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Insider Trading at the Swedish Stock Market

- To What Extent Can the Behaviour of Insiders be Mimicked to Obtain Abnormal Returns?

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Abstract

- Title:** Insider Trading at the Swedish Stock Market- To What Extent Can the Behaviour of Insiders be Mimicked to Obtain Abnormal Returns?
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- Key words:** Insider trading, Abnormal Returns, Earnings Announcement, Event Study, Efficient Markets.
- Purpose:** The main purpose of this thesis is to determine to what extent, if any, outsiders are able to obtain abnormal returns by mimicking the behaviour of insiders at the Swedish stock market prior to earnings announcement. By making separations this study will hopefully provide some advice when the abnormal returns are most likely to happen when outsiders mimic insiders.
- Methodology:** This study is implemented through a quantitative approach. Separations between kind of insiders, Market-to-Book values of the companies, financial crisis vs. non-crisis and size of the company are made in order to increase the comparability to other studies. Two statistical tests are performed in order to determine if the results are significant.
- Theoretical perspectives:** This study is built upon previous research in the area of insider trading. The most important theory for this study is the efficient market hypothesis. Other important theories are information asymmetry and signalling hypothesis.
- Empirical foundation:** Insider transactions around the full year reports for companies listed at Nasdaq OMX Stockholm during 2007-2010 are studied. Companies that are listed or delisted during the period are included the years when there is sufficient information.
- Conclusion:** The result from this study suggests that it is good to follow the insiders with most information in order to obtain abnormal returns. No clear relationship between firm size, Market-to-Book and abnormal returns is established. Following insiders during good or normal times is superior to follow them during a crisis.

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1 Introduction

In this first chapter an introduction to the subject is given and some of the interesting aspects of the subject are explained. The purpose of the thesis and the contribution to the knowledge base is discussed. The chapter ends with a discussion about the delimitations.

1.1 Background

Is there an easy, straightforward way to create abnormal returns¹ on a stock exchange? If you are an investor you probably think, or at least hope so. There are numerous studies (e.g., Abarbanell and Bushee 1998; Seyhun 1986) regarding abnormal returns and how that can be obtained. Some investors use technical analysis, some fundamental analysis and other uses other methods. According to the efficient market hypothesis brought forward by Fama (1970) it should not be possible to systematically beat the market, since the information available is already incorporated in the current stock price. As intuitive evidence against this hypothesis stand Warren Buffet and his Berkshire Hathaway. He has on average had an abnormal return of 11% since 1965, a truly remarkable achievement (Berkshire Hathaway 2011).

One aspect regarding abnormal returns is insider trading and its informational content. It is a subject that has been debated and studied a long time. There are different conclusions depending on the studied market, time horizon, method and similar. Some authors argue that insiders can obtain abnormal returns and some suggests the opposite. The notion that insiders have information that outside investors have not is quite intuitive. One of the most quoted articles in this field is *Insiders Profits, Costs of Trading, And Market Efficiency* by Seyhun (1986). He finds that insiders are able to predict future changes in the stock price and obtain abnormal returns. Others, such as Eckbo and Smith (1998) find no abnormal return for insider trading.

Many persons strive to become wealthy and some of them perhaps do not care too much about how to become it. *Homo Economicus*, as defined by Mintzberg (2002), is the modern economic man, never satisfied and always striving for personal utility maximization. This has led to many corporate scandals, some of them in the field of insider trading. One quite recent example is David Sokol, previously seen as Warren Buffet's likely successor, who is currently under investigation from the Securities and Exchange Commission (SEC) for illegal insider trading. He bought a lot of shares in a company that he afterwards recommended Berkshire Hathaway to buy and he made approximately 20 million SEK from this. He left Berkshire Hathaway after this, but Buffett himself rejects that it has something to do with the insider trading (Veckans Affärer 2011). The problem with insider trading is that it can be hard to determine whether or not an insider transaction is illegal or not, since it is hard to make a clear distinction if the insider is acting on insider or public information. For that reason many of the persons accused of illegal insider trading have not been found guilty (E24 Näringsliv 2010).

There have been some studies of the Swedish stock market (e.g., Wahlström 2003), but the knowledge about insider transactions and its informational content can be developed further and can perhaps be used to increase the returns of investments, as suggested by some authors.

¹ Abnormal returns are returns in excess of the returns predicted by an asset pricing model, such as the market model that is further discussed in chapter 4.

1.2 Problem Discussion

As mentioned in the previous section, insiders may be able to exploit their informational advantage in order to obtain abnormal returns. What about outsiders? Is there a way for outsiders to benefit from the informational content in insiders' transactions? There are an abundant of studies (*e.g.*, Seyhun 1998; Dickgiesser and Kaserer 2010) that look at different aspects of insider trading and abnormal returns. Some of them study just insiders and the returns they are able to achieve while others investigate outsiders' ability to follow insiders' transactions.

One aspect regarding insider trading is when it precedes earnings announcements. Ball and Kothari (1991) show that earnings announcements have on average a positive stock price effect. Korczak, Korczak and Lasfer (2010) study insider trading around earnings announcement in the UK. They find that insiders tend to purchase shares prior to good announcements and sell prior to bad, but there is a trade-off for insiders between making profits by buying prior to good announcements and regulations and losing reputation.

Another thing to consider regarding insider trades is if there is a difference between companies depending on the market value and the market-to-book value. Dickgiesser and Kaserer (2010) study this in the German stock market. They find that insider trades in so called value stocks tend to be followed by large price movements for buy transactions and small price movements for sell transactions. The opposite is true for glamour stocks. Since they are already highly valued, buy transactions does not affect the stock price that much. If they however are somewhat overvalued and insiders sell these riskier stocks, it can be a negative signal to market participants.

Lakonishok and Lee (2001) study insider trades in the US during the period 1975-1995. Their conclusion is that insider purchases are informative but sales are not. This is somewhat intuitive because insiders can sell for numerous reasons, but they buy only to make money. Lakonishok and Lee also say that it is quite hard to implement a trading strategy based on insider's transactions.

Many of the previously mentioned studies are conducted in markets other than the Swedish stock market. Some of the more important studies were performed quite a long time ago. As is obvious from the background and will be even clearer after the literature chapter is that the studies show inconclusive results. This can be due to several reasons, which is further discussed in the end of the literature chapter. Among the reasons might be different markets, different time, different length of the study *etc.* Without performing a study of the Swedish stock market it is hard to predict what the result would be. To our recognition there is only one published study of the Swedish stock market, performed by Wahlström and published in 2003. Wahlström's study has some shortcomings that this study aims to improve in order to find valuable results about the Swedish market.² Apart from Wahlström's study there are numerous master theses about insider trading, some of them focusing on outsiders' ability to mimic insiders. Previous theses have however not incorporated any transaction costs, making

² We are unable to get hold of the Wahlström's study and have therefore not read it. According to Göran Andersson, Associate Professor at Lund School of Economics and Management, Wahlström's study had some shortcomings, such as the absence of a non-parametric test. This might lead to wrong conclusions about the market being drawn.

the results less useful since many studies of other markets find abnormal returns but only when transaction costs are disregarded. By including both a measure of transaction costs as well as non-parametric test this study has potential to improve the knowledge base about insider trading at the Swedish stock market.

As discussed above, Korczak *et al.* (2010), find a positive correlation between insider transactions and the return after a news announcement. Ball and Kothari (1991) find that earnings announcement tend to be associated with positive returns on average. Due to this fact it is more likely to make abnormal returns by mimicking insiders' behaviour prior to a news announcement and this study does for that reason study the time around earnings announcement.

To our recognition there are no published studies of the Swedish market where the effect of the recent financial crisis is incorporated. Studies in other countries have included this feature when it comes to insider trading. By including the recent financial crisis some conclusions might be drawn about personal liquidity needs and similar, that possibly can affect insiders' transactions. If insiders are financially constrained there might be more insiders selling during the years of the financial crisis.

Many of the other studies mentioned above are also only considering if insiders are able to obtain abnormal returns but ignores to study outsiders' ability to do the same by mimicking insiders. The knowledge about the Swedish market can also be improved by studying a more recent period and by making similar separations as studies from other markets.

As investors want to increase their returns by different means one possible way can be by mimicking insiders' behaviour. Since the studies regarding insider trading at the Swedish Stock market is quite limited this study will investigate and try to improve the knowledge base by trying to answer the following questions:

- ❖ To what extent are outside investors able to earn abnormal returns by imitating insiders' purchasing behaviour prior to an earnings announcement?
 - Under which conditions, will the possibilities to obtain abnormal returns be the greatest? Separations are made between the following:
 - Financial crisis vs. Non-crisis
 - Market value of equity, separate between Large Cap, Mid Cap and Small Cap
 - Kind of insider, separate between CEO / Vice President, Board Members, Large shareholders and Others
 - Market-to-book, divided into four different groups

1.3 Purpose of Our Thesis

The purpose of this thesis is to contribute with additional knowledge in the field insider trading and its informational content. This is done by looking at how insiders are trading prior to an earnings announcement on the Swedish Stock exchange. The main objective is to study to what extent, if any, outsiders can achieve abnormal return by mimicking insiders' transactions and under which circumstances the possibility for abnormal returns are the greatest.

1.4 Delimitations

Some delimitations are made, partially due to the limited time frame and partially for other reasons. These reasons are further discussed in chapter 4.

- ❖ The studied market is the NASDAQ OMX Stockholm Large-, Mid- and Small-cap. The investigated firms have been listed on the NASDAQ OMX Stockholm during the years 2007-2010. Companies not listed during some of the observed period are only excluded this period, in order to avoid survival bias.³ Companies with a fiscal year ending on a date other than December 31 are not included the last year since their report for fiscal year 2010 is not yet released. This makes the result less likely to exhibit survival bias.
- ❖ The study is limited to just focusing on net purchasing signals. Net sales are not regarded since they might be the result of multiple reasons while purchases are mainly done to make profits. Other transactions such as allocations, gifts or stocks from incentives programs *etc.* are not considered since they are not actively traded to make profits in the same manner as buying.
- ❖ Some types of transaction costs such as commission fees and taxes are ignored, since they are very individual depending on the kind of investor and would have made the analysis of the data complicated. The only measure of transaction costs included in the calculations is separation of ask, bid, mid and closing quotes for the stock prices.

1.5 Target Group

The target group of this thesis are primarily other students in finance and investors in general with an interest in finding a way of beating the market and gaining abnormal returns. Other persons will hopefully find it interesting as well. This thesis can be read as a way to increase the knowledge in different fundamental economic theories in general and the theories of insider transactions in particular.

³ The survival bias is a systematic error due to the fact that only the companies "surviving" the entire investigated period is in the end sample. By including all companies, even if they are only listed for some of the time period we will reduce this risk.

1.6 Thesis Outline



2 Laws, Regulations and Authorities

In chapter two the regulatory framework for insider trading is treated. It starts by looking at two of the most central acts in this area, which defines an insider and regulates their reporting obligations. The authorities controlling and observing the insider trading are examined in the end of this chapter.

2.1 Laws & Regulations

There are a number of laws and regulations regarding insider trading in Sweden. The laws are controlled by the Swedish Financial Supervisory Authority, Finansinspektionen. As stated on the homepage of Finansinspektionen:

“A person holding an insider position must report shareholdings and other financial instruments in the company held by him or her and closely affiliated natural and legal persons.”

(Source: Finansinspektionen. Insider’s Reporting Duty)

The laws relevant for this study are briefly reviewed below. Only the aspects of the laws relevant for this study are discussed.

2.1.1 SFS (2005:377) Financial Instruments Trading (Market Abuse Penalties Act)

The Market Abuse Penalties act is a central law that regulates most of the issues concerning insider trading and also some of the penalties for different kinds of insider law violations. In the 1§ insider information is defined as non-public information or circumstance that might affect the price of a security significantly. Violating this law by making transactions based on inside information in an illegal way, or by sharing the information with an outsider who tries to exploit the information may result in a penalty. The 2§ states that the penalties range from fines if the offence is minor to jail sentence up to four years if the offence is severe. This law also controls other insider offences such as trying to affect the market price in an unlawful way or hiding information that actually should be public information. Both these types of offences can render fines or prison sentences. In the 10§ and 16§, the law declares that all insider trading or actions should be notified to Finansinspektionen, which has the duty to make certain that this law is followed. If they suspect that someone is trying to make some illegal inside procedure they should report it to a prosecutor at the Swedish Economic Crime Authority.

