volatility to purchase low and sell high. The traditional way to forecast is to make a fundamental and/or technical analysis of the asset before purchase. In which one assume that the information distributed by the company is accurate and accessible for everyone simultaneously, Schöld, (2005). However, there is a group of investors called insiders, whom has an information advantage. According to Seyhun (1985), insider information can lead to abnormal returns and thereby create an asymmetric market. Thus, a possibility is created for other investor, also called outsiders, to replicate insider trades and thereby gain abnormal return. In the academic world, described by Fama (1969), the situation according to his efficient market hypothesis requires for the market to be of semi-strong efficiency, hence reactions on the stock market occurs only from publically known information.

Nevertheless, research within the area is inconsistent and results have shown that it is possible to yield an abnormal return while others conclude the opposite, see Meta-analysis. Further, previous research is done on different markets and with different methods and assumptions. Some result could be explained by the fact that research has been performed under different conditions. For example, the insider trade list called official summary, was only published once a month in the 20th century (Rogoff, 1964) while today it is published with a maximum of only five trading days of delay (SFS 2000:1087, 6§).

Therefore, it is a need to investigate previous research in order to identify the differences regarding condition, methods and assumptions. And in accordance with the outcome, evaluate the data in a new research on today's market in order to clarify if and how insiders actually can be replicated in order to yield an abnormal return. Hence, a research gap exists as to what common conditions previous researchers has used, and if their results can be applied on today's market.

1.2 Problem statement

Creating trading strategies to overcome the market return has inspired and captured many researchers. However according to theories as Fama's (1970) semi strong efficient market hypothesis this can only been done if one possess insider information. As there are often limitations to overcome insider information, one has to find other ways to obtain it, Nilsson (1994). Furthermore Seyhun (1986) states that this information can be obtained, by replicating insiders trading patterns using the official summary. However previous international and domestic studies that have used this method, achieved varied results, Rundfelt (1989). Researchers such as Chowdhury et.al (1993), Rundfelt (1989) and Eckbo & Smith (1998) found no relation between insider trading and abnormal return. Contradictory, other researchers such as Rogoff (1964), Allen & Ramanan (1995), Seyhun (1986), and Schöld (2005) concluded that there is such a relation. Moreover the majority of those previous researchers have shown that insider sales transactions are not an indication of a stock price fall. Therefore, sales transaction are seen as an unreliable source as to if one should follow the insider. When investigating insider acquisitions on the other hand, it seems that the reliability in the source is higher, though with little to no significance. Further, none of the investigated researchers have clearly identified if there is a difference between replication of insider trades in different sectors of the market. Therefore, as a second step, it would be of interest to take the investigation further to see if such differences exists.

The inconsistency in previous research is therefore something that should be narrowed down and investigated. By summarizing research and to find how one can yield an abnormal return and if that strategy can be applied to the Swedish market. The study would identify if there truly exists a possible trading strategy to overcome the market return.

To investigate if this is true and possible, four research questions have been stated and those are as followed:

- How and under which conditions, according to previous research, should one replicate insider trades and can any specific pattern be identified?
- If one can, by using strategies from previous research, receive abnormal return by replicating insider trade on the AFGX index during the period from 2009-04-03 to 2014-03-31
- Is there any difference between sectors when it comes to replication of insider trades?
- Are cluster transactions better to replicate than individual insider trades during the specific period?

1.3 Objective

The objective of the study is to verify if, and how, one can replicate insider trades in order to yield an abnormal return. To find how, a meta-analysis within the field of insider trading will be done. Further, to determine if previous researchers have acknowledged a theory where replication of insider trades actually holds, the theory will be tested on today's market.

2. Theory

In this section, insider, their legal limitations and the fundamental theory of an efficient market will be described and presented in details. Thereafter an extensive meta-analysis of previous research will follow.

2.1 Efficient market hypothesis

In the 1970th Eugene F. Fama (1970) wrote an article concerning the effectiveness of a market. In the article he summarized and developed the prominent research within the area. He further describes the effective market as a market where all participants, e.g. investors have the same information. Therefore, all the assets are valued upon all known information. This implies that an investor could not yield abnormal returns by trading on unpublished information. Further, for a market to be able to adapt effective, three different criteria have to be fulfilled. According to Fama (1970) those are:

All information is available to all investors, at no cost

There are no transaction costs

All participants agree upon, how the information affects the price of the asset

However, in the real world, the effectiveness on different markets varies. The faster the market adaptation is to new information, e.g. changes in share prices, the more effective the market is. Therefore, it is necessary to categorize markets according to the effectiveness of their adaptation. There are three different types of effectiveness according to Fama (1970); these are weak form, semi-strong form and strong form. These can be seen as subsets of each other, as illustrated in Figure 1.

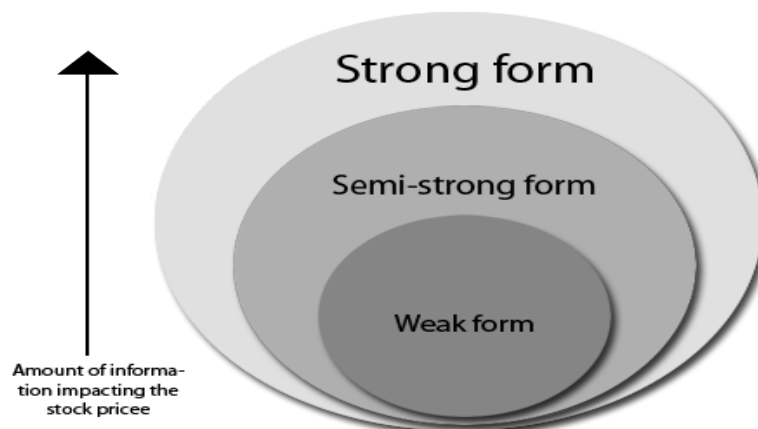


Figure 1 Different levels of Effective Market Hypothesis. Where increases in market efficiency, includes more information that is affecting the price of the stock, inspired by Schödl (2005).

Weak form of market efficiency implies that the value of the asset depends upon the historical information rather than expectations of the future, Fama (1970). This indicates that the asset price will not follow a pattern, (Bodie, 2000), meaning that the price movement will be random. Hence when new information is published the market will not revalue the asset before the information has an effect on the asset. For example, information about a new project will not have an impact on the price of the asset before the project has generated cash and the information has become historical. (Brealy & Myers, 2000)

Semi-strong form of market efficiency, on the other hand implies that the prices are based upon all known public information, Fama (1970). This make it possible to yield an abnormal return with insider information, as the price will react to the new information as soon as it will be public. Thus, it also implies that the non-insiders cannot generate an abnormal return by analyzing already published information as the price will adapt to the new information immediately when it becomes public. (Brealy & Myers, 2000)

Strong form of market efficiency implies that all information reflect the value of the asset, Fama (1970). Hence it is not possible for any investor to make a systematic abnormal return, not even for insiders. It is rather the randomness that dictates if one achieves an abnormal return or not. For example in a world with strong efficiency, the announcement of an upcoming negotiation directly affects the price of the asset, even though it has not taken place yet. It will then immediately adapt according to the development of the negotiations. So when a negotiation about a takeover is published, the price of the asset has already changed due to that particular event, rather than adapt afterwards as it does in reality. (Brealy & Myers, 2000)

Therefore, this research is based upon the idea that the market should be of semi-strong efficiency as it is the only form that makes it possible for insiders to achieve systematic abnormal return.

2.2 Insider and insider information

According to Nilsson (1994) an insider is a person who trades at the market with stocks in which he or she has information advantage. Thus, information that is not yet known to the public market and therefore becomes a point of advantage.

Nilsson (1994) further defines and categorizes insider information into three different types, public price-sensitive information, market information and company specific information. The public price-sensitive information can be explained as the information concerning adjustment

in public interest rates or changes in governance. Market information can for example be insider knowledge of upcoming buyouts from the public market or takeovers. The company specific information can be separated in to two different types, internal or external information. Internal company specific information is for example the knowledge concerning revenues and/or sales data. On the other hand there is external information which is the environment that the company works in. This could be for example, interest rates on company debt and/or changes in terms of the debt.

2.3 Swedish law of insider trade

According to Swedish law; Punishment for market abuse when trading with financial instruments (SFS 2005:377), the crime of trading in the public market with insider information concerns people trading on the behalf of others as well as themselves. This also includes advices given to third parties with the intention to acquire or sell financial instruments. Such crimes will be punished with up to four years in prison or at least six months or other equivalent penalties.

To monitor insider trading there is a law termed; “Notification requirement for insider trade” (SFS 2000:1087). Whom require that all trades made by insiders, their wife/husband, minors or close relatives that live in the same household has to report acquisitions or sells transactions of financial instruments to the Financial Supervisory Authority (Finansinspektionen) within five days of the transaction. This law also conduct that it is illegal for insiders to acquire or sell financial instruments thirty days before the publication of annual and interim reports. Violation of this law will be penalized, depending of the extent of the crime.

2.4 Meta-analysis

In this section of the theory chapter the report will investigate the previous research within the field of insider trading. Firstly, to identify if abnormal returns have historically been achieved by replicating insider trades, and secondly to identify under which conditions and assumptions the researchers have reached their results.

2.4.1 Previous research

In the field of insider trading a lot of studies has been performed during the 20th century. This might be due to the fact that it is an intriguing area of study, since insider trades and the replication of such trades may yield abnormal returns to investors which in fact make the market asymmetric. If such relation were to be found under known conditions, trades based

on insiders would likely increase and strategies based on such trades would escalate. Thus, the research in the area is extensive. However the different studies are based on different markets, during different time intervals and with slightly different approaches leading to inconsistent results.

The amount of international studies on the subject is greater than the studies of the domestic Swedish market, also, in a higher degree, leading to the conclusion that abnormal return is more likely when replicating insider trades. According to Rundfelt (1989), the reason for a higher degree of abnormal return on international markets might be due to the fact that those markets are so extensive, that researcher's has had to make samples of companies to study, compared to domestic studies where entire populations have been studied. Thus, he comes to the conclusion that the size of the sample may be of significance. Further, he states in his research that the inconsistent results may also be due to different time periods studied. Where non-diversifiable market turbulence may affect the return rather than firm specific information, which insiders poses. Likewise, the methods used may also lead to inconsistent results since the models are to some degree based on assumptions. And lastly, other common definition problems may lead to such results, as to; who is an insider, which purchase amount should be weighted the most, etc.

By performing a chronological literature review of some of the previous research, a better idea of what has been studied, their time horizons and results are to be identified and clarified. The chronological order is firstly divided into international studies leading to the chronological order of the domestic studies.

The first in order is Rogoff (1964), who performed a study in which he analyzed corporate insiders purchase and sales of their own stock, to identify if such trades could be used to forecast the market price of that stock. 100 corporations were selected at random from the 1065 common stock on the New York Stock Exchange during the period of 1957 to 1960, yielding a sample of 1507 monthly observations. Since insider trade transactions were only recorded monthly during the period, the return was analyzed six month after the initial insider trade. The statistical results indicated that Rogoffs hypothesis is valid; however it is indicating that the correlation between the stock price and insider transaction is irregular and thereby not predictable. Further indicating that with transaction costs, abnormal return by replication is not warranted.

Rogoff was followed by Jaffe (1974), who performed a research in which he studied the possibility to generate an investment strategy based upon insider trades only. The study consisted of 200 large American firms and random insider trades during the period of 1962 to 1968. The conclusion of the study is that insiders can generate abnormal return by trading on their own stock. Further, the study concluded that when insider acquisitions or sales occurred more frequent, the potential for abnormal returns decreased. It was assumed that when insiders trade more frequent, the fundamental information basing their trades was already known to the public.