2.1.2 SFS (2000:1087) The Act concerning Reporting Obligations for Certain Holdings of Financial Instruments

This law from 2000 treats who has to report certain holdings and changes of financial instruments and under which conditions these reports have to be made. In the 3§ of the Act concerning Reporting Obligations for Certain Holdings of Financial Instruments the different characteristics of who is considered an insider is explained, for example:

- ❖ President & Vice President
- ❖ Members of the Board of Directors
- ❖ Auditors
- ❖ Other employees in leading positions in the firm or subsidiaries.
- ❖ Shareholders with at least 10% ownership of the total equity capital or voting rights.

Insiders must notify the authority about the financial instruments of husband, minors and other closely related family from the same household, according to the 5§. People in insider positions also need to report changes in their stockholdings in companies that are connected to them or their firm. Finansinspektionen needs to be notified about the transaction no later than five working days after the agreement has been made, according to the 6§. Further, they are not allowed to make any transactions closer than 30 days before any ordinary report, which is stated in 15§. Breaching this regulation can render quite heavy fines for that insider, ranging from 15 000-350 000 SEK, as treated in 21§.

2.2 Authorities

There are two main authorities that ought to be mentioned when it comes to insider trading, The Swedish Financial Supervisory Authority (Finansinspektionen) and the Swedish Economic Crime Authority (Ekobrottsmyndigheten) and they will be briefly discussed below.

2.2.1 The Swedish Financial Supervisory Authority (Finansinspektionen)

The Swedish Financial Supervisory Authority, or Finansinspektionen, was established in 1991 with the purpose to create an authority that governs securities, banks and insurance companies (Finansinspektionen. About Us). It is a public authority that supervises all companies in the Swedish financial markets, as of today close to 4000 different companies. Finansinspektionen is also responsible of analysing trends in the financial markets and making sure that companies follow the current regulations. They release different reports regarding risks in the financial markets and similar. In order to provide financial services in Sweden companies need the authorization of Finansinspektionen.

If there is a need for new laws it is also the task of Finansinspektionen to detect and propose amendments. They also publish all insider transactions at their homepage at the Insider Trading register. Another thing that Finansinspektionen are responsible for is making sure that companies provide investors with sufficient and accurate information. Finansinspektionen are also involved in some operations globally and within the EU. There are different co-operations in different segments that they are involved in, for example *The Basel Committee on Banking Supervision*.

What is most important in this context is that they are responsible for making sure that companies act in accordance with the Swedish insider regulations. The laws discussed in more detail above represent the framework that insiders must follow. If there are any possible offences against the law, Finansinspektionen is the authority that should detect and investigate this. If they find that there is an offence against the law, they leave it to a prosecutor at the Swedish Economic Crime Authority to investigate.

2.2.2 Swedish Economic Crime Authority (Ekobrottsmyndigheten)

The Swedish Economic Crime Authority is responsible for several different things (Ekobrottsmyndigheten. About Us). They do for example fight economic crime in general. They currently have several different priority areas, such as fighting economic crime related to other organised crime, and perhaps more relevant in this context, crime that threatens the financial markets. Illegal insider trading is one such crime. Ekobrottsmyndigheten (EBM) cooperates with Finansinspektionen in case of potential insider crimes. If Finansinspektionen detects a potential illegal act, they contact a prosecutor at EBM. It is the task of EBM to determine if there is evidence of a crime, and in that case to bring it to court. EBM has the national responsibility of making sure that the Act (2005:377) mentioned above is followed.

3 Literature

This chapter begins with a discussion about the economic theories that are relevant for this study. It is followed by a discussion of previous empirical studies in this field and ends with a summary of the studies and their importance for this study.

3.1 Theories

In this subsection the theories that are most relevant for the study will be discussed and explained into some detail. Those readers with an understanding of general economic theories can skip this part and begin reading section 3.2.

3.1.1 Information Asymmetry

A well-known subject in the financial world is the concept of information asymmetry, which is when different parties in an agreement or deal are not having the same kind of information. The definition of information asymmetry according to the Dictionary of Business (2003 p.8) is when one of the parties has superior information than the other party. This can possibly be exploited by, for example charging a higher price than the fair price of the product or service.

Hillier, Grinblatt and Titman (2008, ch.19) treats a number of reasons why firms do not have full transparency leading to some information asymmetry. It can for example be that the firm does not want to reveal some of its most valuable information to competitors or avoid the risk of lawsuit due to false information sharing in an initial stage. Most insiders are also aware of the signals changes in their personal stockholding send to the market and must therefore be a bit restrictive when conveying information to outsiders.

Even though earnings announcements and financial changes such as dividends and equity issues reveal information to outsiders and making the information asymmetry less of an issue studies have shown that investors underreact to news disclosure (Michaely, Thaler & Womack 1995). They find that the market is slow to react to announcements of dividends thus making it favourable to trade just after the news to make profits from the announcement and holding over a longer period. This indicates that an information gap between the market and the firm exist, which possibly can be exploited.

Information asymmetry is also present in the world of insider trading where the insider have better information than outsiders. In a study by Frankel and Li (2004) they examine how the information asymmetry affects the insider trading and the ability for insiders to achieve abnormal profits. They argue that firms are trying to minimize the information asymmetry between insiders and outsiders by having better information in their reports and announcements. Improved analyst coverage does also help when trying to reduce the information gap, thus making it harder for insiders to make profits on their information advantage. When looking at the volume of the insider traders Frankel and Li discover that all kinds of announcements increase the insider trading but the more information that is revealed the less trading exists.

3.1.2 Efficient Market Hypothesis

Fama (1970) developed the Efficient Market Hypothesis in its most known form. The interest for efficient markets was however developed earlier, but at that time under the name of

“random walk” and “rational expectations theory”. At first the hypothesis was only something a few economists believed in, but became more or less common knowledge during this time (Jensen 1978). According to Fama (1970) an efficient market is a market where prices fully reflect all available information. He distinguishes between three different types of efficiency; (i) *Weak form*, (ii) *Semi-strong form* and (iii) *Strong form*.

3.1.2.1 *Weak form efficiency*

According to the weak form efficiency all historical information are already priced into the security. Therefore, it should not be possible to analyse historical data and in that way obtain abnormal returns on a continuous basis. Most of the tests of the efficient market target the weak form efficiency and the evidence seems to point in the direction of an at least weak efficient market. Fama (1970) also find that large changes in prices tend to be followed by another large change, but the direction is unpredictable. If there is a divergence between the actual price and the fair price of a security, investors would immediately see this and the price would then be corrected. According to Fama this implies that it takes time to completely evaluate important information. Technical analysis, *i.e.* analysing historical prices and similar would under this form of efficiency not lead to any form of abnormal returns.

3.1.2.2 *Semi-strong form efficiency*

This is the form of efficiency that is relevant for this study. In the semi-strong form of efficiency it is assumed that prices reflect all historical information as well as currently available public information. Studies regarding this form of efficiency also support the hypothesis of the efficient market. The information in different types of announcements, *e.g.* earnings and dividend announcements, M&A announcements and similar, is on average already taken into consideration in the current stock price. Investors can for that reasons not analyse this kind of information in order to obtain abnormal returns, assuming that the semi-strong form of efficiency holds.

3.1.2.3 *Strong form efficiency*

According to the strong form efficiency stock prices reflects all available information about a company. In that case there should be no way in which investors can obtain abnormal returns. Not even insiders with a lot of non-public information should therefore be able to achieve abnormal returns. If this is true, there should be no proof of excess returns for the insiders in Swedish companies. However, according to Fama the strong form of efficiency is best viewed as a benchmark used to compare the market efficiency and deviations from this. One such deviation is the insiders’ ability to use their informational advantage in order to obtain abnormal returns.

Fama (1991) released a sequel to this original article from 1970 where he discusses the development of the market efficiency theory. He study different event studies by other scholars and comes to the conclusion that, on average, markets react quite fast to new information and this is an evidence of the efficiency of the capital markets. Fama discusses studies by Jaffe (1974) and Seyhun (1986) that suggests that insiders can use their non-public information in order to make abnormal returns, which contradicts the efficient market hypothesis in its strongest form. Outsiders can however not use this information in order to achieve abnormal returns. These studies are further discussed below in section 3.2.1.

3.1.3 Signalling Hypothesis

There are numerous different actions a company can take in order to signal different things according to Hillier *et al.* (2008, ch.19). Increasing dividends signal good growth prospects, while decreasing dividends is a signal that is badly perceived by the market. Raising more debt also signals good growth prospects since the company are unlikely to raise more debt if they are not certain that they can manage the higher debt burden and interest payments. Raising more equity signal that the equity is overvalued, and therefore the market often reacts negatively to this type of action.

Recent research by Del Brio and Miguel (2010) finds that the informational content in dividends changes is decreasing whereas the informational content in insider transactions is more valuable. John and Lang (1991) mean that the best way to signal different things to the market is probably by combining different types of signals. By increasing dividends at the same time as insiders are net purchasers of a stock should be seen as a good and strong signal.

Hillier *et al.* (2008, ch.19) mean that share repurchases are another action a company can take in order to signal to the market that the stock is undervalued. One study by Firth, Leung & Rui (2010) find that if a share repurchase is announced and insiders at the same time buy shares it is a very strong signal that the stock is undervalued. If insiders however sell their shares the negative information conveyed in this action outweighs the positive information from the share repurchase and the effect will therefore be a decreasing stock price.

Seyhun and Bradley (1997) investigate insider transactions prior to bankruptcy filings and find that insiders tend to sell their shares prior to this filing, beginning in small scale and then increasing in intensity as the bankruptcy filing approaches. Their findings support the idea that the informational content in insiders' transactions is of importance and can be used to analyse upcoming events.

The relevant signal for this study is of course the transactions that insiders make. Different studies come to different conclusions regarding the signalling effect of insiders' transactions. One intuitive conclusion that Lakonishok and Lee (2001) find is that the informational content in insiders' purchases is useful while it is not useful for insider sales. The reasons for this is that insiders can sell their shares for numerous reasons, but the only reason that they buy shares are because they think they will make money out of it. Dickgiesser and Kaserer (2009) find contradicting results, namely that insider sales are informative whereas purchases are not. Both studies are elaborated further below.

3.1.4 Random Walk

The concept of random walk has been treated by economists for a long time. One early study was made by Kendall (1953) where he examined the movements of prices in time series. He finds that the movements were impossible to predict and that the fluctuations in prices during different close intervals were large and totally random. This random walk in prices made it impossible to see any systematic effects or make predictions with certainty.

Fama (1965) developed the random walk further in his famous article *Random Walks in Stock Market Prices*. He concludes that if the random walk hypothesis holds it is unnecessary for investors to use methods and models trying to predict market movements. Theorists were

able to find some patterns of price changes but unable to forecast them with any real consistency, which talks in favour of the random walk.

Discussions about the usefulness of the random walk have been subject to debates during the years and one famous disagreement started when Malkiel (1973) wrote his book *A Random Walk Down Wall Street*, where he gave support to the random walk theory after making a study of stock trading with the help of coin flipping. Malkiel's book was questioned by Lo and MacKinley (2002) in their book with the slightly ironical title; *A Non-Random Walk Down Wall Street*. Today, the random walk is incorporated into many economic and statistical models such as the Merton model⁴ through the stochastic term (Gray and Malone 2008).

3.2 Empirical Studies

In this section previous empirical studies conducted in the field of insider trading are discussed. There are numerous studies to bring up and the ones most relevant for this study are mentioned below.

3.2.1 Studies

Jaffe (1974) conducted a study regarding insider trading. He studies, among other things, the informational content of public disclosure of insider transactions. The report he study is *The Official Summary of Insider Trading*, which is similar to the Swedish Financial Supervisory Authority's Insider Register. The first finding is that insiders can earn abnormal returns. He also wants to find out whether or not outsiders could mimic this behaviour and earn abnormal returns. He find that outsiders can mimic insiders in order to earn abnormal returns in the case of companies with intensive trading, even after considering transaction costs. In all other samples the transaction costs eliminate the profits otherwise obtained through the information contained in the Official Summary.

In an article by Seyhun (1986) he investigates if uninformed outsiders can mimic insiders' transactions in order to earn abnormal profits, which would contradict the efficient market hypothesis. According to Seyhun insiders may have enough information to predict the future stock price movement and in that way earn abnormal returns. He also finds that some insiders, such as directors, CEOs and similar, have more information than others, thus making them better able to predict the future stock price movement. Further, he finds evidence of insiders making transactions of larger volume when they have more valuable information. When outsiders try to mimic insiders by the use of public information, they cannot earn abnormal returns, when consideration is taken to transaction costs. This is consistent with the efficient market hypothesis.

In subsequent article by Seyhun (1988) he examines insider trading with a little twist. First he gets to the same conclusion as some previous studies (e.g., Jaffe 1974; Seyhun 1986) that the insiders have the ability to spot and exploit mispricing in their own company. The special thing that differentiates this study from the previous ones is that Seyhun tries to figure out if

⁴ The Merton model is used to calculate the probability of default.

the correct actions by insiders buying their own stock before any upswing in price are the result of firm-specific improvements or just the result of an overall market upswing. This study finds that the aggregated insider purchases and sales in one market during one month are closely correlated with the return of that portfolio over a longer period of 1-60 days after the transactions. That means that insiders trade the stock based on what they think is the prospects of the firm, but probably is more affected by environmental changes. This phenomenon is called the Lucas-effect and might be helpful when trying to imitate insiders by getting a clear indication when a market change is about to occur. Seyhun argues that the only things insiders need to keep check on is the different cash flows and from them make predictions, but even so, it seems like a overwhelming task since the cash flows comes from a great number of sources which is hard to synchronize. Seyhun also make separations between large and small firms and finds that insiders in small firms tend to be more accurate when trading on firm-specific factors compared with larger firms that tend to look more at the market factors.

Ball and Kothari (1991) investigates a few hypotheses about stock trading close to the day of earnings announcements. One thing they test is if it exist any abnormal trading returns in the period close to the announcement. They find that the variance and betas of the return increase due to the news effect, thus making abnormal returns more likely. They do not incorporate the concept of insider trading in their study and this open up possibilities for further studies around the subject of announcement returns.

Lakonishok and Lee (2001) study the informational content of insider transactions made in the US during 1975-1995. In contradiction to the findings of Dickgiesser and Kaserer (2009) they find that insider purchases are informative but insider sales are not. They suggests that the reasons for this is that insiders can have many reasons for selling a stock, but only one for buying and that is making money. Further results from their study are that the market is slow to adjust to managerial signals and that insiders are more likely to buy value stocks that have performed well in the past than other stocks. Insiders also tend to be net buyers of small stocks, an asset class that historically have generated high returns. Similar to Dickgiesser and Kaserer, they find that large firms are priced more efficiently than small firms and that insiders are more active in small firms' stocks than in large firms' stocks. Also in line with Dickgiesser and Kaserer they find that insiders selling glamour stocks are a strong signal with a large change in price as an effect. The general conclusion of their article is that insiders' transactions tend to be more informative in small-cap stocks, whereas the informational content in transactions of large companies' stocks is quite low. They conclude that it is hard to find an investment strategy based solely on insider trading information.

Another interesting article was written by Dickgiesser and Kaserer (2009). They study the German stock market and find that the informational content of insiders' transactions cannot be used to obtain abnormal returns, once transaction costs is considered. They suggest that arbitrage risk is costly and that outside investors therefore cannot make abnormal returns by mimicking insiders' transactions. They also find a negative relationship between idiosyncratic risk and speed of price adjustment. The higher the idiosyncratic risk, the longer it will take for

the price to adjust to the right level. Another topic in the article is the profitability of mimicking insiders over time and the findings suggest that it has decreased. Other things they find is that insider sales are considered to be a stronger signal than insider purchases and that past stock performance is negatively related to post-event abnormal returns. The conclusion of this is that insiders tend to buy stocks that have a bad historical stock performance. Dickgiesser and Kaserer also study value- (low market-to-book) and glamour stocks (high market-to-book) and its implication for abnormal returns. In the case of value stocks, they found small changes for insider sales and large changes for insider purchases. The opposite is true for glamour stocks, *i.e.* small changes for purchases but large changes for sales. Overvalued stocks are associated with higher risk and negative signals are thus more likely to affect the stock price strongly negative. Dickgiesser and Kaserer find that the cumulative abnormal return (CAR, further discussed in the next chapter) decreases as the firm size increases. Insiders in small firms should thus be able to exploit their informational advantage better.

Brio and Miguel (2010) performed a study of the Spanish stock market and signalling effects of different types of actions taken by a company and their insiders. They look at the informational content in dividends changes, but also insider transactions. One quite obvious conclusion they come to is that insider sales are seen as bad signals. Brio and Miguel find in their study that the informational content of dividends changes are slightly decreasing over time. The market does not pay that much attention to this as compared to what it used to do. According to them the signalling effect of dividend changes are only effective when combined with another signal, *e.g.* insider purchases. Insider trading is more informative than dividend changes in many cases. The authors suggest that insiders often time their transactions to two months prior to an announcement, which can be related to the regulations discussed in 2.1.2.

In an article by Jiang and Zaman (2010) they study aggregate insider trading and its ability to predict future aggregate market return. In their study they find strong evidence of insiders' ability to predict future unexpected cash-flow news, in turn related to unexpected returns. Their conclusion is that insiders can predict future market movements by using their superior information about the future cash-flow news. These findings are similar to the ones presented by Seyhun (1992). He study the period 1975-1989 and find that insiders' net purchases the previous twelve months can predict approximately 60% of the coming twelve months variation in abnormal stock returns. He also find that the aggregate transactions of insiders in small firms can predict the future returns of stocks in larger groups of firms.

In a recent study by Inci, Lu and Seyhun (2010) they look at the intraday behaviour of the share price in respect of the insider trading. They argue that the trading of insiders convey a lot of information to outside investors about the company's prospects. According to their study the sales and purchases of insiders tend to be followed by a large market price reaction during the first day after the trade. If there is a strong pattern of insiders purchasing a specific share, you can expect the price of that share to increase within a short time frame. The opposite goes for sales even though the link is not as significant. One aspect that is closely

related to this study is that they find stronger relationship of market price reactions due to insider trading the more inside information the insider is expected to have. If, for example the CEO of a company sells a lot of his/her shares the market prices is expected to be very depressed the following day.

Trading around news announcements is a central aspect in this study. One recent study at the United Kingdom market is made by Korczak *et al.* (2010), where they investigate the reasons and results of making insider transactions just before a news announcement. They reveal that when buying shares from an insider position the decision to buy is based on a trade-off between the predicted profits and the risk of losing reputation or some regulatory risk. When selling shares the only real consideration is losing reputation since it sends out an unfavourable signal about the company's share. As many other studies Korczak *et al.* finds a positive correlation between buying or selling and the return after the news announcement. The result is strongest for the group with the most inside information, such as executives. At the same time they find that the corporate governance characteristics do not seem to matter for the insider trading preferences. Further, the more sensitive news that is going to be revealed the less insider trading it seems to be, which can be the result of increased reputation risk.

The insider trading during times of financial crises and especially the recent one during 2008-2009 is explored in a study by Abumustafa and Nusair (2011). The result they find is that the aggregate insider trading went up during the month when the crisis was at its worst. This can be the effect of a low personal liquidity level of some people making them sell some of their shares to get the funds needed. This is what they call time-function traders, *i.e.* investors buying shares when their income exceeds their expenditures and selling when the opposite holds. They come to the conclusion that time-function traders do not seem to outperform the market at any time.

3.2.2 Discussion and Criticism of Theories and Empirical Studies

Table 3.1 Summary of Empirical Studies

Authors	Research Area	Studied Period	Market	Main Findings
Abmustafa and Nusair (2011)	Insider Trading and Financial Crisis	2008-2009	United States and Kuwait	Higher aggregate insider trading during the crisis.
Ball and Kothari (1991)	Returns around news announcements	1980-1988	United States	Higher variance and betas around news announcements lead to increase expected return.
Brio and Miguel (2010)	Informational content of dividends, insider trading etc.	1992-1996	Spain	Informational content of dividends slightly decreasing over time. Insider trading is more informative. Insiders time their trading to two months prior to an announcement
Dickgiesser and Kaserer (2009)	Informational Content of Insider Trading	2002-2007	Germany	Negative relationship between firm size and CAR. Outsiders cannot mimic insiders to achieve abnormal returns.
Inci, Lu and Seyhun (2010)	Intraday behaviour of stock prices around insider trading	1988-2002	United States	Insiders' trading conveys information about the prospects of the firm. Intensive insider purchases often followed by increased stock price.
Jaffe (1974)	Informational content of public disclosure of insider trading	1962-1968	United States	Outsiders can mimic insiders to obtain abnormal returns in cases with intensive trading, even after considering transaction costs.
Jiang and Zaman (2010)	Aggregate insider trading and market returns	1975-2000	United States	Insiders can predict future market movements by using their superior information about future cash flows
Korczak, Korczak and Lasfer (2010)	Investigate reasons and results of making insider transactions prior to news announcements	1999-2002	United Kingdom	Positive correlation between purchasing/selling and post-announcement return
Lakonishok and Lee (2001)	Informational Content of Insider Trading	1975-1995	United States	Insider purchases are informative whereas sales are not. Insiders more likely to buy value stocks. Insiders more active in small-cap stocks where their actions are more informative.
Seyhun (1986)	Investigate if outsiders can mimic insiders to obtain abnormal returns	1975-1981	United States	Insiders have information that can be used to predict future stock price movement. The more informed the insiders are the better ability to predict stock price movement. Outsiders cannot earn abnormal return by mimicking insiders after consideration of transaction costs.
Seyhun (1988)	Investigate if insiders' actions are the result of firm-specific improvements or overall market upswing.	1975-1981	United States	Insiders trading are more affected by environmental changes than firm-specific changes. Insiders in small firms are more accurate when trading on firm-specific factors.

In the previous section a lot of studies from different markets have been mentioned and a short summary of those studies can be seen in Table 3.1 above. In the following section there is a discussion about the previous empirical studies and their relevance to this study. Possible explanations for the difference in results among the different studies are brought up as well.

Many of the studies have come to the conclusion that insiders actually can make abnormal returns by the use of private information (*e.g.*, Seyhun 1986; Jaffe 1974; Jing and Zaman 2010). These results come from several different markets and one can therefore argue that the possibility for insiders to make abnormal returns is not that dependent on the market where the insider is active.

There have been studies where they also look at outsiders' ability to obtain abnormal returns by using the informational content of insiders' transactions and the results have been mixed. Dickgiesser and Kaserer (2009) in their study of the German stock market find that once transaction costs have been considered the possibility for outsiders to obtain abnormal returns disappear. This is also similar to the findings of Seyhun (1986) in his study of the US stock market. Jaffe (1978) also study the US stock market and he find that outsiders in some cases actually can mimic insiders' transactions and in that way obtain abnormal returns, even when consideration is taken to transaction costs. Jaffe's and Seyhun's studies are quite old and their explanatory power for the current environment can therefore be discussed. It is possible that Jaffe's findings are not applicable in today's environment.

Korczak *et al.* (2010) conducted a more recent study regarding insider transactions. They find that the more information the insiders are likely to have, the stronger the signal their actions send. This is similar to what Inci *et al.* (2010) find in another recent article. This suggests that it is more likely to obtain abnormal returns by following a CEO than a large shareholder for example, which is related to the well-known phenomena of information asymmetry and signalling hypothesis. The information the CEO has is probably greater than the information a large shareholder has. Therefore, the signalling effect of the CEO's actions is likely to be more informative than the signalling effect of the large shareholder's actions. This seems like a reasonable conclusion and therefore this study make a separation between the kind of insiders, in order to see if the same conclusion can be made about the Swedish stock market.