The research was continued by Seyhun (1986), who discovered that an investment strategy based upon replication of insider trades can yield abnormal return. He studied 60 000 buy and sell transaction during the period of 1975 to 1981 on the New York Stock Exchange. To be able to distinguish and compare the transactions, the companies were divided according to size, into categories of small, medium and large. Further, the transactions were also analyzed in accordance to size. The conclusions were that by replicating insiders in smaller firms, the generated abnormal return would be higher than replicating those in larger firms. Additionally he concluded that, the higher the insider transaction amount, the greater the signal of a stock price movement. By analyzing the period in 100 days interval, an abnormal return of 3 % could be generated by following insider acquisitions. And by following insider sales, one would save a loss of 1,7 %.

In retrospect to Seyhun article, Heinkel & Kraus (1987) studied the Vancouver stock market during 1979 to 1981, in order to examine if insiders would outperform outsiders. Their result showed a not so strong relation between insider trades and abnormal returns. The data was analyzed in eight week periods but also in six month periods. The results of the study indicated that abnormal returns could be achieved by insiders, however, since there was no statistical significance, a trading strategy based upon insider transactions were neither recommended nor discarded. The six month period showed a higher possibility for a greater return than the eight week period.

A study conducted by Chowdhury et.al (1993) came to similar conclusion, that there is only a minor relation between insider trades and abnormal returns. Furthermore, they concluded that insider acquisitions indicated a stronger signal than insider sales. The reason for this insight were thought to be correlated with the fact that sales transactions can be performed in accordance with personal factors, while acquisitions were rather performed in the belief of a

stock price rise. The study was performed on selected firms from the New York/American Stock Exchange, and the analysis interval was eight week periods, partially same as in Heinkel & Kraus (1987) study.

Allan and Ramanan (1995) performed a similar study but with the company unexpected outcome as a measure instead of a stock price movement when analyzing insider trades. Data was gathered from 1978 to 1987 and analyzed in 15 month periods. The results showed, in retrospect to Chowdhury et.al and Heinkel & Kraus weak relation theory, that there is a strong relation between insider trades and unexpected results, indirect moving the stock prices. The strongest relation was found between insider acquisitions, though not for sales transactions, similar to Chowdhury et.al results.

The Norwegian professor of finance Eckbo and his colleague Smith (1998) studied the Oslo Stock Exchange during the period of 1985 to 1992. In their study, they examined insider portfolios in relation to regular equity funds, to see if insiders performed better than the general market. The result contradicts Rogoff, Seyhun, and Allen & Ramanan results since they found that there is no relation between insider portfolios and abnormal returns. Rather, the equity funds performed better during the analyzed period than the insider portfolio.

Studies on insider trading on the Swedish market has not been conducted in the same extent as to the international, foremost the American market. However, one of the most known Swedish studies were conducted during 1984 to 1986 by economic professor Rundfelt (1989). His study analyzed if insider tended to make better stock trades in their own stock than outsiders. In relation to the study by Eckbo (1998) he found that insiders may possess extensive knowledge about their own firm, nonetheless, the comprehension of what drives the stock prices may be lacking. Rundfelt (1989) study was conducted on the Stockholm Stock Exchange where he generated one insider acquisition portfolio and one insider sell portfolio. These were studied out of a one-, three-, six-, and twelve month period to identify if they outperformed the general market. The concluding marks states that no significant value could be placed on the insider transactions, however, he does not exclude that insider trades should be omitted in a firm analysis. Further, he identified that the insider acquisition portfolio was more reliable than the insider sell portfolio, which is similar to the result by Chowdhury et.al and Allan & Ramanan.

Additionally, Karte & Näss (2002) performed an event study on the Stockholm Stock Exchange during a period of one year. They analyzed the stock price 75 days prior to the

insider trade and 75 days after, to identify if any significant change had occurred. Further, they divided the different insider groups into different subsection according to company position. However they found no relation between insider acquisitions and abnormal return, but rather that insider sell transitions could indicate a negative trend bump. Surprisingly, they also found that lower officials within the firm performed better than officials with a higher position within the firm in contradiction with Seyhun (1986), see 2.3.2 previous methods used. This was later discussed, as being an effect of the market observing the higher officials in a greater extent.

The following year, Wahlström (2003) studied if insiders could generate cumulative abnormal return and if outsider could yield abnormal return by following the insider trades. The studied period was between the first of July 2000 to the first of July 2002, and all data was gathered from the Stockholm Stock Exchange. The companies were then divided into different groups regarding the turnover of the stock, no differences between acquisitions and sales were performed. The result of the study indicated that the stock with the higher turnover could yield a cumulative abnormal return of 1,26%. Wahlström also concluded that by following insider trades and by keeping the stock for at least three months, one could yield abnormal return. However, by including transaction costs into the calculations, the abnormal return would decrease and/or maybe be totally reduced according to Wahlström. Additionally, the stocks with the lowest turnover indicated that insiders actually received a negative return.

As Seyhun (1986), a master thesis from the following year of Wahlström (2003) at Stockholm University, School of Business, Moreau & Sångberg (2004) analyzed the possibility to yield abnormal return by replicating insiders. The market observed was the Stockholm Stock Exchange and the studied period was one month in October 2003. Though they only analyzed transactions over 500 000 SEK and therefore the study only included 28 transactions. The conclusion of the study specified that during short term investment periods insider actually yielded less than the market, but during longer investment periods insiders yielded higher return than the market. No statistical significant was however found during the longer period.

In a similar master thesis from Stockholm University, School of Business, by Jangklev & Kilander (2004), an equivalent result was established. They studied the first quarter of 2004 on the Stockholm Stock Exchange, which led them to the conclusion that insider acquisitions would yield an abnormal return of 3 to 3,5%. However, based on a significance test they found that for outsiders it would not be profitable to replicate these transactions.

In contradiction to the two previous master theses, another research conducted by Schöld (2005), came to another conclusion. He analyzed a bigger window with insider transaction from 1998 to 2002 and examined the abnormal return six month after purchase. He concluded that insiders would yield an abnormal return of approximately 20% above the market index, thereby stating that insider acquisition is a strong buy signal for outsiders. Schöld also identified that insider stocks acquired by option programs had less relation with abnormal return than those stocks acquired by active trading.

In relation to Schölds master thesis, one conducted by Johansson & Knopp (2005) came to a similar conclusion. They performed a quantitative study over Stockholm Stock Exchange for the period January 2002 to September 2004, in order to identify if insiders generated abnormal return compared to the public. The results specified that such relation exists, and that outsider could statistically replicate insider transitions to generate abnormal returns.

In conclusion, the studied area is quite extensive as shown, however the results varies from different authors. According to the literature review performed, the international studies show a stronger relation between insider trades and abnormal return, though with little or no statistical verification. Further, the studies on the Swedish market slightly contradict the international once, since a lower degree of abnormal return could be crystallized by the authors. The overall conclusion from the literature review indicates that both international, and domestic studies displays that five out of seven studies show that abnormal return can be achieved. Although, only three out of seven show that it is statistically verifiable. To visually illustrate the range of studies that have been reviewed and the different results, two tables have been composed. See table 1 and 2 below.

Table 1 Summary of international studies of insider trade, containing main assumptions and result, in chronological order

International studies

Author(s)	Rogoff, D.	Jaffe, J.F.	Seyhun, N. H	Heinkel & Kraus	Chowdhury, M., et.al	Allen, S. & Ramanan, R.	Eckbo, E. B. & Smith, D. C.
Published in	1964	1974	1986	1987	1993	1995	1998
Country	USA	USA	USA	Canada	USA	USA	Norway
Market	All companies listed in SEC at that time (Official Summary Of Stock Transactions)	200 large U.S firms	New York Stock Exchange (NYSE)	Vancouver Stock Exchange	Selected firms from New York/ American Stock Exchange	A large sample of firms from the American Stock Exchange	Oslo Stock Exchange
Abnormal returns	Yes	Yes	Yes	Yes	No	Yes	No
Statistical significance	Yes, however insider trades were only reported monthly	No	Yes	No	Not stated	Yes	Not stated
Time period	1951-1962	1962-1968	1975-1981	1979-1981	8 weeks	1978-1987	1985-1992

Table 2 Summary of Swedish studies of insider trade, containing main assumptions and result, in chronological order

Swedish studies

Author(s)	Rundfelt, R.	Karte, T. & Näss, M.	Wahlström, G.	Moreau, K. & Sångberg, J.	Jangklev, R. & Kilander, A.	Schöld, C.	Johansson, L., Knopp, M.
Published	1989	2002	2003	2004	2004	2005	2005
Country	Sweden	Sweden	Sweden	Sweden	Sweden	Sweden	Sweden
Market	NASDAQ OMX Nordic Stockholm	NASDAQ OMX Nordic Stockholm	NASDAQ OMX Nordic Stockholm	Transaction over 500 000SEK on the Stockholm stock exchange	50 selected firms from Stockholm stock exchange	NASDAQ OMX Nordic Stockholm	NASDAQ OMX Nordic Stockholm
Abnormal returns	No, but not excluded	No	Yes	Yes, but only during long term investments	Yes	Yes	Yes
Statistical significance	No	No	Yes, however no consideration to transaction costs	No	No	Yes, insider trades can be seen as a strong signal	Yes
Time period	1984-1986	1 year	2000-2002	1 month in October 2003	Q1 in 2004	1998-2002	2002-01 to 2004-10

2.4.2 Previous methods used

In the literature review, six different studies were analyzed, three international and three domestic (Swedish) researches were found to yield abnormal return with statistical significance. Hence, these are subjects for further investigation to identify if these studies have used the same methods, criteria's, delimitations and so on, see table 3.

The first area of interest is how their research questions and/or hypothesis are stated. Four of the studies; Seyhun (1986), Wahlström (2003), Schöld (2005) and Rogoff (1964), all did research within the area of whether replicating insiders trade would yield abnormal return or not. The other two; Johansson & Knopp (2005) and Allen & Ramanan (1995) investigated if insiders themselves could yield abnormal returns.

The researchers have had no differences in their choosing of insiders to study, all of the authors mentioned have investigated all or the majority of the insiders listed in the official summary. This is also true for the choice of method, were the authors have used the market model, with exception for Rogoff (1964), whom has used statistically/hypothesis test. This is also why there is no event window displayed for this author. The other authors have used the market model in cooperation with an event window. The length of event window is however widely varied, ranging from 38 days to 15 months, Johansson & Knopp (2005) Allen S & Ramanan R (1995) respectively.

As the research has been performed in different time periods and in different countries there are some circumstances that have affected the result. The main thing for the three international studies being that when they were performed, the official summary was published with up to 90 days delay of the transaction, causing the insider to have a possible information advantage for a longer time period. The market development does also affect the result, for example during the research for Johansson & Knopp (2005) the stock market did increase considerable. This was then pointed out as one of the possible reasons for their result, indicating higher returns for acquisitions than for sells transactions. However, Schöld (2005) argue that a considerable increase in the stock market lowers the possible abnormal returns. Due to the fact that investor will also buy as the market is on an upward trend, rather than on insider information.

There are also some interesting conclusions of the studies. Rogoff (1964) did, as previously mentioned come to the conclusion that cluster of transactions would yield higher returns and also that buy transaction would yield higher returns. This conclusion was supported by Schöld

(2005) who also found that cluster trades would yield higher returns. Further, Rogoffs (1964) result was also reinforced by Seyhun (1986), who found a higher possible return from buy transaction than sells transactions. Seyhun (1986) did also come to the conclusion that smaller firm and executives within the firm would yield higher returns, which is supported by Johansson & Knopp (2005) findings. This conclusion is however in contradiction with Wahlström (2003), who found that the stocks in the A-List's most turnovers would yield the highest return, (to be noted on the A-list a company would have to be valued at more than 300 million SEK). Wahlström (2003) also concluded that a three month period would be the best investment period. He also concluded that the abnormal return would decrease when introducing transaction costs.

To conclude, it has been found that buy transactions can yield an abnormal return, further, acquisitions normally yield a higher return than sales transactions. Additionally, insiders buying stocks in clusters indicate that an even higher abnormal return can be gained. An event window composed of three months is seemed optimal. In addition, Johansson & Knopp (2005) mentions that further research within cluster trading are preferred. Lastly, the market model is the most used calculation method. Hence, there is a great interest to see if an abnormal return can be gained under these conditions and assumptions, and if so, can it be statistically verified.