Ball and Kothari (1991) studied abnormal returns in the time close to earnings announcement but did not incorporate insider transactions. They however find that some of the abnormal return in the days after an announcement may be due to the news effect of the announcement and not related to insider transactions per se. This cannot be detected in this survey but the result might be biased because of the news effect and this is important to remember in the analysis.

Lakonishok and Lee (2001) find that large firms are more correctly priced than small firms, which also is consistent with the findings of Dickgiesser and Kaserer (2009). This is quite intuitive since the informational disclosure of large firms often is larger than for small firms. The information asymmetry between insiders and outsiders is thus likely to be greater in small firms. Therefore, insiders in small firms are better suitable to spot and take advantage of mispricing of their stocks and the information conveyed in their actions might be useful for outsiders as well. They also come to the conclusion that insiders' selling glamour stocks is a

strong negative signal to the market. While Lakonishok and Lee suggest that insiders purchasing is a stronger signal than selling, Dickgiesser and Kaserer find the opposite. The difference in results may be due to that they study different markets. Dickgiesser and Kaserer's study is conducted during general good economic development and that can have an effect on their result. Because of Lakonishok and Lee's long time horizon they cover both troughs and peaks and their result might therefore be somewhat more reliable.

Since this study investigate time of both financial crisis and non-crisis it is important to know how the number of insider transactions depends on the economic climate. Abumustafa and Nusair (2011) study insider transactions during financial crisis and find that the intensity of insiders' transactions increases, which can be due to insiders being privately financially constrained. Their findings are only based on two years of observations and one financial crisis and may therefore not be generally applicable. It is however reasonable to believe that insiders will be affected by a downturn in the general economic climate and that can lead to increased intensity in the sale transactions. This might be seen in this study since the recent financial crisis occurs during some of the studied period.

The results from previous studies regarding insider trading is quite inconclusive. It is dependent on the market the study is conducted in, the time horizon and the period for the study. There have been some studies in the Nordic countries (*e.g.*, Eckbo and Smith 1998; Wahlström 2003) but none of them particularly recently conducted. This study uses the same approach as some of the other studies previously mentioned to ensure comparability for the results. The methods are discussed in detail in chapter 4.

4 Methodology

In this chapter the methods, such as data collection and the construction of this event study, will be explained. There is also a discussion about the validity and reliability of the results and a reflection of the potential sources of errors.

4.1 The Sample

According to Backman (2008, ch.5) the two main ways to construct a study is to use the traditional way where you observe the phenomena objectively or to make a qualitative study where you try to investigate how people experience the studied event. The character of this study makes the traditional path more appropriate since it is more based on objective data than qualitative observations. The next step is formulation of hypotheses that shall be tested with a 95% confidence interval. It is more or less common practice to use a 95% confidence interval in statistical surveys and therefore it is used here as well (Körner and Wahlgren 2006, p.161).

In order to increase the likelihood of this study leading to an increased knowledge base some distinctions are made that separate this study from previous ones. As mentioned in chapter 3, Seyhun (1986) made a well documented study of outsider's inability to use public information of insiders trading patterns to gain abnormal returns. Since this study is quite old and for example have not taken the recent 2008-2009 financial crisis into account it could be good to test if Seyhun's arguments for the efficient market holds. A more recent study that looked at the level of insider trading during the last financial crisis is made by Abumustafa and Nusair (2011). There are good opportunities to develop their result of increased insider trading in times of general financial trouble and to see if investors can exploit the increased level of public information.

Korczak *et al.* (2010) made a study similar to this where they examine how insiders traded close to news announcements. It can be interesting to see if their conclusions are applicable to the Swedish market as well.

To test the hypotheses, some separations of the data is done and those separations are outlined below.

4.1.1 Separation I: Firm Size

One important aspect to consider when making the study is to separate the firms according to market value. Some previous studies have tested if there is any correlation between firm size and insider's ability to make abnormal returns (Cheuk, Fan & So 2006; Wong, Cheuk & Wu 2000). Both of them come to the conclusion that insiders' in large and middle size firms are not able to make abnormal profits. It is only in the small firms they have the opportunity to make profits above the expected level. Wong *et al.* (2000) explains this with their finding of higher level of information asymmetry in smaller firms, thus making it easier to exploit misvaluations through insider information. They do not see any clear indication of outsiders' ability to follow insiders to gain abnormal returns but suggest them to follow insiders in smaller firm since the chance of success is best there.

By separating the firms in this analysis by size the hypothesis that firm size is a determinant of abnormal returns is investigated. The same separations as NASDAQ OMX Stockholm

make is used, Large-, Mid- and Small Cap. A further description of the market value separation is to be seen in section 4.2.2.

4.1.2 Separation II: Kind of Insider

As mentioned in section 2.1.2 the definitions of who is considered an insider is quite broad. It is everything from executives and board members to large shareholders. Depending on the position of the insider, they have different ability to spot the important information and exploit it. Seyhun (1986) discovered this result by separating between different types of insiders. He find that the people with the most insight in the firm, such as chairmen and boards members have much better ability to predict changes in share value.

In order to make the study's result comparable to Seyhun's, a similar distinction of type of insider is made. This distinction is also made my Finansinspektionen, making it easier to study. By looking at them separately comparison to Seyhun's (1986) study is possible.

The following breakdowns are made, were the first group is considered having the most inside information:

- ❖ CEO and Vice President
- ❖ Board Members
- ❖ Large Shareholders
- ❖ Others, such as auditors, family to insiders or other employees.

4.1.3 Separation III: Market-to-Book Value

Some previous studies have made a distinction between the Market-to-Book values of the companies, in order to determine when insider transactions are most informative (*e.g.*, Dickgiesser and Kaserer 2009; Lakonishok and Lee 2001). A similar distinction is made in this study of the Swedish stock market. The whole sample is divided into quartiles and calculations for the different subcategories are made, in order to determine the explanatory effect Market-to-Book ratios have for insider transactions informational content. The subcategories will be as followed:

- 1) Lower quartile: 0-25%
- 2) Lower mid quartile: 26-50%
- 3) Upper mid quartile: 51-75%
- 4) Upper quartile: 76-100%

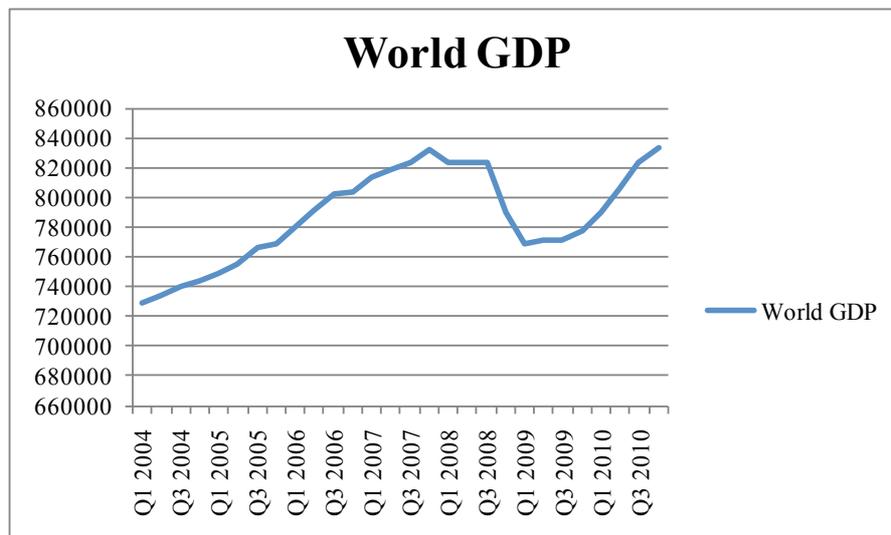
4.1.4 Separation IV: Financial Crisis

A few studies have made connections between insider trading and financial crises. Abumustafa and Nusair (2011) show that the aggregate insider trading of both sales and purchases goes up during times of financial trouble. This study is just looking at net purchases and because of that it is uncertain if the same pattern is seen. Abumustafa and Nusair suggest that the aggregate increase is the result of much more sales to support liquidity needs of individuals. They do not test if there are any differences for outsiders following insiders during good or bad financial times.

Seyhun (1988) do not find any indication if it is better to follow insiders during bad or good financial market conditions even though he propose that you can look at insiders' behaviour to spot overall market changes. This is an interesting result that demonstrates that it might be good to differentiate between insider signals in good and bad times.

Since it is hard to clearly specify with daily accuracy, when the last financial crisis started and ended, changes in World GDP level are used to get an estimate of that period. One can argue that the Swedish GDP level should be used instead but the World GDP should be a better proxy for the time of the financial crisis than the Swedish GDP alone. A lot of the companies included in the study are heavily affected by other countries as well, making World GDP more appropriate to use. As can be seen in Fig. 4.1 there has been high volatility during the last years. We consider the reports for fiscal years 2008 and 2009 to be part of the financial crisis while the reports for fiscal years 2007 and 2010 are considered to have taken place during non-crisis times.

Fig. 4.1 World GDP



(Source: Datastream)

4.2 Description of Sample and Other Aspects

In this section the different sampling methods and ways of constructing the analysis are outlined and explained.

4.2.1 Reports

As previously mentioned many older studies (e.g., Seyhun 1986; Dickgiesser and Kaserer 2009) about insider trading have not included the variable of news announcement and instead just looked at the ability to earn abnormal returns regardless of the time. Ball and Kothari (1991) find that the returns are more volatile around news announcements, making it more likely for abnormal returns. Since the different news announcements contain a lot of

information that will affect the market, insiders are probably more careful when making purchases just prior to an announcement. The full year report conveys a lot of information, both about the past and managements thoughts about the future. Because of this, one can argue that it is more likely that the information insiders have are more valuable close to an announcement. Therefore, it may be better for outsiders to mimic insiders at this time, which is investigated in this study.

4.2.2 Market and Choice of Companies

Stockholm Securities Exchange was founded in 1863 and is today a part of the world's largest exchange company, NASDAQ OMX. This study investigate insider trading at NASDAQ OMX Stockholm, which is divided into three main segments. The market value of equity determines the list the companies belong to. They are divided as follows:

❖ **Large Cap:**

- Market value of equity above €1Bn
- Currently 78 companies

❖ **Mid Cap:**

- Market value of equity between €150M and €1Bn
- As of today 82 companies

❖ **Small Cap:**

- Market value of equity below €150 M
- Currently 123 companies

The different segments are revised two times every year, first of January and first of July, based on a weighted average of the stock prices for November and May (Swedbank 2011).

All companies listed on the exchange are included in this study. A company may have been listed only part of the period for a couple of reasons. For example, they have made an IPO, have been delisted or changed list during the period. All companies that are included all or parts of the period are considered in this survey to avoid survival bias.

The information about the release dates are collected from the homepage of Dagens Industri. Some companies have fiscal years ending on dates other than 31 December. Because of that, some of the reports for fiscal year 2010 are missing. Further, there need to be information about insider transactions available from The Swedish Financial Supervisory Authority's Insider Register.

Since the population is quite small it is appropriate to study the entire population, instead of doing a sample survey. Separation between type of companies, market value of equity, type of insiders *etc.* is also made and therefore a case study of the full population is preferable (Dahmström 2005, pp. 63-64).

4.2.3 Transaction Costs

In order to account for the transaction cost caused by the bid-ask spread this survey look at different quotes for the stock prices, which is common for these kinds of event studies

(Dickgiesser and Kaserer 2009). Consideration to bid, ask, mid and closing quotes is taken. The bid-ask spread is used as a transaction cost already by Demsetz (1968) in his study of the New York Stock Exchange. The intuition behind this is that sellers need to be compensated for providing the buyers with immediacy on the stock market, *i.e.* the spread between ask and bid price. According to Demsetz approximately 40% of the transaction costs are comprised of the ask-bid spread and 60% of commission fees. He also find that transaction costs is lower when the number of shareholders are higher, which would mean that the ask-bid spread ought to be lower for larger firms than smaller firms. The negative relationship between ask-bid spreads and firm size is also confirmed by Roll (1984).

The problem with bid-ask spreads is also discussed in an article by Lease, Masulis & Page (1991). They find that the result of event studies can be partially biased because of prices moving towards bid or ask prices. Lease *et al.* suggest that the midpoint of the bid and ask prices should be used in order to reduce the risk of a bias in the event study result. The risk of a bias is probably bigger for shares of smaller firms due to their larger spread. In this study both bid, ask, mid and latest paid is considered in order to determine the impacts the share price used has for the result. In the results and analysis chapter the result for the mid quotes is discussed the most, but consideration to the other quotes is taken as well.

Another transaction cost is the commission fees that investors must pay in order to make transactions. This fee depends on what type of investor you are and is therefore not incorporated in this study. Instead a table with different commission fees for different brokerage firms is constructed and should be used in conjunction with the returns we find in our study in order to determine if the returns are abnormal after consideration of these costs (Table 4.1). As can be seen below there is quite a divergence between different brokerage firms. It should also be mentioned that the commission fees paid by institutional investors is lower than for ordinary investors.

Table 4.1 Commission Fees

Brokerage Firm	Commission Fee	Minimum Commission
Aktieinvest	0,08-0,15%	29-99 SEK
Avanza Bank	0-0,15%	9-99 SEK
Danske Bank	0,10%	79 SEK
Handelsbanken	0,09-0,20%	99 SEK
Länsförsäkringar	0,09%	99 SEK
Mangold	0,04-0,08%	49-99 SEK
Nordea	0,00%	99 SEK
Nordnet	0,03-0,15%	39-99 SEK
Nordnet Direkt	0,15%	9 SEK
SAXO E*Bank	0,04-0,09%	59-99 SEK
SEB	0-0,09%	69 SEK
Skandia	0,03-0,10%	69-99 SEK
Swedbank	0,03-0,09%	59-99 SEK
Average	0,05-0,11%	59-88 SEK

(Source: Privata Affärer)

4.2.4 Purchases

As previously mentioned, all insider transactions or changes in stock holding should be reported to Finansinspektionen. This study only examines the net purchases of shares since they are more informative according to some empirical studies (e.g., Lakonishok and Lee 2001). One explanation is that purchases together with sales are more active choices than for example allocations from incentive programs. The reason why sales are excluded is that they might happen for a number of reasons such as avoiding losses, making profits or raising liquidity. Then, only purchases remain because they have probably only one real reason- *i.e.* making good returns.

4.2.5 Time frame

The time frame chosen is 2007-2010 to make the survey focus on the latest available data. Including the recent financial crisis might also bring something new to the knowledge base. The years chosen incorporate some time of really deep financial crisis that can be used when comparing with times of better financial condition. A longer time horizon has both benefits and disadvantages. It would probably make the results more applicable to reality due to more observations but because of the limited time frame available for the analysis it is not possible.

4.3 Data Collection

To implement this quantitative study in a good manner a lot of data collection is required. The numeric information such as stock quotes and insider information are mainly collected from Finansinspektionen and Thomson Reuters Datastream.

4.3.1 Finansinspektionen (FI)

The data about insider trading is gathered from Finansinspektionen. They have public information regarding all kinds of insider trading. The procedure starts with searching for a certain company during the testing period to see if any purchases have been made by insiders. Then the cumulative number of shares is gathered and separated between the different insider positions. Since it is not required to inform Finansinspektionen about the actual value of the transaction they do not have that information. Therefore, only the number of shares purchased/sold during the period is considered instead of the value of the shares.

The data collected from Finansinspektionen, which is a governmental authority is considered very reliable since the public information from them are closely regulated by national laws, which can be seen in Chapter 2.

4.3.2 Datastream

From Datastream, which is a financial database, the information of the different historical quotes is collected. Other data that is gathered from Datastream are Market-to-Book values, indices and GDP levels. The information from Datastream is highly reliable but to make certain that it is correct we did some random crosschecking between Datastream and the share price information from NASDAQ OMX Stockholm. The only potential sources of error from this part of the analysis are false calculations after downloading the data to Excel.

4.3.3 Literature

When looking at previous empirical studies and analyses in the area of insider trading articles from the Lund University Library database, LibHub, are used. To further increase the reliability of the articles used we have chosen to use only articles from journals and publishers with a good reputation that requires high quality.

The books used are student literature from different economic, law and statistical educations at Lund University. Therefore, it should be reasonable to conclude that they have been examined thoroughly and determined to have good academic information.

In those cases Internet sources are used only information from adequate and trustworthy sources are used.

4.4 Event Study

In this study an event study is adopted in order to measure if and in that case, to what extent outsiders are able to mimic insiders' behaviour in order to obtain abnormal returns. The aim of an event study is to determine if a specific event lead to abnormal returns (positive or negative) for a company's stock (Benninga 2008 ch.15). The event of interest can be of different characters, for example an M&A announcement and earnings reports *etc.* In this particular study there will be more than one event of interest. In this subsection the outline of the event study is discussed. MacKinlay (1997) proposes a seven-step approach to the outline of an event study.

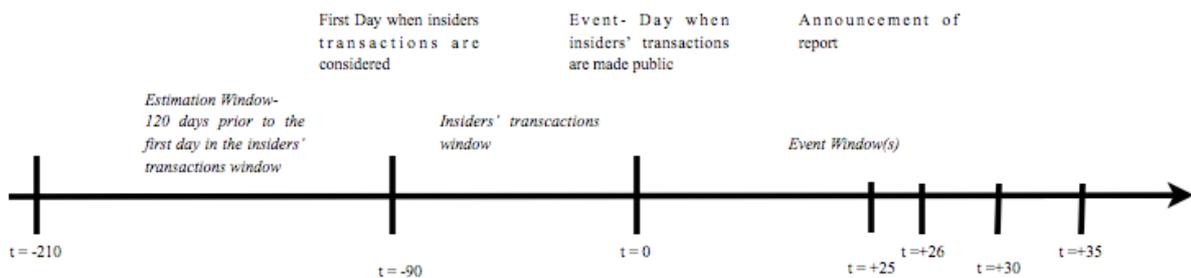
4.4.1 Outline of the Event Study

1. *Event Definition:* The most important thing when conducting an event study is to determine the event itself. In this study there are actually two events of interest. The purpose of this thesis is to determine if outsiders can mimic insiders to obtain abnormal returns. The first event of interest is thus the period when insiders transact. The second event of interest is the period after the announcement of the full year report. In Fig. 4.2 below the event is defined as the last day insiders' transactions prior to an announcement is released. As mentioned in chapter 2 about law and regulations they cannot transact within the 30 days prior to an announcement and they must notify Finansinspektionen within five days after a made transaction. The event day is thus 25 days prior to the announcement and is denoted τ_1 . The cumulative abnormal return is calculated for different lengths of the event window, where τ_2 is the end of the event
2. *Selection Criteria:* The selection criteria are of high importance as well. As previously mentioned, this study investigates all companies listed on Nasdaq OMX Large, Mid and Small Cap during the period 2007-2010. In order to minimize the risk of survival bias all companies are included, even if they only were listed on the specific exchange for a limited time. Another criterion is that there are insider transactions made during the period prior to the release of the report. If no transactions are made, the company is excluded. Since all stock prices are collected from the database of Datastream the information must also be available from their database. Companies that are missing in Datastream can for that reason not be included in this study. In section 4.1 above there

are further information about the different breakdowns for the companies included in this study. In section 1.4 there is also detailed information about the delimitations for the study.

3. *Normal and Abnormal Returns:* As MacKinlay (1997) mentions, there are mainly two different models used to measure normal returns; the constant-mean return model and the market model, which is a type of factor model. According to MacKinlay there are small gains from adopting a multi-factor model and he proposes that the market model should be used. In the market model the normal return of a stock price is a function of the return of an index. The market model is further discussed below in section 4.5.1. The abnormal return is simply the actual return less the abnormal return as predicted by the market model.
4. *Estimation Procedure:* In order to estimate the parameters in the market model an OLS regression is conducted against the market index of interest. In this study the estimation window consists of the 120 days prior to the first day of insider transactions. According to MacKinlay (1997), 120 trading days with daily returns is sufficient to get an accurate estimation of the expected returns.
5. *Testing Procedure:* With the normal returns in hand the abnormal returns can easily be calculated. In order to determine if the result is significant or not two different types of statistical test is conducted, *Student's t-test* and *Wilcoxon's Signed Rank Test*, both further discussed below in section 4.6.
6. *Empirical Results:* In the next chapter the empirical results are presented. In some cases the result of an event study can be greatly influenced by one or a few firms. Since the number of firms is large in this study that ought not to be a problem.
7. *Interpretation and Conclusions:* One very important aspect of the event study is to interpret and discuss the result. There can be many reasons for the particular result. In chapter six the authors' thoughts about the result and potential reasons for the result deviating from previous studies are discussed.

Fig. 4.2 Simplified Outline of Event Study



Source: Own

4.5 Formulas and Calculations

Most of the calculations are made with the help of Excel. In order to handle the large amount of data for this study as much as possible have been automated. For an excellent introduction to the advanced formulas in Excel, see Benninga (2008).

4.5.1 Market Model

The market model is the most commonly used model to determine a stock price normal behaviour (Benninga 2008). In this study the estimation window that is used to determine the normal behaviour is 120 trading days. The market model is a simple regression of a stock's return and a market index return. Since this study investigates different lists of the Swedish stock market different indices is used, see the different indices below in Table 4.2.

Table 4.2 Indices Used in the Market Model

List	Index Used	Comments
Large Cap	OMX Stockholm 30	30 largest companies on Large Cap
Mid Cap	OMX Stockholm Mid Cap	All companies on Mid Cap
Small Cap	OMX Stockholm Small Cap	All companies on Small Cap

Source: Own

The advantage of the market model depends on the explanatory power of the regression analysis, as measured by R^2 . The higher the R^2 the more of the stock's return can be explained by the market model and thus the behaviour of the market index used in the regression analysis (MacKinlay 1997).

MacKinlay also say that multifactor models, e.g. Fama-French three-factor model, can be used to determine the normal behaviour of the stock, but that the gains from adopting a multifactor model are limited due to low marginal R^2 of including more factors. In this study a multifactor model is not useful due to the companies being in different industries.

Brown and Warner (1985) find that the results of event studies with large samples are not particularly sensitive to the type of model used to determine the normal behaviour of the stock. One thing that could affect the result, at least to some extent, is that a constant Beta and Alpha is used during the event window. The effect of this should not be large and will probably not affect the result too much. The market model is thus considered to be a good proxy of the normal behaviour of the stock price.

After conducting the regression analysis the following formula below is used to determine the expected behaviour of the stock price. The expected return is now a function of the return of the index used in the regression analysis.

Equation 4.1 Expected Stock Price Behaviour According to the Market Model

$$E(r_{it}) = \alpha_i + \beta_i r_{Mt} + \varepsilon_{it}$$

$E(r_{it}) = \text{Expected Stock Price}$

α_i & $\beta_i = \text{Coefficients from the OLS regression}$

$\text{var}(\varepsilon_{it}) = \sigma_{\varepsilon_i}^2$

Source: MacKinlay (1997)

4.5.2 Actual Return

When calculating the actual return the natural logarithmic have been used. Strong (1992) suggests that the natural logarithmic is preferable because, among other things, it is more likely to be normally distributed and thus fulfilling the requirements of Student's t-test. The formula for the actual returns can be seen below.

Equation 4.2 Actual Returns

$$r_{it} = \ln\left(\frac{\text{Price at time } t}{\text{Price at time } t - 1}\right)$$

Source: Strong (1992)

4.5.3 Abnormal Return

In the previous section the calculation of the actual and expected return of the stock price is described. The abnormal return is calculated according to the following formula:

Equation 4.3 Abnormal Returns

$$AR_{it} = r_{it} - E(r_{it})$$

Source: Benninga (2008)

The abnormal return calculated from the formula above is a measure of the impact the event has on the behaviour of the stock price.