Table 3 Summary for comparison of studies, a detailed comparison between 3 international and 3 domestic studies that found abnormal return. Presenting and comparing the methods used and the results obtained.

Area	International			Domestic		
Author(s)	Rogoff, D	Seyhun, N.H	Allen, S. & Ramanan, R.	Wahlström, G.	Schöld, C.	Johansson, L. & Knopp, M.
Research question /Hypothesis	Can any investor earn abnormal by reading the official summary?	Can any investor earn abnormal by reading the official summary?	Can insiders yield abnormal return?	Can any investor earn abnormal by reading the Swedish official summary?	Can any investor earn abnormal by reading the Swedish official summary?	Investigates whether insiders generate an abnormal return compared with other investors on the Swedish Stock Market
Type of insider	Executives	Executives	All registered transactions	All registered transactions	All registered transactions	All registered transactions
Method	Hypothesis test/ Statistical test	Market model & Prediction error	Market model & Unexpected values	Market model	Market model & Previous research	Market model,
Event Windows	-	199 days before to 300 days after	15 months subsequent & prior	44 post trading days in average	6 months after purchase	Day 0- to day 38 Day -5 to day 38 Day -5 to Day 5
Specific circumstances affecting the result	Only if there does not exist transaction cost Official summary is published with up to 90 days delay	Includes the Dividends, The official summary has a delay of up to 90 days	Is published with up to 50 days delay	Only if there does not exist transaction cost	Avoid insiders with small numbers of stock Transactions within 30 days period is considered as one	Considerable increases in the stock market
Result	Purchases seem to yield higher returns, and Increases when Two or more Executives buy	Abnormal return 100 days post Insider buy; 3% and sell; 1,7% 100 days prior Insider buy; 1,4% and sell; 2,5% (Highest 100 days following) Small firms and executives tend to give higher Returns An outside investor yield 1.1% in 300 days Following larger amounts traded seem to increase the return	Strong relation between insider trades and unexpected results In the short term, the insider transaction itself increases the price of the asset	A-list most turnover would yield 3,68% though transaction would diminish and/or eliminate it. A three month period were considered the best time limit	Insider stocks in option programs had less abnormal return than those stocks acquired by active trading, Multiple transactions increases the possible abnormal return, with stock market decline, the abnormal returns seem to increase	Buy transactions yield an abnormal return, however sell transactions does not. The highest returns were found among the small cap and attract 40 companies. Highest return has the relatives to the primary insider. The highest and smallest transaction amounts should be avoided as they do not yield high returns.

3. Method

In this section, the method and approach are described in detail in order to further clarify the method of choice.

3.1 Deductive approach

The thesis is using theories to analyze the possibility of an abnormal return through replicating insider acquisitions on the Swedish stock market, implying that a deductive approach has been applied. Where the use of theories will be either confirmed or rejected through studies of the market. The deductive approach incorporates a theoretical world, which is then investigated and could lead to new theories. The opposite of the deductive approach is the inductive, which assumes the existence of a result of an investigation which is used to craft new theories. The disadvantage of the deductive approach is that the delimitations are stated before the information is collected (Jacobsen, 2002). The effect of such issue in the performed study may be that areas of interest are overlooked and/or fully missed, even though they affect the outcome. By applying previously used and approved methods, such issues are assumed to be avoided.

3.2 Quantitative method

Studies can be done using a qualitative and/or quantitative approach. A qualitative method is a method based on facts rather than values, for example observations or interviews. A quantitative method is on the other hand being based on variables, for example number of stocks or daily share prices (Bryman 2005). As for this study, the quantitative approach will be applied since previous studies have shown that is the most preferred way of calculating abnormal returns (Rundfelt, 1989). However, quantitative methods do simplify the way to produce and summaries the results while also tend to push the thesis into a false sense of certainty, described by experts as a problem with validity (Bryman 2005). The validity shortcoming caused by the quantitative method will be handled through a statistical hypothesis test, to identify if the result has occurred by chance or not.

3.2.1 Validity

In order to truly measure what is intended to be measured, it is important to have a high degree of validity. This can be explained with the following example; the objective of this study is to investigate the possibility of abnormal returns when following insider trade. However, to perform such research, the investigators have chosen to measure how many trades are done in a year. This has truly a high reliability, due to that if the test is repeated

there would be equal results. On the other hand, the test does have a low validity, because the research has not fulfilled the objective, to investigate the possibility of abnormal returns when following insider trade. (Nationalencyklopedin, 2014)

3.2.2 Reliability

While the validity measures what is truly intended to be measured, the reliability is how well the instrument of measurement does measure. As with the example of this study in the validity paragraph, one can say that if estimations are used to measure the number of trades, the research has a low reliability. However, if one would instead use data from Finansinspektionen to measure the number of trades, it would be of high reliability. This is because if new research were to be performed within the field, the results would probably differ. The estimation measurement may not be of the same units or an accepted measurement procedure, therefore not measuring with accuracy. Additionally, a low reliability implies that there also exists a low validity, for example if the measurement is too vague, one cannot say that the research has measured what it intended to measure. (Nationalencyklopedin, 2014)

3.3 Method of choice

As stated in the background, many researchers have been intrigued by the possibility of finding the relation between insider trades and abnormal returns. However, the results have varied and there is no common understanding as to why this gap has been created. Rundfelt (1989) states that it might be due to the fact that different markets, conditions and assumptions have been used. Therefore, the methods assumptions, delimitations and calculations in this report will adhere from six of the previous research report that have identified both a possibility to replicate inside trades yielding abnormal return, and stating that is it a possibility with a statistical significance test. The analyzed articles are as stated below, see table 4.

Table 4 Authors that have identified abnormal returns, their methods have been applied in this study, in alphabetical order

Author(s)	Title
Allen, S. & Ramanan, R. (1995)	The Conditional Performance of Insider Trades
Johansson, L., Knopp, M. (2005)	Insynshandel på den svenska aktiemarknaden
Rogoff, D. (1964)	The Forecasting Properties of Insiders Transactions
Schöld, C. (2005)	Insideranalys: från beteendebaserad finansiell teori till praktisk tillämpning
Seyhun, N. H (1986)	Insider Information: Insider Trading is a Useful Signal to Predict Returns
Wahlström, G. (2003)	Legal insider trading and abnormal returns: Some empirical evidence from Sweden

3.4 Event studies

The objective of the study, is through quantitative methods, analyze the possibility of achieving abnormal returns by replicating insider transactions. To analyze this type of dependency between share price and insider transactions, an event study will be used (MacKinlay, 1997). Event studies have previously been tested by numerous researchers within the field and are mentioned as: “*Perhaps the most successful applications have been in the area of corporate finance, where event studies dominate the empirical research in this area*” MacKinlay (1997), p.36. Event studies assume that an event will directly have an effect at a dependent variable, in this case a transaction and the share price. In the MacKinlay (1997) article from the Journal of Economic Literature, several recommendations when performing an event study are stated, as follows:

- First step in this method is to choose and define an event and its time horizon. In this study, it is insider acquisitions over 90 days, see 3.6 event window. The time horizon should be at least the time of the event, in this case the announcement of the transaction and the day after. As the periods before and after also can implicate the results, these could also be included.
- Second step is to decide the selection of firms, in this study AFGX index. Delimitations based upon the data availability should also be considered in this selection, for example no registrations of trades below 50 000 SEK, see 3.2.3 external effects of the validity and reliability.
- Thereafter the abnormal returns on the stocks should be calculated, the real return and the normal return need to be known for this. To calculate the normal return on a stock there are two models at hand, Constant mean return model and the one used in this study, the market model. The constant mean return is defined as a constant mean return from the asset, whereas the market model assumes a stable relation between the return of the asset and the market return.
- To calculate the normal return an estimation window should be used, this is a period prior to the event which is used to calculate what could be expected of the asset before the event. Therefore the estimation window should not include the event period. This is due to the fact that the event period could affect the outcome of the estimation window. MacKinlay recommend a window up to 120 days prior to the event.
- Normal return and real return is used in the calculation of abnormal return, though the results must be confirmed by a hypothesis test. Hence it is of utmost importance that

the hypothesis is defined correctly so that the test actually represents what it is intended to. In this case they are defined as H_0 , one cannot yield abnormal return by replicating insider transactions and H_1 , one can yield abnormal return by replicating insider transactions, see 3.8 significance test.

- In addition the result should be compiled and presented. There should also be considerations about the importance of certain variables that could affect the result. This could for example be extreme values, see 5.2.3 and 5.3.3 adjusted cluster values in the Analysis section.
- At last the conclusion should be made and a feedback to the problem stated in the beginning. This confirms that the research has been made in accordance with the problem, see 6 conclusions.

3.5 Problematic aspects with event studies

In many economic models and formulas, simplifications are used to make the models useful. In practice; the same applies to event studies. There are several different aspects that have to be considered and assessed in order to achieve the desired result. One of which is the difficulty of isolating the studied event, e.g. the insider transaction. Other factors during the event window may affect the result, these factors in this study may be, but not limited to, dividends, the issuing of new shares and other stock price driving information. The longer the event window, the more of these factors will be included in the study affecting the results. On the other hand, an event window that is too short will not provide data sufficient enough for a study of this sort to be executed. Hence, a balance between the two ought to be identified. (McWilliams & Siegel, 1997) Further, Brown & Warner (1985) concluded that the size of the stock sample can affect the results in event studies. As a sample of too little stock will not provide data sufficient enough to draw conclusions, while a larger sample or a whole population will arrange for slow calculations or shorter time periods to be studied.

3.6 Event window

When assessing the event window, one should consider the time frame to be analyzed in order to isolate the studied objective to reach the desired result. In the MacKinlay (1997) report, they start off by indexing the event time using t . Where $t=0$ is the event date, hence the time when the insider trade is published according to the study performed. That is; the time between T_1 to T_2 represents the event window. According to MacKinlay (1997), even if the studied objective occurs instantly, such as the publication of an insider trade, it is typical to

set the event window larger than 1. The reason for this is due to the fact that it simplifies the calculation of the abnormal return, since only closing price of the stock is needed, rather than several observations daily. Further, from T_0 to T_1 the estimation window is represented, and from T_2 to T_3 the post-event window is represented. In some studies, the post-event window and the event window both starts at T_1 , and the reason for this, according to MacKinlay (1997), is to increase the robustness of the normal market return measure since it would gradually change in its constraints. On the contrary, it is not legitimate for the estimation window and the event window to overlap. Since the normal return measure should not include the impact of the studied event, which in itself should be isolated if the study is to achieve the desired result. In order to clarify the different variables, an illustration has been composed in Figure 2 below.

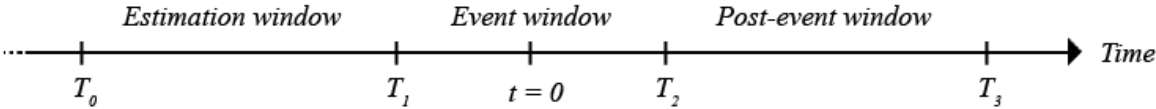


Figure 2 Timeline of the Event studies, the standard timeline inspired by MacKinlay 1997

In the study conducted, the adjusted market model will be used as calculation method. Therefore, an estimation window will not be required since the estimated (expected) return will be equal to the return of the index, also known as the market return. The event window will however be composed of 90 days, see 2.3.2 previous methods used, and be subjected with a one day negative displacement in accordance with the MacKinlay (1997) recommendations. Thus, as mentioned in the MacKinlay (1997) report, the robustness of the normal market return measure will increase. See figure 3.