4.5.4 Cumulative Abnormal Return

The cumulative abnormal return is the sum of the abnormal returns during the event window. In this study there are five different lengths of the event windows and the cumulative abnormal return is calculated for all the different event windows. The cumulative abnormal return is calculated as follows:

Equation 4.4 Cumulative Abnormal Return

$$CAR(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AR_{\tau}$$

Source: MacKinlay (1997)

4.5.4.2 Variance of CAR

The variance of CAR is needed to perform the t-test. Benninga (2008) suggests that the standard error of the regression prediction should be used to measure the significance of the result. This can be used to determine significance of the abnormal return, but needs to be adjusted in order to be useful for the cumulative abnormal return. MacKinlay suggests that the following formula should be used:

Equation 4.5 Variance of CAR

$$\text{var}(CAR(\tau_1, \tau_2)) = \sigma_{\varepsilon_i}^2 = (\tau_1 - \tau_2 + 1)\sigma_{\varepsilon_i}^2$$

σ_{ε_i} = Standard error of regression

Source: MacKinlay (1997)

4.5.5 Cumulative Average Abnormal Return

When the CAR is calculated for all observations in the sample the Cumulative Average Abnormal Return (CAAR) is calculated. The statistical test, further discussed below in section 4.6 is conducted with respect to the CAAR. The CAAR is calculated according to the following formula:

Equation 4.6 Cumulative Average Abnormal Return

$$CAAR(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AAR_{\tau}$$

Source: MacKinlay (1997)

4.5.5.2 Variance of CAAR

In order to conduct the t-test, the variance of the CAAR is needed. In this study the framework of Benninga (2008) and MacKinlay (1997) is adopted. MacKinlay (1997) suggests that the following proxy for the variance should be used:

Equation 4.7 Variance of CAAR

$$\text{var}(CAAR(\tau_1, \tau_2)) = \frac{1}{N^2} \sum_{i=1}^N \sigma_i^2(\tau_1, \tau_2).$$

Source: MacKinlay (1997)

4.6 Statistical Analysis

To find out if the results from the event study are statistically assured some statistical tests are used and the formulation of the hypothesis as well as the statistical tests used, are treated below. The first step when conducting a statistical test is to formulate the hypothesis about the studied population. The second step is to determine the significance level and this study use

the commonly used 5% level as the critical area. The main reason for using statistical analysis is that the full population is not studied. There is always some random error when not including all observations in the studied area (Körner and Wahlgren 2006, ch.8). Since it is a relatively large number of firms that are excluded from this study, due to no insider transactions taking place, statistical analysis is justified to ensure the results.

4.6.1 Hypotheses

The aim of this study is to determine to what extent outsiders can mimic insiders in order to obtain abnormal returns. Some breakdowns have been made in order to determine if there is any difference depending on the type of insider making the transaction, the market value of the company *etc.* Similar breakdowns have been made in previous studies (*e.g.*, Dickgiesser and Kaserer 2009).

The null hypothesis (H_0) is always that no difference between the samples can be seen. In this study that means that no abnormal returns can be detected. The alternative hypothesis (H_1) can be somewhat different depending on the aim of the study. In this case the alternative hypothesis is that abnormal returns are possible. Below the hypothesis in this study are treated.

H_0 : Outsiders cannot obtain cumulative abnormal returns (CAR) by mimicking insiders' transactions prior to earnings announcements.

H_1 : Outsiders can obtain cumulative abnormal returns (CAR) by mimicking insiders' transactions prior to earnings announcement.

The hypotheses above are tested for the different breakdowns of the sample below. For a more thorough description about the breakdowns, see section 4.1.

- ❖ Firm size
 - Large Cap
 - Mid Cap
 - Small Cap

- ❖ Kind of insider
 - CEO / Vice President
 - Board Member
 - Large Shareholder
 - Other

- ❖ Market-to-Book Value
 - 1) Lower Quartile (0-25%)
 - 2) Lower Mid Quartile (26-50%)
 - 3) Upper Mid Quartile (51-75%)
 - 4) Upper Quartile (76-100%)

❖ Financial Crisis

- Reports released for fiscal years 2008 and 2009 are considered to have taken place during the financial crisis.
- Reports released for fiscal years 2007 and 2010 are considered to have taken place during non-crisis times.

4.6.2 Significance tests

There are a number of statistical test to choose from depending on the underlying factors, such as number of observations and assumptions about normal distribution. The statistical tests used in this survey are Student's t-test and Wilcoxon signed rank test. The reason for using two different tests is that there is some uncertainty about the normal distribution of the different samples. There are two important concepts regarding normal distribution curves that should be mentioned, *skewness* and *kurtosis*. The skewness measures how symmetric a curve is. A skewness of zero means that the curve is symmetrical around its mean, as in the case of the normal distribution. The kurtosis of a curve determines if the curve is flat, peaked or somewhere between. A normal distribution curve should have a kurtosis of approximately three (Salvatore & Reagle 2002). To describe the normal distribution in a way that is easier to understand; the standardized normal distribution has a mean of zero and a standard deviation of one. Populations that are not normally distributed might have some skewness or other defect that makes the distribution asymmetric (Körner and Wahlgren 2006, ch.5).

In order to detect if the assumptions behind the t-test hold Shapiro-Wilk's normality test is done. This test is further discussed in section 4.6.2.3. If the studied population is not normally distributed or the sample is small, the usage of non-parametric methods is preferable. In cases when the assumptions for the parametric tests hold the efficiency of those are superior to the efficiency of the non-parametric tests (Körner and Wahlgren 2006, ch.12). Corrado and Zivney (1992) studies and compares the performance of sign test, t-test and rank test in event studies of abnormal security returns performance. Among their results they find that the rank test performs better than the sign test when it comes to usage of non-parametric test. Therefore, by using both the non-parametric Wilcoxon signed rank test and the parametric Student's t-test, the adequacy of the statistical testing is better and the reliability of the results are improved compared with only using one method. In order to determine when each method is appropriate normality test is conducted, which is discussed below in section 4.6.2.3.

4.6.2.1 Student's t-test

Student's t-test is a parametric test that requires that the observations follow a normal distribution (Körner and Wahlgren 2006, ch.7). A description of the different parts of the equation below is treated above in section 4.5.

Equation 4.8 Student's t-test

$$t = \frac{CAAR(\tau_1, \tau_2)}{\sqrt{\text{var}(CAAR(\tau_1, \tau_2))}}$$

Source: MacKinlay (1997)

The most important underlying assumption behind the t-test is that the population is normally distributed. If it is not normally distributed the result of the t-test is not reliable and in that case is Wilcoxon's signed rank test used instead.

4.6.2.2 Wilcoxon signed rank test

As mentioned above, non-parametric tests are used when some of the assumptions behind the previous test are not met. The Wilcoxon signed rank test do not do not necessarily assume a normal distribution of the population, but instead requires that the samples can be ranked (Körner and Wahlgren 2006, ch.12). One main advantage with Wilcoxon's signed rank test is that the test itself eliminates the effect outliers⁵ have for the end result.

The idea behind the Wilcoxon signed rank test is to compare two independent samples and examine if the difference between them are significant. The procedure in this study is to rank the abnormal returns by size and give them numbers ranging from 1 to n , where 1 is given to the lowest and n to the highest value. This sample is compared with 0 to find if the abnormal returns are significant. The calculations for the Wilcoxon's signed rank test are conducted in SPSS. For large samples the formula below can be used to test the hypothesis:

Equation 4.9 Wilcoxon's Signed Rank Test

$$Z_w = \frac{\left[W \frac{n(n+1)}{4} \right]}{\frac{\sqrt{n(n+1)(2n+1)}}{24}}$$

Source: Körner (2000) p. 38

4.6.2.3 Normality test

A normality test is conducted in order to determine if the studied population can be considered to be normally distributed. There are a couple of commonly used normality test, e.g. Kolmogorov-Smirnov, Shapiro-Wilk and Anderson-Darling. The most used normality test is probably Shapiro-Wilk and this test is therefore used in this study (Gel Miao & Gastwirth 2007). The normality is conducted in the statistical software programme SPSS.

If the result of the normality test suggests that the population is normally distributed the result of interest is the one from Student's t-test, whereas Wilcoxon's signed rank test is more appropriate in the case of a non-normal distribution.

4.7 Validity and Reliability

In studies of this kind you want to minimize the potential sources of error, thus increasing the validity and reliability. High validity means that the parameters that you are studying are measuring what you have intent to study and describes the event in a relevant way. Reliability concerns the degree to which you can rely on the results and to get high reliability you want to avoid systematically and random errors as much as possible (Dahmström 2005, ch.10).

⁵ Outliers are observations that are far away from the mean of the sample. They can have a great impact of the end result if they are not approximately of the same size for negative and positive abnormal returns.

There are a few potential sources of error in this study. The one of most concern for the reliability is the input of data from Finansinspektionen, since it is manually done. The constructed formulas in the excel-sheets are controlled many times but there could of course still be errors. The information collected from Finansinspektionen is per se very reliable since it is a governmental authority.

All information about report dates is also manually typed into Excel and this is another potential source of error. The dates are controlled several times in order to minimize the risk of a mis-representing result due to this.

In event studies the event windows should not be overlapping to get the best result and avoid clustering. In this study there can be some overlap since many of the companies have releases of the reports about the same time. The calculation of the variance assumes that there is not any overlap between the event windows across securities and can therefore be calculated without consideration of any covariance (MacKinlay 1997). MacKinlay (1997) proposes two different ways to account for the problem with clustering. Due to the limited time frame this consideration was not possible in this study and is thus a potential source of error. Due to the large sample sizes the possible error due to overlapping event windows should not be particularly large.

One important aspect to consider in an event study is the survival bias. To minimize the risk of a survival bias all companies that have been listed anytime during the studied period have been included, even if they are delisted at present or where recently listed. This makes the result more reliable and the analyses of the results more reliable as well.

Information about previous stock prices is collected from Datastream, a very reliable source. The potential sources of error are thus negligible. The article database of LibHub is used to find articles related to this study. In LibHub there are only well-renowned journals available and this source is therefore also considered to be very reliable.

One main thing that this study is built upon is the assumption that the market model gives a good estimation of the normal return of the stock. As can be seen in Appendix 8.5 the explanatory power of the market model is quite different for the different firm sizes. The model performs very well for Large Cap firms and Mid Cap firms, but for Small Cap firms the model is not as good. The lowest explanatory power for all firm sizes is during 2009 when the financial crisis is likely to affect this. Due to the turbulence on the stock market during this time the market model has a lower explanatory power than during the other years. Since the standard deviation is incorporated in the study when performing the statistical test one can argue that the lower explanatory power is considered as well since this is associated with higher standard deviation of the observations.

The overall reliability and validity of this study is considered to be good. Only reliable sources are used and all imputation is controlled several times in order to minimize the risk of typing errors. When making the event study the formulas from Benninga (2008) are used in order to simplify the construction as well as increasing the reliability. The main potential sources of error are still typing errors and to some extent the risk of clustering brought forward by MacKinlay (1997).

5 Results and Analysis

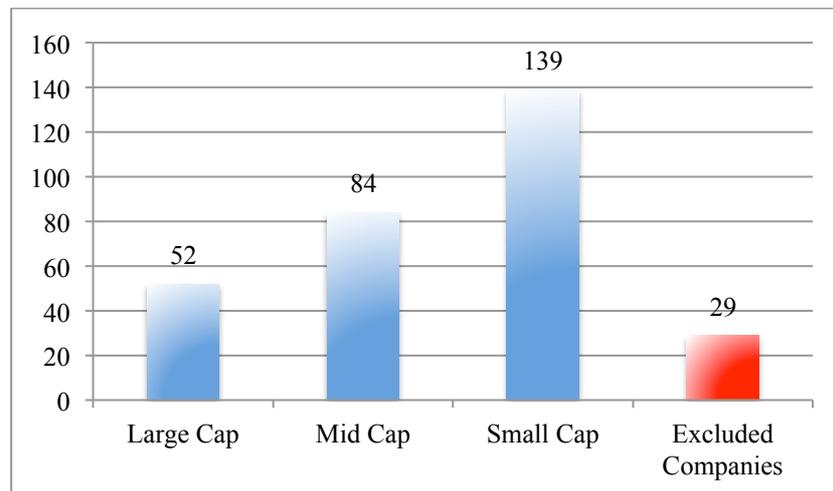
In this chapter the results of the study are presented in the form of tables with comments intended to increase the likelihood that the result is correctly understood. In this chapter the results are based on the mid quotes of the stock prices. The results of the tests based on the other quotes can be seen in Appendix 8.6-8.9.