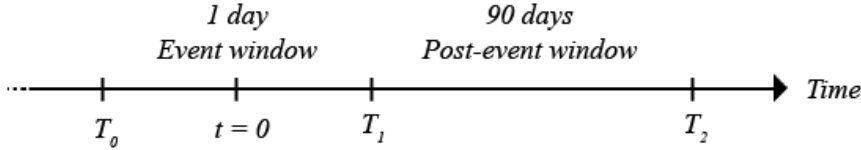


Figure 3 The used timeline in the study, which interprets the chosen 90 days event window, inspired by MacKinlay 1997

The 90 days event window is chosen since Wahlström (2003) in his study of the Swedish market concluded that a three months period was considered as the best time limit for achieving abnormal returns. However, although Wahlström (2003) concluded a large study on the Swedish market, other researchers such as Heinkel & Kraus (1987) have concluded that other event windows are favored. In their study, they concluded that a six month investment period is better than an eight week period. Rogoff (1964) also used an investment period of six month, although Seyhyn (1964) used a window of 100 days and received exceptionally

high abnormal return. Not surprisingly, the inconsistent patterns continuous, many of the different researchers have used different event window and no real consistency can be crystallized. The strongest evident support as to the length of the event window can be found in Schöld (2005) article, where he states that an event window that is too extensive automatically includes other factors than the insider trade that will affect the result. Therefore, a medium to short investment horizon will increase the chances of reaching the desired result, which is also shown in his study as well as Seyhyns (1964).

When analyzing insider trades within the event window, both individual and cluster trades will be analyzed. Schöld (2005) argues that insider trades that occur with an interval of 90 days can be thought of as cluster transactions, since he believes them to be based upon the same fundamental information. However, such long period may include several different fundamental analysis made by insiders. Henceforth, in order to manifest that the two or more trades really is cluster transactions, they will be evaluated as a cluster only if they occur within 30 days of each other. Thus, increase the possibility that the analyzed trades are based upon equal fundamental analysis. Additionally, this approach gives more observations points and hopefully a more precise result.

Further, Rogoff (1964) and Jeng, Metrick & Zeckhauser (1999) have concluded that insider cluster transaction represents a stronger buy signal than individual insider trades. Therefore, the two will be compared within the event window in order to identify which trades is the best to replicate for an outside investor.

3.7 Selection criteria

The various conclusions within the field furthermore intrigue the finding of a relation between return and insider trades. This report seeks to find answers to these conspicuous questions, by investigating previous research and to identify under which conditions and actions those results were reached. Performing the studies on today's market data and thereby crystallizes if their theories actually holds, and foremost, identify if it is possible for outsiders to trade based on insider transactions. In order to grasp the extensive amount of data from the financial markets, the report is limited to the Swedish Stock Exchange and Affärsvärldens general index, commonly referred as the AFGX index during the period of 2009-2014. The time period has been chosen due to that the individual stock rates has been collected from Nordnet.se which is limited to a history of five years. Five stocks with insider transactions have been randomly selected from each sector in the AFGX index. The selected data has been

chosen as there are few researches done within this market and within the AFGX index, although it is a preferred market for many Swedish investors (Affärsvärlden, 2013).

The insider trades for the period are collected from the official summary. No consideration has been taken as to the insider performing the trade or the amount of stocks acquired due to the extensive analysis it would require. Still, the data has been allocated into only buy transactions where options programs, gifts and other type of acquisitions has been removed since the signal value for those trades are less Seyhun (1986).

3.8 Market model

In order to identify if there is a possibility to yield abnormal return, the actual stock price development needs to be identified, also known as the realized return of the stock, as well as the expected/normal return of the stock. The realized return can be calculated by studying historical data during the event period. In this study, the realized return of the stock is calculated as the difference of the closing price at time t , subtracted by the closing price at time $t-1$ divided by the price at $t-1$, as follow:

$$R_{i,t}(R_{m,t}) = \frac{P_t - P_{t-1}}{P_{t-1}}$$

Further, the expected return is to be identified. The expected return is defined by De Riddler (1988), in his research about suspension in trading and price development, as the anticipated return of the stock that would be earned on average, without disruption. Thus, the point at a normal distribution curve with the highest frequency of returns. Moreover, there are several different formulas for calculating the expected return depending on the known variables. One well known model is CAPM, where the expected return is calculated with regards to the market risk free rate, the market return and the stock beta (Berk, DeMarzo, 2013). However, since the study is performed on historical data, the market return is estimated to equal the expected return of the stock during the event window. Therefore, the formula above is used to derive the expected return of the stock, but with regard to $R_{m,t}$ instead of $R_{i,t}$.

The deviation between the stocks realized return and its expected return, is represented as the abnormal return. Thus, the abnormal return can be either positive or negative. The market model sets out to calculate this deviation between the realized return and the expected return.

De Riddler (1988) states that the market model is historically derived from Fama, Fisher, Jensen and Roll in the 1960th, but has over time developed through various empirical studies.

Therefore, the market model can be performed differently depending on which previous research it is referred to. De Riddler (1988) exhibits two common displays of the model; these are the called the market model and the adjusted market model, where the later, is a simplification of the market model.

Market model:

$$ar_{i,t} = R_{i,t} - (\alpha_i + \beta_i R_{m,t} + \varepsilon)$$

$ar_{i,t}$ = Abnormal return in stock i at time t

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

α_i = Alfa for stock i

β_i = Beta for stock i

$R_{m,t}$ = The return of the market portfolio at time t

ε = Error term

Adjusted market model:

$$ar_{i,t} = R_{i,t} - R_{m,t}$$

$ar_{i,t}$ = Abnormal return in stock i at time t

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

$R_{m,t}$ = The return of the market portfolio at time t

Previous research, such as Jeng et al (2003) have identified that the adjusted market model is equally accurate in its assessment of the abnormal return as the extended market model. Brown & Warner (1980) believes the reason for the equivalent results of the two formulas is due to the instable estimations of the beta (B) value over time. Beta is to be calculated during the estimation period, without insider trade disruption. In this study, with the objective of analyzing insider trades, the randomness of when they occur will affect the estimation of the beta, thereby making it misleading. Therefore, the use of the adjusted market model is more suitable for the specific study, even though it contradicts the estimation window from the MacKinlay (1997) report on event study. Other researchers such as Eklund & Linden (2008), Atallah & El-Amrani (2005) and Sjögren (2008) have all used the adjusted market model, further; Brown & Warner (1980) also states that the adjusted market model is extensively used in event studies. Therefore, the model to be used in this study is the adjusted market model.

The adjusted market model is based on the estimation that Beta (β) and Alfa (α) is set to 1 and 0. Thereby the realized return is adjusted to the general development of the market during the event window. De Riddler (1988) also mentions that the adjusted market model should represent a reliable value, even if the event window were only one day, if a sufficient number of stocks were to be analyzed.

The next step in the market model is to aggregate the different observations in order to draw conclusions from the data. Since the data is two dimensional, both time wise and across different firms in the index, the first aggregation will be along the time axis. This is done by calculating the cumulative abnormal return (CAR_i), for each transaction during the event window from time t_1 to t_2 in a security, which is the sum of the included abnormal returns during the event window. According to MacKinlay (1997) the process is necessary in order to accommodate for a multiple period event window. The formula used to achieve this is:

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

Thereafter, the cumulative average abnormal return ($CAAR_i$) is calculated for each security in order to analyze the average cumulative abnormal return for each transaction performed during the whole analysis period. The formula for calculating $CAAR_i$ is:

$$CAAR_i = \frac{1}{n} \sum_{t=1}^T CAR_i(t_1, t_2)$$

As mentioned earlier, the data is two dimensional, across both time and different firms within the index. Now that $CAAR_i$ for each security is accessed, the overall abnormal return for the whole sample can be calculated as the average $CAAR_i$. This is done by the adding each $CAAR_i$, for each stock, and dividing it by $N-1$, where N is the number of securities analyzed within the index. The formula is as follows:

$$CAAR_{index} = \frac{1}{N-1} \sum_{i=1}^N CAAR_i$$

Moreover, a weighted CAAR will be calculated due to that the normal CAAR will only represent the return of a stock. Alternatively the weighted CAAR will represent individual transactions and the expected return from each transaction. This is done by weighing the $CAAR_i$ for each individual stock by the number of transactions and then use the formula for

CAAR_{index}, with the only difference that N will not represent the number of stocks, but rather the number of transactions.

3.9 Alternative model- Buy and Hold

There are alternative models that could calculate the abnormal return of a stock. One of them is the Buy and Hold model (BHAR). However Fama (1998) has pointed out that it is problematic to use this model due to the statistical problem and the associated test statistics. Furthermore, Barber & Lyon (1997) and Lyon, Barber & Tsai (1999) identify three problems using this model, the “new listing”, “rebalancing” and “skewness biases”. However Lyon et al (1999) also states that the new listing and rebalancing biases can be addressed using a well-constructed index. Though, the more serious problem is that the asset/stock is biased where the index is not. This creates a bias of the BHAR test, causing a rejection of the null hypothesis where it should not (Barber & Lyon, 1997). Despite this problem the BHAR was calculated for the cluster transactions as an extra robustness check. The method and the result can be found in the appendix.

3.10 Significance test

One of the steps in the MacKinlay (1997) report on event studies is that a significance test is to be performed on the data in order to evaluate the result. Therefore a hypothesis is to be established and tested to confirm or reject the theory. This is done in order to estimate if the result is of random nature or not.

When performing statistical tests, one should consider performing parametric or non-parametric tests, depending on the distribution of the data. Non-parametric tests include, but are not limited to, the Wilcoxon’s signed rank test and the Chi square test. The parametric tests are largely supported by the student t-test. (Körner, 1996).

The student t-test is widely used by previous researchers in the area to measure the significance of their results, some of which are Jönsson & Rasmusson (2010), Johansson & Knopp (2005) and Atallah & El-Amrani (2005). Furthermore, Newbold, Carlson & Thorne (2010) states that a large body of empirical evidence supports the use of the central limit theorem, which in short realize the application of the student t-test to non-normal distributed data, when the sample size is large enough.

As a result, Newbold et al (2010) have performed tests in order to identify when the number of observations are sufficient enough to conclude that the data is normally distributed. When a symmetric distribution is analyzed, the number of observations needed to conclude that the

data can be normally distributed is 20 to 25. When the data has a skewed distribution the observations needed is commonly slightly more, however, in their study 25 observations was sufficient in order to determine that the sample closely followed a normal distribution.

The number of observations in this study is represented by the number of insider trades and insider cluster trades. As these are 1509 respectively 265, one can conclude, according to the central limit theorem, that the data can be considered as normally distributed (Newbold et al, 2010), see Figure 4. Therefore, the statistical significance test will be the student t-test since it is in accordance with previous research and supported by the data distribution. But as an extra robustness check, a Wilconx test will be performed and presented in the appendix.