5.1 Descriptive Statistics

In this subsection is some background information presented in order to increase the knowledge about the different samples. A more detailed presentation of the descriptive statistics can be seen in Appendix 8.3-8.4.

5.1.1 Number of Companies Included in the Study

Fig. 5.1 Number of Companies Included / Excluded from the Study

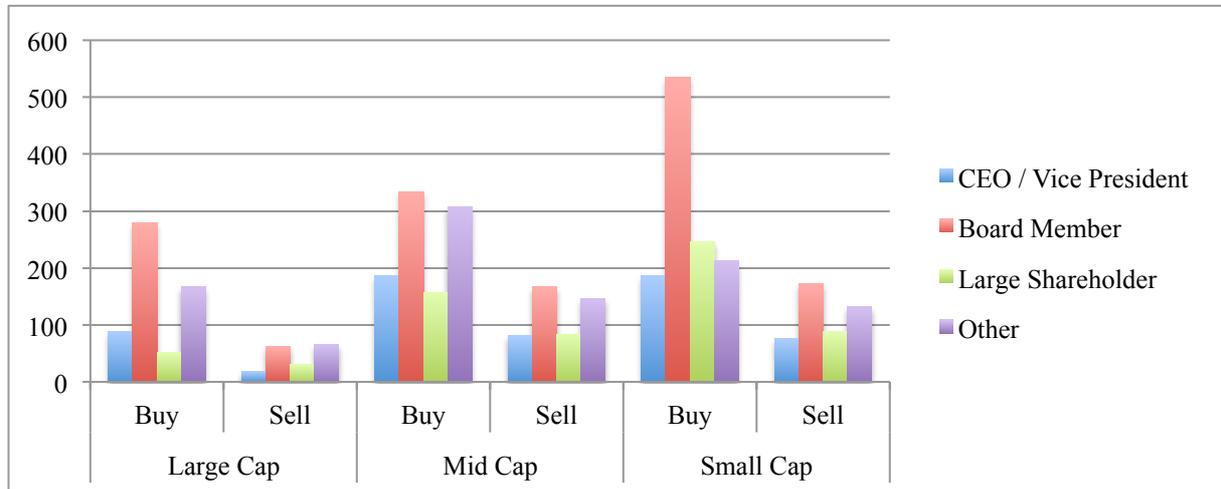


As can be seen in Fig. 5.1 above, there are a total of 275 companies included in the study. A part from the companies excluded by our delimitations some of the companies are excluded for other reasons. Appendix 8.2 shows the companies excluded with a short comment about the reasons for the exclusion. The companies that are missing are unlikely to affect the end result since they represent only a fraction of the total population.

Some of the companies included in the study have only been listed part of the time. The potential survival bias described earlier is minimized by including companies that have been delisted as well. The largest part of the companies is from the Small Cap list and the smallest part from the Large Cap list. Since the study covers four years there are roughly four times as many reports as companies. Appendix 8.1 presents all companies included at least one year in our study.

5.1.1 Number of Transactions

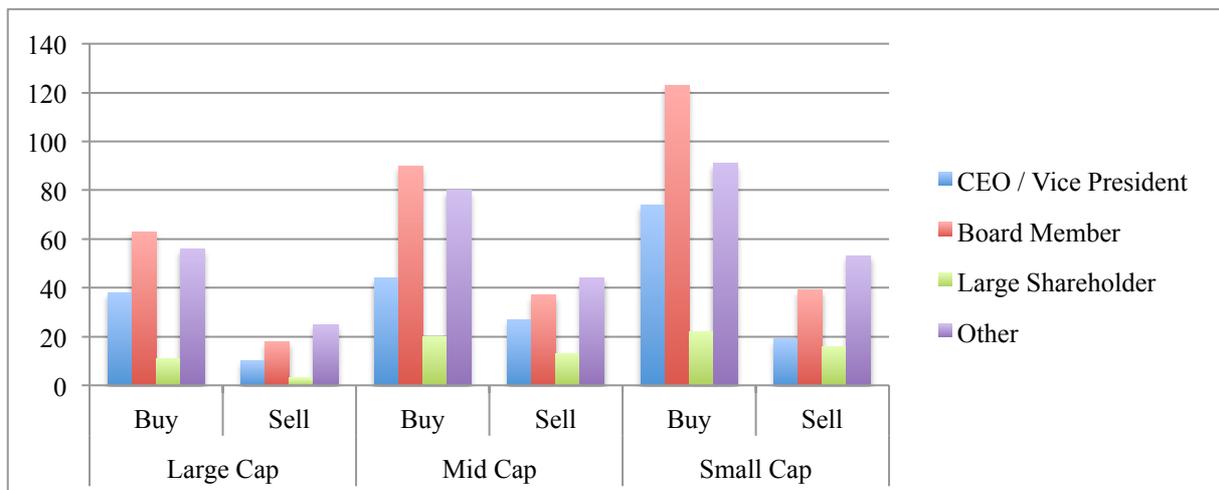
Fig. 5.2 Total Number of Transactions



As can be seen in Fig 5.2 above, the category with most transactions is the one with Small Cap companies. Board members are the most active among all insiders, which can be due to them being a quite large group at some companies. They are also the insiders with the most information after CEO / Vice President. Since there are only two persons in the last category it is an intuitive result that board members are more active. The number of insider transactions seems to be negatively correlated to the size of the firm.

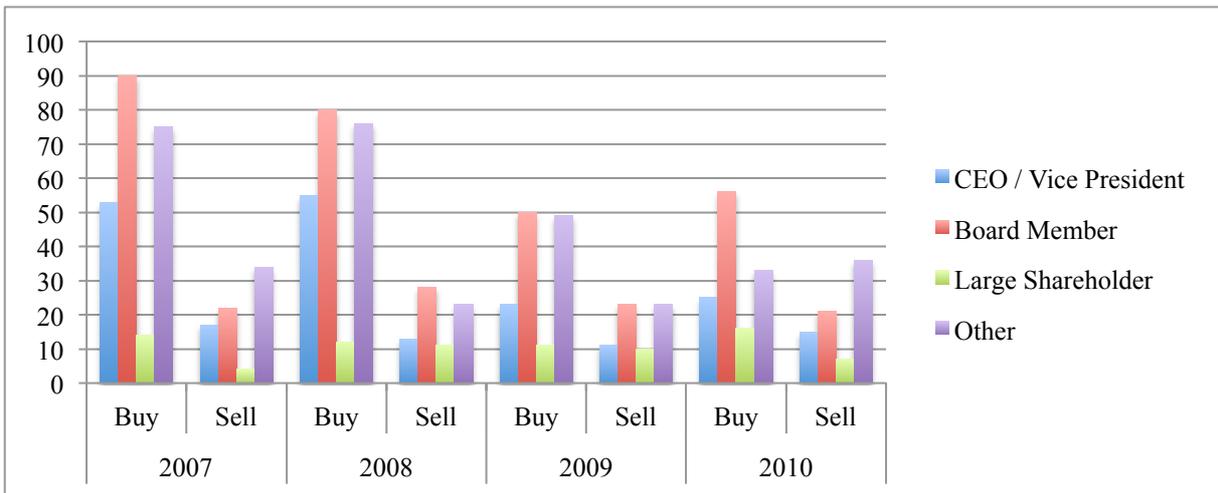
5.1.2 Number of Signals

Fig. 5.3 Number of Signals- Divided by Type of Insider



In Fig 5.3 the total number of signals for the different insider categories during the studied period is shown. The number of signals is substantially higher for the companies included in the Small Cap list, both when it comes to buy and sell signals. The sell signals for Mid Cap is approximately the same as for Small Cap. Least signals are seen at Large Cap, which of course is related to the number of firms being the fewest on this list.

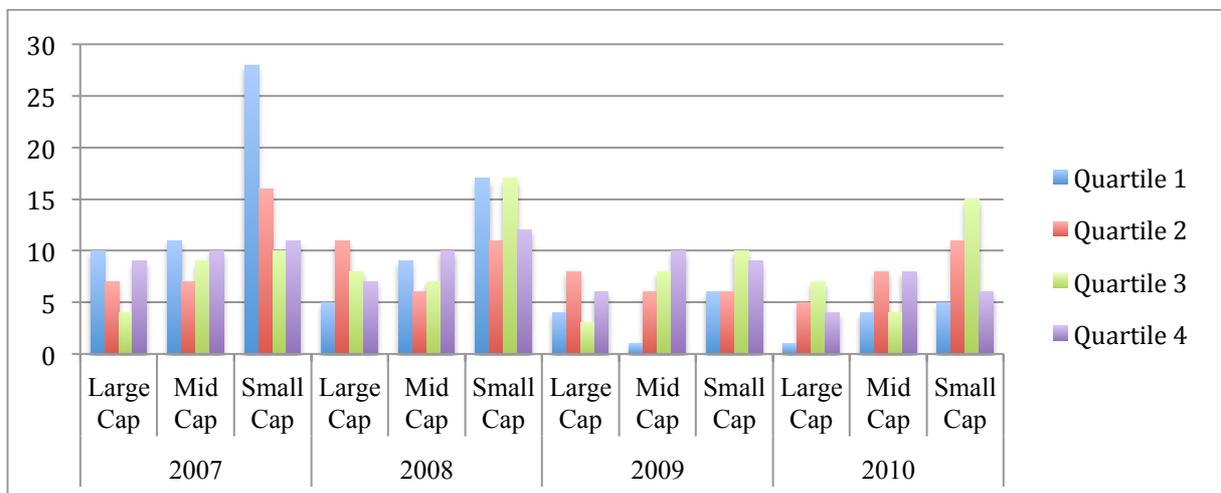
Fig. 5.4 Number of Signals- Divided by Year



The number of buy signals in this study is considerably more for the first two years included. There is a large leap between 2008 and 2009, which might be related to the financial crisis that began during the autumn of 2008. The number of sell signals is approximately the same for all years included in the study.

5.1.3 Market-to-Book Value

Fig. 5.5 Market-to-Book Value- Divided by Year and List



In Fig 5.5 above are different Market-to-Book categories described. To make the analysis in the next section easier and clearer each category is also divided by years. Only those companies included in the analysis are presented in the figure above and they can be included more than one year. As can be seen, Small Cap companies are over-represented especially in Quartile 1, the one with lowest Market-to-Book values, for the first year. Mid Cap companies are underrepresented in Quartile 1 for 2009 and Large Cap companies for 2010. In the other categories/years is the result quite mixed and no clear pattern can be seen.

5.2 Results and Analysis

In this section are the results presented along with analysis about the results. It is important to remember that the only transaction cost considered is the Bid-Ask spread described earlier in section 4.2.3. The reason for this is that this is the only transaction cost shared by all investors. The reader should compare the returns to the different commission fees presented in section 4.2.3 to make the result more reliable.

5.2.1 Firm Size

In this subsection the results from the tests conducted is presented based on the size of the firm, and there are three different sizes; Large Cap, Mid Cap and Small Cap. In this section no consideration is taken to the type of insider or what year the transactions are made, the only breakdown is of the firm size.

5.2.1.1 Large Cap

Table 5.1 Cumulative Average Abnormal Return- Large Cap

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,006	7,78E-05	0,631	0,264	0,866	0,193	0,006
1 Day After Report	0,012	8,56E-05	1,331	0,092	1,630	0,501	0,024
3 Days After Report	0,015	9,34E-05	1,569	0,058	1,757	0,039	0,007
5 Days After Report	0,015	1,01E-04	1,453	0,073	1,533	0,063	0,036
10 Days After Report	0,004	1,21E-04	0,406	0,342	1,004	0,152	0,000

As can be seen in the column to the right the normality tests shows that the distribution of the sample cannot be assumed to be normal and therefore Wilcoxon's test should be used instead of Student's t-test. The chosen significance level is 5% and the p-value of Wilcoxon's test is above 5% for all lengths of the event window, except the event window ending on three days after the report. This suggests that outsiders cannot mimic insiders in Large Cap firms in order to systematically obtain abnormal returns.