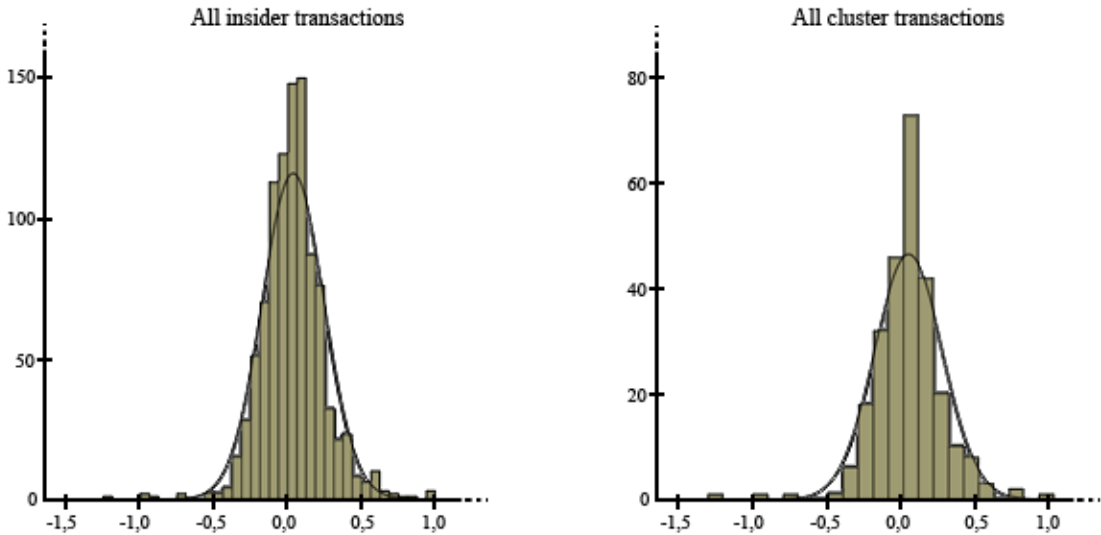


Figure 4 The data in relation to a drawn normal distribution curve. Were one can identify that the data is normally distributed, calculated using SPSS

As the objective of the study is to identify if replication of insider trades can yield an abnormal return it is necessary to compose two hypotheses. The two hypotheses are formed in relation to the objective of the study and stated as follows:

H₀: One cannot yield abnormal return by replicating insider transactions

H₁: One can yield abnormal return by replicating insider transactions

The hypotheses are to be evaluated against the return of the sample stocks, as these might differentiate from the index itself. It is also due to the stock sample, important to test the likelihood that the return will occur across the whole index. The significance test will be performed and evaluated against the conventional P-value of 5%. If the resulted P-value is lower than 5%, H₀ can be rejected and similar if the resulted P-value is above 5% H₀ cannot be rejected. (Newbold et al, 2010).

4. Result

*In this section the result from the empirical study and its statistical significance will be presented. The result from the study will further be compared to previous research within the field. Note that an abnormal return of 1% means that the return was 1% higher than the selected index and **not** the total realized return*

4.1 Literature studies

In the meta-analysis, evidence for possible abnormal returns was found. Nonetheless, there are researches that have rejected the fact that it exist systematic abnormal returns while other have verified the opposite. Therefore it is not possible to say that it indeed exist a systematic abnormal return or not, based solely on previous research. However, in the meta- analysis it was also found that there exist some circumstances that would increase the abnormal return. It was found that a 90 days period was the most profitable length of investment per transaction, small companies seemed to yield higher abnormal returns, clusters increased the possible abnormal return and higher executives in different positions gave a stronger buying signal. It was also found which methods are preferable; event studies, the Market model/adjusted Market model and the students t-test.

4.2 Abnormal return by replicating individual insider trades

The outcome generated by replicating single insider acquisitions resulted in an abnormal return. The replication (CAAR) generated approximately 3,95% return above index (see table 5). Thus, exceeding the portfolio return by 2,45%, as the portfolio of the chosen stocks will yield 1,5% return by chance above the index when kept for 90 days, in average. For stocks in portfolio see table 15 in the appendix. The number of transactions within each individual firm differentiated from 1 to more than 100 transactions. This was taken into consideration by weighting the CAAR of each firm by the number of analyzed transactions. The average result from this was an abnormal return of 3,46%, see table 5.

Table 5 Average return obtained by following individual insiders and also the average return of the chosen stocks in relation to the index called average 90 days return on portfolio.

Average 90 days return on portfolio	CAAR	Analyzed transactions	Total number of transactions	Weighted CAAR
1,50%	3,95%	985	1512	3,46%

Table 5 exhibits that the number of Analyzed transactions and the Total number of transactions differ from each other. This is due to the fact that some transactions have been performed on the same day and sometimes by the same insider, which has only been accounted for as a single transaction. Hence, the report sees daily transactions as only one event. Since if they are made during one day they are most likely based on the same insider information, thus only one buy signal exists.

4.2.1 Transaction significance

The study was conducted using a sample of 40 stocks, five randomly chosen firms from eight different sectors, from the total population of 299 firms. One sector, utility services, was excluded since it only contains two firms. Due to the fact that a sample is used, it is essential to test the significance of the sample to see if the result could be applied to the whole population, thus, the AFGX index. In order to accomplish this, a hypothesis test called student t-test was conducted, see 3.8 significance test. However as the portfolio had an abnormal return of 1,5%, the test was performed with a test value of 0,015, hence the H_0 value was 1,5%. The result from the significance test implied that the null hypothesis, H_0 could be rejected as the t-test obtained a P-value of 0.05% (see table 6), which is less than the conventional limit of 5%. Which mean that the H_1 would most likely be true, implying that one can yield abnormal return by replicating insider trades.

H_0 ; Abnormal return $\leq 1,5\%$; One cannot yield abnormal return by replicating insider trade

H_1 ; Abnormal return $> 1,5\%$; One can yield abnormal return by replicating insider trade.

The t-test also exhibits, with a 95% confidence interval, that the abnormal return would be within the interval of 0,84% to 3,49% above the portfolio return of 1,5%, as illustrated in Figure 5. Hence, with 95% certainty the average abnormal return by replicating single insider trades is separated from the average return yielded by the portfolio.

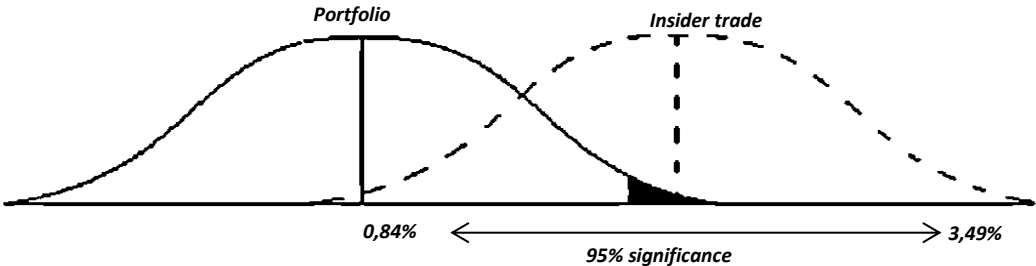


Figure 5 Two normal distribution curves for the portfolio and the abnormal return of insider trade show that the confidence interval of 95% is between 0,84 % up to 3,49 % above the portfolio return. The figure is not in accordance of scale.

Table 6 Significance result obtained by Students t-test when following individual insiders, the data has been tested against the return of the portfolio.

	Test Value = 0.015				
	t	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
All transactions	3,205	0,001	0,02162	0,84%	3,49%

4.2.2 Transactions by sector

The study has also been performed in such way that the abnormal return for each sector can be acknowledged, see table 7. Each of the insider trades, in each sector, has been studied and compromised into a whole for each sector in order to identify differences between them. As the table 7 shows, six out of the eight sectors exhibits an abnormal return higher than the index with exceptions for Consumer goods and Technical. Table 7 also exhibits that all of the sectors insider trades, with exceptions for Consumer goods, has an abnormal return higher than the sector specific abnormal return, hence higher than the average return on 90 days. Also worth mentioning is that the abnormal return varies between the different sectors, e.g. Oil has an abnormal return of 17% which is almost 6% higher than the firm specific. While Consumer goods have an abnormal return of -5,28%, which is almost 3% less than the sector specific abnormal return. Due to the fact that some firms only have a few transactions it is necessary to calculate a weighted CAAR which would make the results less bias. When calculating the weighted CAAR, each insider transaction is added and divided by the total number of transactions, instead of each firm being evaluated separately then averaged out by the number of firms in the sector. This then resulted in a decrease of the abnormal return for Oil (-5,59%), Raw material (-0,57%), Industrial (-0,33%), Medical (-2,16%) and an increase for Consumer goods (1,03%), Consumer services (2,4%), Economy (0,89%) and Technical (1,42%), see table 7.

Table 7 Result obtained by following individual insiders, per sector a comparison of the different sectors

Sector	Average return in 90 days	CAAR	Number of trades analyzed	Total number of trades	Weighted CAAR
Oil	11,32%	17,02%	39	47	11,43%
Raw material	-2,72%	1,64%	129	171	1,07%
Industrial	3,00%	4,15%	115	199	3,82%
Consumer goods	-2,34%	-5,28%	92	130	-4,25%
Medical	6,10%	8,54%	115	156	6,38%
Consumer services	-2,24%	5,24%	219	334	7,64%
Economy	-0,41%	0,62%	175	325	1,51%
Technical	-0,75%	-0,36%	101	150	1,06%

4.3 Abnormal return by replicating cluster transactions

The result from replicating single insider transaction shows that it is possible to yield an abnormal return. Hence it is of interest to see if the abnormal return would increase if one were to follow insider cluster trades instead, and if it is in accordance with previous research, see 2.3.2 previous methods used. In the study, 265 different clusters transactions were found, although for one of the firms, Black Pearl Resources, no insider transactions met the requirements to be considered as a cluster acquisition. The result from this study was that the abnormal returns for clusters were 1,97%, only 0,47% better than the portfolio abnormal return. In comparison with single insider transactions the strategy yielded almost 2% less in abnormal return, see table 8.

Table 8 Result obtained by following clusters and also the average return of the chosen stocks in relation to the index called average 90 days return on portfolio.

Average 90 days return on index	CAAR	Total number of clusters	Total number of trades	Weighted CAAR
1,50%	1,97%	265	1509	3,40%

4.3.1 Cluster significance

In comparison to the significance test for single insider transactions, the abnormal return for cluster transactions does not meet the requirements of the 5% significance level. The test resulted in 8,7%, see table 9. Hence, hypothesis H_0 cannot be rejected. Therefore, one cannot say with statistical significance that by following insider cluster transactions, that one can yield an abnormal return.

H_0 ; Abnormal return $\leq 1,5\%$; One cannot yield abnormal return by replicating insider trade

H_1 ; Abnormal return $> 1,5\%$; One can yield abnormal return by replicating insider trade.

Table 9 Significance tests obtained by Students T-test using data from following clusters, the data has been tested against the return of the portfolio.

	Test Value = 0.015				
	t	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
Cluster	1,362	0,174	0,01900	-0,85%	4,65%

4.3.2 Cluster by sector

In accordance with previous result where all single transactions were analyzed, six out of eight sectors exhibits a yield higher than the average return in 90 days, when analyzing insider cluster transactions, see CAAR in table 10. The exceptions are for the Industrial and Technical sector. One can also conclude that by weighting the average CAAR, hence analyzing all cluster transactions and not evaluate each firm separately then averaging them out according to the number of firms, the volatility decreases. Since higher abnormal returns decreases and the lower abnormal returns increases. Exhibited as a decrease of the abnormal return for Oil (-3,04%), Raw material (-0,37%), Medical (-4,25%), Consumer goods (-2,07%) and an increase for Industrial (3,41%), Consumer services (2,06%), Economy (0,55%) and Technical (16,96%). Further, the abnormal returns varied less between the sectors in this result compared to the result from all single insider transactions.

Table 10 Results obtained by following clusters, presented by sector, a comparison of the different sectors

Sector	Average return in 90 days	CAAR	Number of clusters	Total Number of trades	Weighted CAAR
Oil	11,32%	14,56%	13	88	11,52%
Raw material	-2,72%	0,96%	41	223	0,59%
Industrial	3,00%	-1,16%	33	202	2,25%
Consumer goods	-2,34%	1,62%	24	159	-0,45%
Medical	6,10%	11,73%	26	280	7,48%
Consumer services	-2,24%	4,48%	53	396	6,54%
Economy	-0,41%	3,59%	49	342	4,14%
Technical	-0,75%	-20,02%	26	150	-3,06%

5. Analysis

In order to evaluate the result this section is composed and will comprehend a discussion and analysis of the methods used and the resulting data as well as other comparative constraint related to previous research.

5.1 Literature studies

The meta-analysis of the literature has been conducted in order to crystalize what previous researchers has concluded, their method, as well as assumptions. The literature has been chosen in accordance of the amount of citations as well as of the applicability of the content. However, although approximately fifteen studies on the matter has been analyzed there are still research that has not been covered, implying that there is a slight chance that other conclusions could have been drawn. Although, since the amount of analyzed studies account for a large number of the most prominent literature in the subject, the belief that the validity of their result is good.

Since many of the previous researchers have not states the stock prices and developments, no calculation could be done in order to avoid for their calculation errors. Further, no time was to be allocated for such heavy investigation. Therefore, if previous researchers have performed calculation errors, these have not been accounted for in the performed study. It has been proven that abnormal returns can be yielded. Thereby, the market is of semi-strong efficiency according to Fama (1970), thus the stock market will immediately reflect all published information. Further suggesting that all unpublished information can be profitable, as the securities can be acquired at a lower price before the market adjusts to the new data. Thus by replicating insider trades, outsiders can acquires stocks while the information is still unpublished and thereby yield an abnormal return.

5.2 Abnormal return by replicating individual insider trades

Although only 40 firms were selected, the number of trades during the five year period is accumulated to 1512, and out of these, 985 did met the requirements to be analyzed. Since the amount of trades is quite extensive, the belief that a valid result has been reach is high and also shown by the significance test. Another approach to gain the extensive amount of trades would have been to select more firms, however during a shorter time period. Whether it

would have given another result is left unsaid. Although, the belief of that the time horizon is of more importance have been applied in this study.

The individual insider trades have been compiled into different sectors in order to clarify if any differences exist. As mentioned in Transactions by sector, the Oil sector has proven to be a vice investment during the period with a return averaging 17,02% every 90 days. Since the 985 trades have been divided into different sectors, the result per sector is of lower significance than the average result of the whole portfolio. As can be identified in the Oil sector, see table 7, only 39 insider trades could be analyzed. On the other hand, in the Customer service sector, 219 trades could be analyzed, thereby implying a stronger validity to the result. Nevertheless, both sectors presented a positive abnormal return in comparison to their sector. The insider acquisitions in the Oil sectors gained an abnormal return of 5,7 %, while the insider acquisitions in the Customer service sector outperformed the sector by 7,48% each 90 days period. So even though there is a stronger validity for the result in the Customer service sector, it still outperforms the Oil sector in relation to abnormal return.

Another significant aspect to consider is that when the individual trades were analyzed, there were no extreme values found. Hence, there were no trades that significantly repelled from the index, neither up nor down, by more than 100%. Therefore no adjustments to the data had to be performed, leading to a statistically better result.

5.3 Significance test of all transactions

In the hypothesis test for all the insider transactions, the H_0 hypothesis was rejected, meaning that it is possible to yield an abnormal return by replicating insider acquisitions. This could be concluded as the sigma obtained in the test had a value of 0,05%, which is located in the far right corner of the normal distribution curve, see figure 6. Implying that with 99,95% certainty the average return of insider trade is separated from the average return of the portfolio. Therefore it is 0,05% chance that the result was obtained by a coincidence. Hence, according to the study, one can say that it is highly likely that by replicating insider acquisitions and holding the security for 90 days one will outperform the average 90 days return of the same stocks.

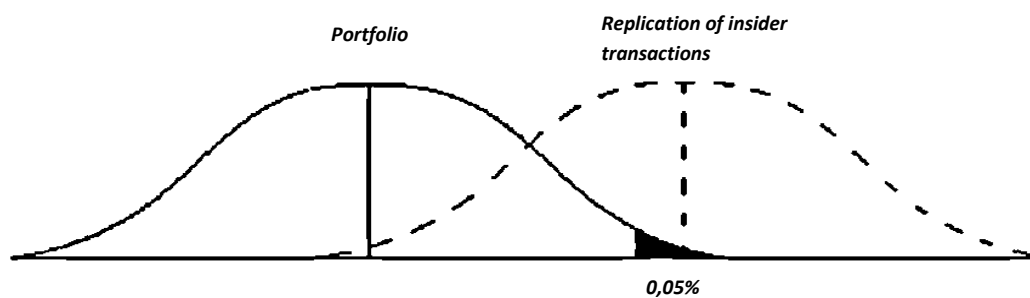


Figure 6 Two normal distribution curves for the portfolio and the abnormal return of insider trade. There is a chance of 0,05% that the replicated distribution curve is within the normal distribution curve of the portfolio. Hence it is 99,95% chance that they are two separate curves. Note that it is not in accordance of scale.

In the test it was also concluded that the spread from this sample would most likely (95% confidence interval) yield an abnormal return within the area of 0,84% and up to 3,49% above the portfolio, (2,34% and 4,99% above index). This further supports the conclusion that following insider trades will actually yield higher returns than traditional index portfolios.

5.4 Abnormal return by replicating cluster transactions

The number of cluster trades that occurred during the period is 265, hence, the number of analyzed cluster trades is significantly less than the number of individual insider trades. Therefore, the validity of the result decreases, which was also noticed in the significance test since H_0 could not be rejected. On the other hand, when the data was adjusted for extreme values, H_0 could be rejected. The conclusion drawn is that the significance is dependent on one value; hence, a higher number of cluster trades would decrease the substantial impact of such single trades. Thereby, a greater number of trades to analyze would improve the result.

The selection of what actually constitutes as a cluster trade was at least two trades within one month. Since the selection is stricter than Schöld (2005) definition of what actually constitutes as a cluster trade, less trades were analyzed. However, the cluster trades that actually were analyzed accounted for a higher significance, since the fundamental analysis from the insiders within the period is more likely to be based on the same assumptions.

A contradiction to the common belief that cluster trade actually yield more than single insider trades is the one presented by Jaffe (1974). He argues that when different insiders in a firm acquire stocks frequently within a period, the information basing their trades is already known to the public. In relation to the result of the study, where cluster trades yield less than single insider trades, Jaffes (1974) theory can feasibly be correct on today's market.

5.4.1 Significance test of cluster transactions

The cluster transactions did on the other hand not result in a rejected H_0 , since the sigma obtained was 8.75%. Thus there is risk that the result obtained is just due to chance. This

could have been an effect of the considerable lower amount of cluster transactions, which were only 265 compared to the 985 insider transactions used in the first test. Additionally, the transactions seemed to have a higher volatility which in combination with fewer observations creates a wide spread. Which can also be identified within the 95% confidence interval which is between 0.85% and 4.65%. In order to resolve the issue with low significance, more firms could have been included. This would have decreased the necessity of a hypothesis test as the greater sample of the population would have been included. Thus, decreased the possibility of misleading results.

5.4.2 Adjusted cluster values

The result for cluster transactions was greatly affected by one firm within the technical sector; Bioinvent, which had an abnormal return of negative 121.35% and lost 96% of its market share during the period. When adjusting for this firm, there would be an abnormal return of 5.13%, which is 1.18% better than replicating single insider transactions. When observing the Weighted CAAR in Table 11, one can however identify that the one bad investment did not affect the return per transaction as much.

Table 11 Result obtained by following clusters and also alternative calculation, adjusted for extreme values and the return obtained by portfolio adjusted/unadjusted for extreme values

Cluster transactions	Average 90 days return on index	CAAR	Total number of clusters	Total number of trades	Weighted CAAR
Unadjusted for extreme values	1.50%	1.97%	265	1509	3.40%
Adjusted for extreme AR >100%	1.76%	5.13%	264	1492	3.88%

To further illustrate why Bioinvent is considered as an extreme value and adjusted for, the development of the stock and the index has been plotted in a diagram over the chosen time period. What is revealed is a great down curve, see diagram 1 (*Note that the index is in relation to the left x-axis while BioInvent is in relation with the opposite x-axis*). The index has advanced from 200 SEK up to 450 SEK, while Bioinvent has decreased from 20 SEK to 3 SEK.

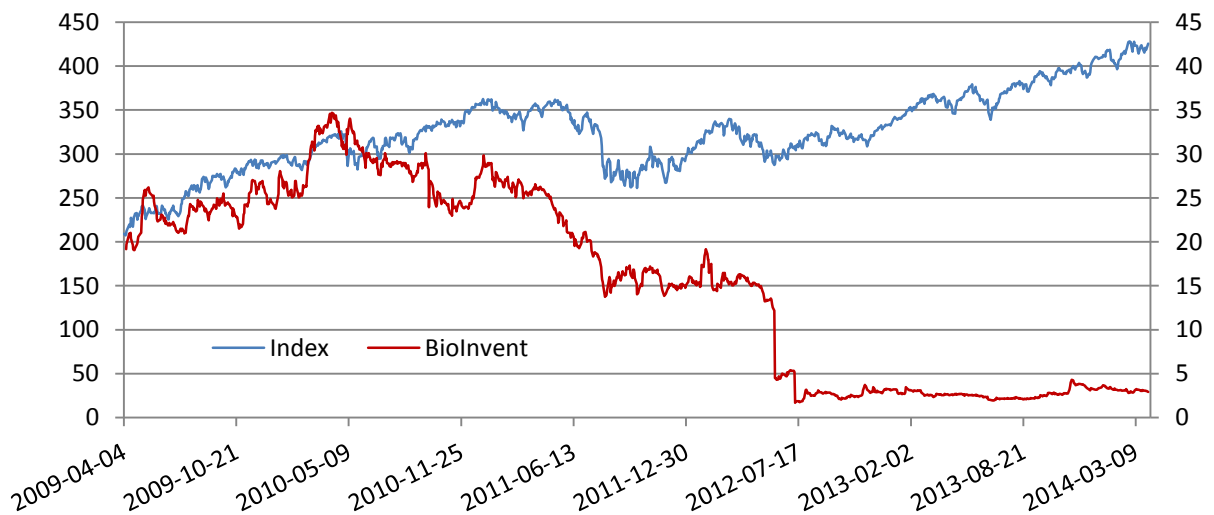


Diagram 1 Development of the index (left scale) and BioInvent (right scale) during the period of 2009-04-04 until 2014-04-04. Note that they are presented in different scales

Since the study is calculating the abnormal return, thus the return in relation to the index, the negative abnormal return for BioInvent becomes exceptionally low. In this diagram a decrease of more than 150% is exhibited. It also happens that the 90 days basis used in this report collide with the biggest drop of the share price during the studied five years period, resulting in a drop of approximately 129 % in relation to index, displayed in Diagram 2.

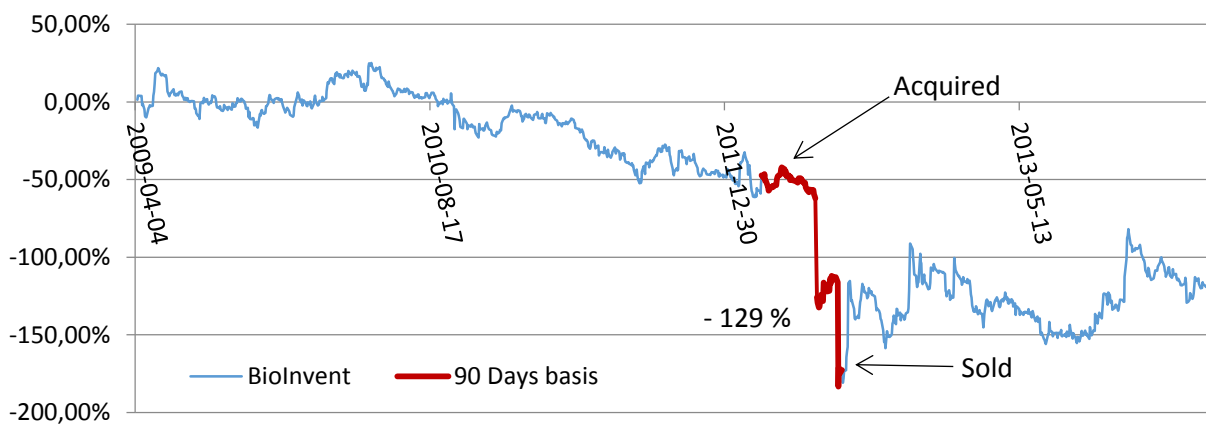


Diagram 2 Development of Bioinvent in percentage during the period of 2009-04-04 until 2014-04-04. Note that it is in relation to the Index, (index equal 0%) and that the 90 days transaction is marked.

These diagrams support the argument that the value truly is of extreme nature. This also justifies the need to do alternative calculations, as this type of extreme developments seldom occurs nor up or down. Therefore, it does also give reason to use the alternative calculations. However, no such conclusion will be drawn, only that the data is highly affected by extreme values.

5.4.3 Significance test of adjusted cluster values

In the study, there were a firm exhibiting an extreme abnormal return of negative 121.35%, therefore it was necessary to compute an alternative result as the firm changed the whole portfolio by more than 3% and about 20% for the specific sector. In relation, the firm generated an issue when performing the significance test, providing a result that was insignificant. If adjusting for the specific firm, the following result would have been obtained by the significance test for cluster transaction, see table 12.

Table 12 Alternative significance tests obtained by Students T-test using data from following clusters in relation to portfolio and tested against the return of the portfolio

Cluster-adjusted for extreme values	Test Value = 0.015					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
	1.800	263	0.073	0.02371	-.0022	.0497

Table 12 exhibits a sigma of 3.65%, which is acceptable and thereby it is possible to reject the H_0 hypothesis. Hence one could say with 96.35% certainty that the result is in fact true, that cluster would yield higher return than the portfolio. On the other hand this clearly illustrates the riskiness of the market and that even though a model is good it is never perfect as it is almost impossible to predict the market development. Since only one transaction out of 265 was enough to reject model.

The purpose of this study is also to see if replication of clusters would increase the abnormal return compared to only replicating single insider trades. It is concluded, according the adjusted data, that there exist an abnormal return and one that is higher. Nonetheless, the question remains whether it does increase the abnormal return with statistical significance. When a statistical test is performed the result indicated that it was a coincidence and not in fact a higher value. Hence if the test where repeated the result could also be lower than the abnormal return yielded by all insider transactions. Therefore one cannot say with certainty that one would yield higher abnormal return by replicating cluster trades. See table 13.

Table 13 Alternative significance tests obtained by Students T-test using data from following clusters, in relation to Abnormal return yielded by individual insiders.

Cluster-adjusted for extreme values	Test Value = 0.0395					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
	-.060	263	0.952	-0.00079	-.0267	.0252

5.5 Comparison between single insider trades and cluster trades

To conclude the two results obtained in the research, a table of comparable statistics and a diagram has been created, see table 14 and diagram 3. In the table, one can detect that in five out of eight sectors a better return is generated by following individual insiders instead of replicating cluster transactions. The portfolio as a whole would also yield a higher abnormal return when single insiders are replicated, thus, not in line with previous research from Schöld (2005) and Rogoff (1964). Although, if the data is adjusted for extreme values, replicating cluster transactions would yield a higher abnormal return of 5.13%, instead of only following insiders which would yield 3.95%, thus, in line with previous research. In the weighted columns in Table 14, both cluster transactions and individual trades exceed one another on four out of eight sectors. However, the portfolio would generate a higher average return if only single insiders were to be replicated. Again, when the data is adjusted from extreme values, one can identify that the cluster portfolio would yield a higher return. Thus, the data's relation with previous research regarding if cluster transaction or individual insiders are the best strategy when investing, is rather inconsistent and randomly dependent.

Table 14 Comparison of results obtained by following clusters and individual insiders, presented by sector. Additionally adjusted values are presented that has been calculated without extreme values. Illustrated in diagram 3

Sector	CAAR All transactions	CAAR Cluster	Difference	Weighted by All transactions	Weighted by clusters	Difference
Oil	17.02%	14.56%	-2.47%	11.43%	11.52%	0.10%
Raw material	1.64%	0.96%	-0.68%	1.07%	0.59%	-0.47%
Industrial	4.15%	-1.16%	-5.31%	3.82%	2.25%	-1.57%
Consumer goods	-5.28%	1.62%	6.91%	-4.25%	-0.45%	3.80%
Medical	8.54%	11.73%	3.19%	6.38%	7.48%	1.09%
Consumer services	5.24%	4.48%	-0.76%	7.64%	6.54%	-1.10%
Economy	0.62%	3.59%	2.97%	1.51%	4.14%	2.62%
Technical	-0.36%	-20.02%	-19.66%	1.06%	-3.06%	-4.12%
Portfolio	3.95%	1.97%	-1.98%	3.46%	3.40%	-0.06%
Technical Adjusted	-0.36%	5.31%	5.67%	1.06%	1.67%	0.61%
Portfolio adjusted	3.95%	5.13%	1.19%	3.46%	3.88%	0.41%

As illustrated in Diagram 3, most of the investments, regardless of replicating clusters or individual insiders, generated a return that is higher than the index itself. There are only two sectors that underperformed, which are Consumer goods and the Technical sector. The adjusted extreme value in the technical sector can easily be discovered in the illustration, see diagram 3.

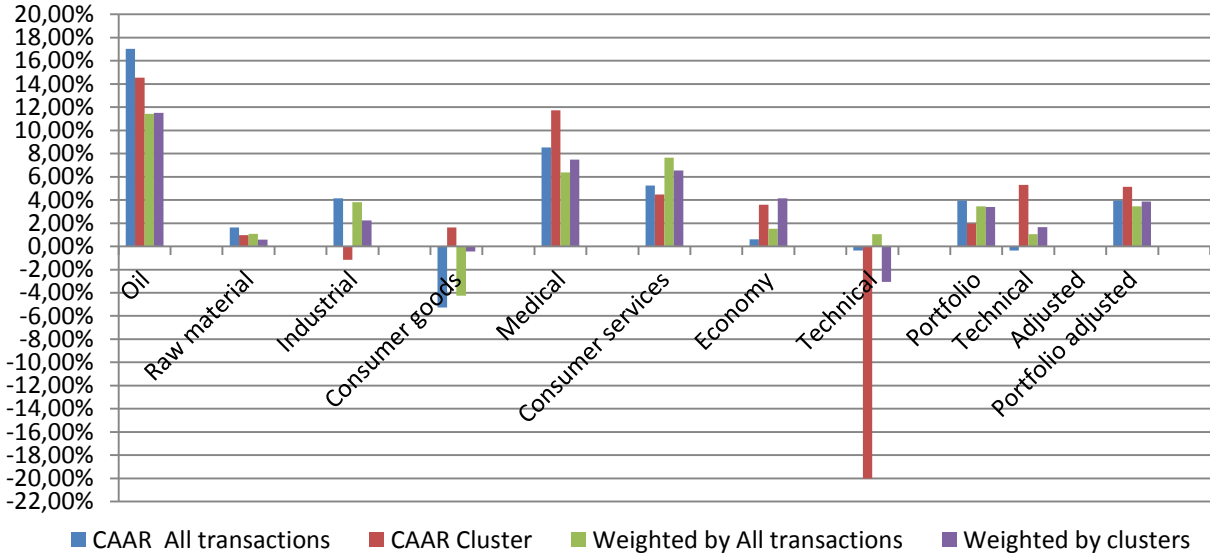


Diagram 3 Comparison of results obtained by following clusters and individual insiders, presented by sector, detailed values can be found in table 14.

5.6 Event window

The chosen event window is 90 days, according to Whalström (2003) research. Although, does a rational investor truly follow these specified event windows when holding a security? When the investment has been placed, the stock ought rationally to be processed through a fundamental analysis where the investment period preferably should be based on that analysis, rather than on a period used to study the effect of the event. Therefore, one can question the length of the event window, in both directions.

5.7 Weighted CAAR

The phenomenon of weighted CAAR (WCAAR) could not be identified in any of the studied articles. However, it is added in order to give the study an event further depth. CAAR can be seen as the cumulative average abnormal return for the sample of stocks. CAAR is also calculated firstly, as the average of the CARs, then averaged again as the medium of the sample stocks return. Therefore, it does not show the average return per trade, but rather per stock. This is not an issue when the amount of trades in each stock is equivalent to each other, but in this research, the number of trades in each stock ranges from 1 to 75. Hence, in order to

identify the average return per trade, the weighted CAAR has been added. See formulas in 3.8 Market model.

5.8 Reliability and validity

In this thesis, one would argue that the validity is high due to the fact that it is based on methods that have previously been used to measure same and/or equivalent objectives. The thesis is also based on a meta-analysis, which also is considered to have a high validity. Still, one can argue that the meta-analysis might be misinterpreted and/or biased. Though, since the previous authors have interpreted the data in similar ways, the risk of misinterpretation is estimated to be low.

Since the methods within the following thesis is academically used and accepted, a high degree of reliability is achieved, even though the methods have displayed different result which could be interpreted as a reliability issue. Nonetheless, one can say that the studies have a high reliability concerning the chosen time period and market. This could be an evidence of differences, due to regulations over time and market specific changes. (Nationalencyklopedin, 2014)

Thereby can this thesis be seen to have a high reliability for the chosen time period and market, though the absence of possibility to generalize would lower that reliability on a greater scale. This directly affects the validity, as validity cannot be greater than the reliability. Hence the study has a high validity and reliability for the specific market and chosen time period, though this is not true for generalizations of other markets and time periods. Thereby can the chosen methods be used to continue the research within the field, even though the result is limited to the specific time period and market.

5.9 External effects of the validity and reliability

The study has been performed on the Swedish stock market and the AFGX index; thereby, there exists some restrictions to the result that are important to highlight if the thesis would be used to compare with international studies. One thing among others is the Swedish official summary, which has a lower limit restriction as to when insider are to report transactions. The limit is set to 50 000 SEK, implying that amounts lower will not be reported. Another issue is that the insider trades sometimes have been registered further than with a five days delay, which in fact makes the insider information less valuable when published. Fortunately, this is not an extensive problem and has only been identified a few times. Therefore, it is not considered to affect the result. In addition, there are regulations concerning delayed

registration, see 2.2.3 Swedish law of Insider trade. Another issue affecting the result is that there exists something called Kapitalförsäkring, Swedish endowment insurance. The problem with this type of insurance is that the formal owner of the stock is the insurance company, and not the insider. Hence there is no registration in the official summary of this type of transaction. So the insider could potentially yield high returns within this gray area, where it does not exist a transparency of the market (Lidén, 2012).

5.10 Effects of the market

The study has concluded that by replicating single insider trades, one can with statistical significance yield an abnormal return. However, according to Johansson & Knopp (2005) the market environment may affect the result. As the graph below shows, see diagram 1, the AFGX index has, during the period from April 2009 to April 2014, increased by 103.45%. According to Johansson & Knopp (2005), such increase of the market may affect the result in a positive manner. On the other hand, Schöld (2005) argues that a considerable increase in the stock market lowers the possible abnormal returns. Due to the fact that investor will buy as the market is on an upward trend, rather than on insider information. Whether their theories are correct or fouds is difficult to predict since no evidence in their studies is compiled. What can be stated on the other hand is that the market environment can have an effect on the result, but in which direction is unclear. In relation to the issue, Rundfelt (1989) also mentions that market turbulence may affect the result, since the market movement will then rather be based on non-diversifiable risks than firm specific information risks. Nevertheless, if one were to know the future movement of the market, a strategy based on insider acquisitions would probably not be the most favored approach.

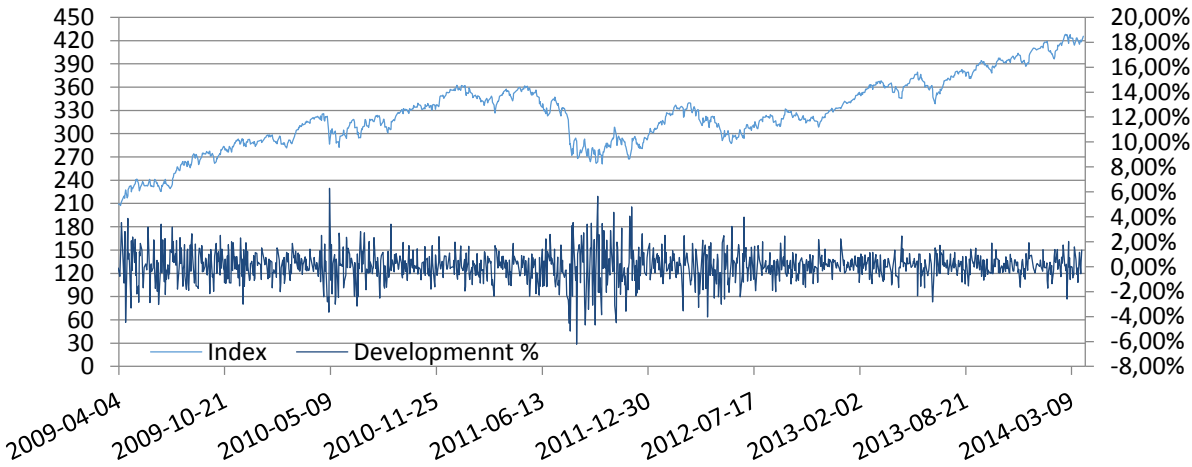


Diagram 4 Development of the index (absolute numbers) during the period of 2009-04-04 until 2014-04-04 and also the volatility (percentage) during the same period, note that they are presented in different scales

Diagram 4 also exhibits that the daily index development, exhibited in percentage, seems to be more volatile as the market is on a downwards trend, as seen in the summer of 2011. What this may imply is that insider acquisitions during the period, is affected by the volatility of the market. If an insider however is better at assessing the information and projecting the future development of the firm than others, their trades would be of greater significance for outsiders during these periods. If such relations exists is however not clarified. On the other hand, insider acquisitions are, as Rundfelt (1989) discussed, affected by the turbulence of the market and affected by other factors than the firm specific information during these periods. Ultimately a conclusion whether insiders are to be replicated during volatile market periods is neither recommended nor rejected, as no evidence of such result can be shown. The only conclusion to draw is that the market is more volatile during a bear market.

5.10.1 Effects of the selection criteria

Rundfelt (1989) argues that a smaller sample size of the population may affect the result in a positive manner. As of this study, a sample of 40 firms was randomly selected; five out of each sector, in order attain a comprehensive amount of data. In accordance with Rundfelts (1989) theory, due to the fact that a sample was used, it may have affected the result positively. However, delimitations had to be drawn as to the amount of firms or the length of the study period, in order to decrease the amount of data making it comprehensive. The length of this study is on the other hand from 2009-04-03 to 2014-03-31 on the Swedish market, and it ought to be highlighted since it offers the study a depth that only a few other researchers has achieved. Hence, the length of this study was prioritized which may have led to a greater abnormal return, if Rundfelts (1989) theory is to be followed.

5.10.2 Effects of the transaction costs

The study has not considered fees such as transaction costs when calculating the result. In order to add such fees in the calculation, one would have to assess the different ways in which one can acquire stocks, add these fees in order to identify where the equilibrium price is. Further, depending on the amount of acquired stocks, the fees would vary from a fixed price onto a variable cost that is in relation to the amount. Hence, to add such variables to the calculations would firstly be problematic as to the fee amount, but secondly and foremost, also lead to a result that would not be comparable to previous research. However, one can accumulate the purchase and sales trades in order to assess the amount of trades in the study. From there, the transaction cost can be calculated in accordance to the selected fee by multiplying the fee by the number of trades. This is however something that should be done

on an individual level since it is dependent on the amount that is to be invested and the transaction fee one have.

6. Conclusions

The conclusions drawn from this study is that by replicating single insider trades, one can yield an abnormal return between 1.96% and 2.45%. The returns are calculated as the average abnormal return per firm (CAAR), and average abnormal return per trade (WCAAR). The result has been statistically tested and H_0 (One cannot yield abnormal return by replicating insider transactions) could with 99.95% significance be rejected. The study has also investigated if insider cluster transactions could be replicated in order to yield an even higher abnormal return, in relation to previous research. The result shows that the abnormal return of cluster transaction in between 0.47% to 1.9%. Hence, less than by replicating single insider trades. Further, no statistical significance where found due to the cause of an extreme value, were one of the identified transactions had a development of -129% in relation to the development of the index. Consequently if this value was neglected a return of 3.63% would have been obtained. Which is indeed larger than the return of individual trades, although it could not be statistically verified. This truly demonstrates the riskiness of the market.

Since there is a possibility for outsider to replicate insider trades, and thereby yield an abnormal return, the market is of semi-strong efficiency according to Fama (1970). Thus, the theory states that the market immediately reflects the published information, but by replicating insider trades the outsider acquires stocks while the information is still unpublished.

The study has answered the previously stated research questions. Firstly, the conditions and patterns under which one should replicate insider trades are that the security should be held for approximately 90 days in order to achieve the effect of the insider trade. Further it could be crystallized that smaller firms yielded a higher return and that cluster trades increased the possible abnormal return, although, clusters were questionably invalidated on today's market since no statistical significance could be found. Other patterns of importance are that when higher executives in different positions of the firm acquire the stock, a stronger buy signal can be identified. Further, no conclusions could be drawn from the significance test as to what sector to invest in. Although, the Customer service sector has proven to be a wise investment during the period for both cluster and single insider replication, since the abnormal return has been 6.72% respectively 7.48%. That is while the sector itself has decreased by 2.24% during the period. Further, replication of single insider trades has shown in five out of eight sectors, that is a preferred strategy over cluster transactions.

Lastly, the report has shown that some of the earlier theories hold on today's market while others do not. When studying if outsiders actually can replicate insiders to yield abnormal return, the result is convincing that such possibility exists. On the other hand, cluster transactions did not yield a higher return than the replication of single insider trades. However, no statistical significance for cluster trades could be found, hence, the rejection of the theory is not flawless. Further, in accordance with Wahlström (2003), the investment period of 90 days is found to yield an abnormal return.

However, one should keep in mind that historical returns are never a guarantee for future returns.

6.1 Contributions to the field

This study has contributed with several aspects to the field. First of all the study has an extensive meta-analysis which has concluded that there possibly exist abnormal return and also summarized the most profitable ways of yielding such abnormal return. These are among others;

- 90 days period is the most profitable length of investment per transaction,
- Small companies seem to yield the highest return,
- Clusters increase the possible abnormal return
- Higher executives in different positions give a stronger buying signal
- Academic models to be used (Market model, student's t-test)

Furthermore, two of the results have been tested for validation. These are; if abnormal returns indeed exist and then if, by replicating insider clusters transaction, one would yield a higher abnormal return. The contribution of the research is that there exists a systematic abnormal return and that clusters will not yield higher returns, see 5 analysis. Furthermore, the study has used an alternative way of interpreting the results, by using a so-called Weighted CAAR, the WCAAR. This puts weight to all transactions instead of only using the average return, hence gives a more representative value of what a transaction would yield rather than what the stock would yield. This has not been identified in other research papers within the field of abnormal return from replicating insider trades.

6.2 Proposal for further research

The conducted study has answered the objective and reached its aim, however, along the process further research questions have appeared. Areas that would need further investigation is:

- Does the market model and adjusted market model create different results? Has this an impact on all the previous research?
- There exists difference whether it is best to follow insiders during upward trends in the market or in a downward falls. More research is needed within the field to comprehend the impacts.
- Do the best fund managers yield systematic abnormal return and is it possible to replicate these to yield an abnormal return?
- With the new internet platforms were individuals can see and replicate each other's trades, e.g. Shareville, would it be beneficial to replicate those with the highest historical returns?

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8. Appendix

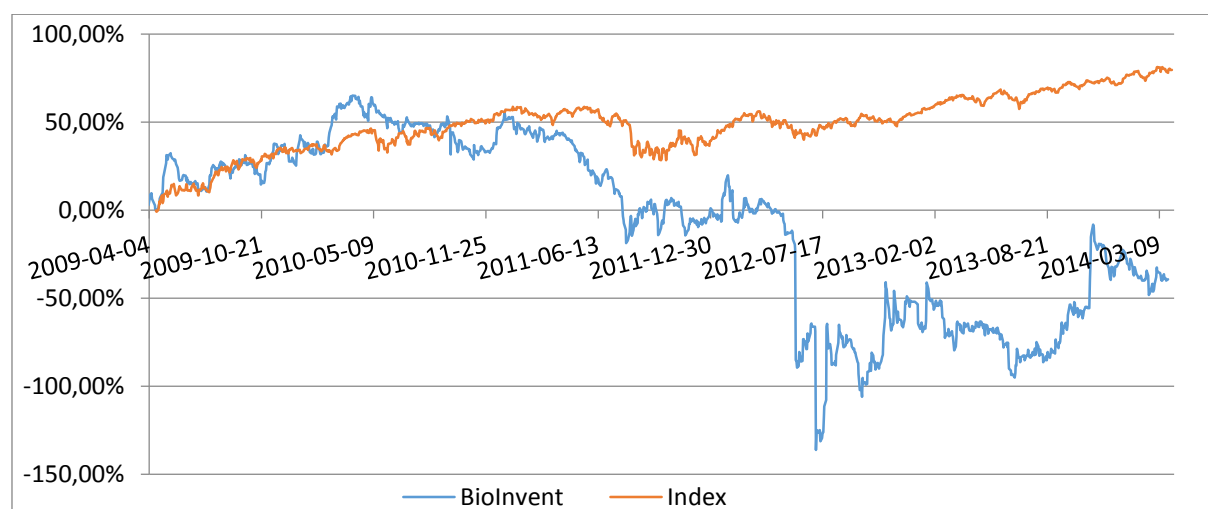


Diagram 6 Development of Index and BioInvent in percentage during the period 2009-04-04 until 2014-04-04, illustrating the differences between the index and BioInvent

Table 15 Summary of analyzed companies that has been used to create the portfolio

Analyzed Companies	Sector	Analyzed Companies	Sector
Black pearl resources	Oil	Bergs Timber B	Raw material
Lundin Petroleum	Oil	Holmen B	Raw material
PA Resources	Oil	Lundin Mining	Raw material
Shelton	Oil	Profilgruppen B	Raw material
Tethys oil	Oil	SSAB	Raw material
Avanza	Economy	BioInvent	Medical
JM	Economy	Elos B	Medical
Midway Holding	Economy	Getinge B	Medical
Swedbank A	Economy	Karo Bio	Medical
Wallenstam B	Economy	RaySearch B	Medical
Elanders B	Industrial	Acando	Technical
Loomis	Industrial	Axis	Technical
Partnertech	Industrial	Cybercom Group	Technical
Sweco B	Industrial	Seamless Distribution	Technical
Trelleborg B	Industrial	Vitec Software Group B	Technical
Black Earth farming	Consumer goods	Bilia A	Consumer services
Electrolux A	Consumer goods	Clas Ohlson	Consumer services
Mekonomen	Consumer goods	Eniro	Consumer services
New Wave Group B	Consumer goods	Hemtex	Consumer services
VBG Group B	Consumer goods	Skistar B	Consumer services

As a robustness check of the data, a Wilcoxon signed rank test has been performed. The test, unlike the student t-test, tests if the median is statistically separated from zero. As displayed in table 15 and 16, the null hypothesis could be rejected for all transaction but not for cluster transactions, similar to the result from the t-test.

Table 16 Wilcoxon test performed on all insider transactions. The result shows that the data is significantly separated from 0.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The median of Alltransactions equals 0	One-Sample Wilcoxon Signed Rank Test	,004	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is ,05.

Table 17 Wilcoxon test performed on the cluster transaction. The result shows that the data is not significantly separated from 0.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The median of Cluster equals 0	One-Sample Wilcoxon Signed Rank Test	,113	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is ,05.

Buy and Hold model

The BHAR model is calculated using the following formula, Gershgoren, Hughson & Zender (2005):

$$BHAR = \prod_{t=1}^T (r_{it} + 1) - \prod_{t=1}^T (r_{im} + 1)$$

r_{it} = Events gross holdingperiod

r_{mt} = Markets gross holdingperiod

The result obtained by this test indicated a 8,77% abnormal return in average for the chosen firms for the period, although, still not of significance. Further it seems to be much higher than the CAAR, which partly can be a result of the biasness of the test especially when there is a great volatility of the stock.