5.2.1.2 Mid Cap

Table 5.2 Cumulative Average Abnormal Return- Mid Cap

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,016	8,20E-05	1,797	0,036	1,602	0,054	0,023
1 Day After Report	0,019	9,02E-05	1,998	0,023	2,016	0,022	0,025
3 Days After Report	0,018	9,84E-05	1,855	0,032	1,895	0,029	0,051
5 Days After Report	0,015	1,07E-04	1,479	0,070	1,502	0,067	0,082
10 Days After Report	0,021	1,27E-04	1,887	0,030	1,946	0,023	0,080

In the right column Shapiro-Wilk's normality test is shown. In the case of Mid Cap the three longest event windows are normally distributed whereas the two shorter windows are not. The CAAR from the first day in the event window until the day before the report is significant according to Student's t-test but not to Wilcoxon's test. Since the normality test suggest that the sample is not normally distributed the result of the Wilcoxon test is the appropriate one to consider. The CAAR until the first day after the report is significant according to Wilcoxon's test. As can be seen above two of the three longest event windows have significant abnormal returns according to both the Wilcoxon test and Student's t-test. Since the p-value from the normality test suggest that the sample almost is normally distributed it is good that both Wilcoxon's test and Student's t-test gives the same result in those cases. The result presented above implies that it can be beneficial to mimic insiders in Mid Cap firms.

5.2.1.3 Small Cap

Table 5.3 Cumulative Average Abnormal Return- Small Cap

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,013	1,28E-04	1,191	0,117	1,660	0,048	0,000
1 Day After Report	0,008	1,40E-04	0,689	0,245	1,603	0,054	0,000
3 Days After Report	0,008	1,53E-04	0,616	0,269	1,294	0,098	0,000
5 Days After Report	0,011	1,66E-04	0,817	0,207	1,624	0,052	0,000
10 Days After Report	0,015	1,98E-04	1,040	0,149	1,151	0,125	0,001

The normality test for the all the different event windows for Small Cap observations suggests that Wilcoxon's test should be used. The CAAR from the first day in the event window until the day before the report is statistically significant at the 5% level but the other lengths of the event windows show no significant abnormal return.

5.2.1.4 Analysis: Firm Size

The market's information and knowledge about firms differs depending on their size, due to more analyst coverage *etc.* Consequently, the largest firms should therefore have higher transparency, thus experience less information asymmetry. The result that outsiders do not have the ability obtain significant abnormal returns by imitating insiders at Large Cap firms, confirms that hypothesis. It is only at three days after the report the cumulative abnormal average return is significant and still, it is not with any wide marginal. This could be the result of the market's ability to quickly incorporate the news of the insider's transactions, making outsiders less likely to make abnormal returns by following insiders.

The result confirms and develops the findings of both Cheuk *et al.* (2006) and Wong *et al.* (2000) that find that insiders' abnormal gain is possible at the smallest firms. They do not find anything significant about outsider's ability to mimic insiders at Large Cap firms, which is similar to this study. It shows positive CAARs only for the event window ending three days after the release of the reports. The other event windows shows far from significant abnormal returns and therefore, one can conclude that it would not be a good strategy to mimic insiders at firms listed at Large Cap.

For Mid Cap the result is not as intuitive as at Large Cap, where it only shows abnormal returns in one of all cases. The firms at Mid Cap have to be considered quite large and also subject to a lot of analysis. The results suggest that abnormal profits are possible at one, three and ten days after the report, which is the full time frame of the study. At one and three days the result is not as surprising as for ten days since one might imagine that the market needs some time to incorporate the news into the stock price. Ten days is a long time and clearly, the result for the longest period is not coherent with the semi-strong form of the efficient market hypothesis. Instead this is explained by Michaely *et al.* (1995) that show that the market is slow to react and often underreact to news announcements.

The results by Cheuk *et al.* (2006) and Wong *et al.* (2000) are almost the opposite of what this study finds for Mid Cap. They do not find abnormal returns for neither insiders nor outsiders for the mid size firms, while positive CAARs are found for three out of four event windows after the report in this study. The reason for the deviating results in this study might be the effect of the earnings announcement. In their study they do not incorporate the news effect and therefore it might be the deciding factor. For this to be true the average earnings announcement at Mid Cap must have been surprisingly positive, so that the market was not able to anticipate it fully. It is explained by the findings of Ball and Kothari (1991) that says that the variance and betas increase after a news announcement, which would make larger fluctuations more probable and also thus increasing the likelihood of abnormal returns. The higher variance at the time of the news announcement might explain the fact that there are no positive CAARs for the event window ending five days after the report, whereas there are positive CAARs both before and after. This is related to the findings of Ball and Kothari (1991).

At Small Cap, all days in the event window except the day prior to the report show no significant CAAR. Compared with previous empirical studies this result is surprising. It contradicts the findings of Cheuk *et al.* (2006) and Wong *et al.* (2000) as mentioned above

about Large Cap. Ball and Kothari's (1991) results of higher variance in smaller firms are however confirmed by this study.

Possible explanation for the divergent results can be the researched market and the time period. The Swedish stock market might have other characteristics than the markets in other studies. Also the years 2007-2010, was extreme in many aspects and since at least two of the years are considered to be crisis years this might have struck the smallest firms the hardest.

Comparing the results of the mid price to the results from the other three quotes in Appendix 8.6, the biggest difference is with the close price that finds three, five and four abnormal returns out of five possible for Large, Mid and Small Cap respectively. For the bid and ask prices the results suggests to use the insider mimicking strategy at the largest firms, where the significant CAARs are the most common. The reason for the large difference between the results at the different price series might be that the smallest firms have the largest spread, since some of them are not as frequently traded as the larger firms. The results from the other quotes are similar to the mid price result, the opposite of what Lakonishok and Lee (2001) find when they conclude that the informational content of insider transactions are greatest for the smallest firms. According to them you should have the most benefit from insiders in smaller firms, which is in contradiction to the findings of this study.

As concluding remarks one can say that the best chance for outsiders to gain abnormal returns by mimicking insiders is at Mid Cap, but since the results differs between days one can conclude that it would be risky to base the insider strategy strictly on firm size. The result is neither conclusive when comparing with other quotes. To improve the results it is probably better to include some other variable as well.

5.2.2 Kind of Insider

In this subsection the results from the tests conducted is presented based on kind of insider, with four different kinds of insiders; CEO / Vice President, Board Member, Large Shareholders and Others. No consideration is taken to the size of the firm or what year the transactions are made.

5.2.2.1 CEO / Vice President

Table 5.4 Cumulative Average Abnormal Return- CEO / Vice President

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
	t	p-value	Z	p-value			
1 Day Before Report	0,023	6,65E-05	2,824	0,002	2,613	0,004	0,393
1 Day After Report	0,028	7,32E-05	3,238	0,001	3,351	0,001	0,000
3 Days After Report	0,026	7,98E-05	2,918	0,002	3,089	0,001	0,001
5 Days After Report	0,026	8,65E-05	2,745	0,003	2,960	0,002	0,000
10 Days After Report	0,021	1,03E-04	2,076	0,019	1,928	0,027	0,005

The normality test suggests that Wilcoxon's test shall be used in all cases except the event window that ends on the day before the report. In that case the underlying assumption about the distribution of the population does hold and therefore is Student's t-test preferable.

As can be seen in the table above all lengths of the event window show significantly positive abnormal returns for the studied period with CAARs ranging from 2,1-2,8% for a period of 24-35 days.

5.2.2.2 Board Member

Table 5.5 Cumulative Average Abnormal Return- Board Member

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,010	4,04E-05	1,632	0,051	1,747	0,040	0,000
1 Day After Report	0,010	4,45E-05	1,570	0,058	2,122	0,017	0,000
3 Days After Report	0,011	4,85E-05	1,541	0,062	1,666	0,048	0,000
5 Days After Report	0,011	5,26E-05	1,568	0,058	1,719	0,043	0,000
10 Days After Report	0,013	6,27E-05	1,626	0,052	1,339	0,091	0,000

According to the normality test Wilcoxon's test should be used instead of Student's t-test. As can be seen, there is positive CAAR for four out of five different lengths of the event window when outsiders follow the board members insider transactions. The cumulative average abnormal return ranges from 1-1,3% when outsiders follow board members' transactions and is statistically significant at the 5%-level.

5.2.2.3 Large Shareholders

Table 5.6 Cumulative Average Abnormal Return- Large Shareholder

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,016	1,86E-04	1,159	0,123	1,297	0,094	0,386
1 Day After Report	0,012	2,05E-04	0,832	0,203	1,173	0,121	0,047
3 Days After Report	0,006	2,24E-04	0,426	0,335	0,845	0,199	0,012
5 Days After Report	0,008	2,42E-04	0,482	0,315	0,801	0,212	0,040
10 Days After Report	0,018	2,89E-04	1,070	0,142	1,102	0,135	0,409

According to the Shapiro-Wilk normality test Wilcoxon's test should be used for the CAARs for 1 day after the report, 3 days after the report and 5 days after the report. Student's t-test is used in the two other cases. As can be seen above there are no possibilities to obtain abnormal returns by mimicking the behaviour of large shareholders.

5.2.2.4 Others

Table 5.7 Cumulative Average Abnormal Return- Others

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,016	4,77E-05	2,334	0,010	2,213	0,014	0,000
1 Day After Report	0,018	5,25E-05	2,460	0,007	3,268	0,001	0,000
3 Days After Report	0,021	5,73E-05	2,734	0,003	3,435	0,001	0,000
5 Days After Report	0,024	6,20E-05	2,987	0,001	3,556	0,000	0,000
10 Days After Report	0,024	7,40E-05	2,792	0,003	3,063	0,001	0,000

In the table above Wilcoxon's test should be used for all cases since the assumption about normality is rejected according to Shapiro-Wilk's test. The p-values from Wilcoxon's tests are below 5% for the five different lengths of the event window, suggesting that outsiders can achieve abnormal returns by imitating the insider category Others' behaviour.

5.2.2.5 Analysis: Kind of Insider

When mimicking the CEO / Vice President there are positive CAARs for all different lengths of the event windows. This suggests that they have information that the market does not have at the time of their transactions. It is quite intuitive that the CEO and the Vice President have the most information among the insiders and the informational content of their transactions is thus quite large. As can be seen above the returns for mimicking CEO/Vice President is approximately twice the return for mimicking Board Members. This is consistent with previous studies that show that the returns are higher the more information the insider is likely to have.

The results for the board members are quite intuitive as well. In four out of five lengths of the event window the cumulative average abnormal return is statistically higher than zero. Only for the longest event window, ending ten days after the report, the CAAR is not significantly higher than zero. This suggests that the market is quite slow to react to the news announcement, but somewhere between five days to ten days after the report is the information incorporated into the stock price.

The results based on following large shareholders are quite intuitive. They are unlikely to have any superior information and even if the CAARs are positive they are not statistically different from zero for any of the event windows. The number of signals for large shareholders is quite few during the studied period. This might be related to the fact that they care more about long-term return than short-term gains and therefore not transact to a large extent prior to earnings announcement. They may also care about having a diversified portfolio of stocks, which in that case also can explain the result to some extent.

When it comes to the results based on the category of others the results is very interesting. According to this, outsiders are able to obtain abnormal returns by mimicking insiders in this category. The insiders included in this category can have various connections to the firm, such as lawyers, accountants, but also family of the CEO and similar. It is therefore hard to draw

any real conclusion about this particular group. One can however argue that the insiders in this category are likely to have information superior to the large shareholders, maybe due to their relation to persons with much inside information. Therefore, the result might be explained partly by their connections to other insiders with more information. Any clear conclusion about the result is hard to make since the group can be very diversified.

This study can be related to several previous studies performed at different markets. Seyhun performed a study of the US stock market in 1986 where he find that the more information insiders have the better ability do they have to predict future stock price movements. Outsiders ability to obtain abnormal returns by mimicking insiders were however limited once transaction costs were considered.

In contradiction to Seyhun's findings the result of this study suggests that outsiders can obtain abnormal return by mimicking insiders even after considering transaction costs. The CAARs are higher the more information the insiders have and are in that sense similar to Seyhun's findings. When it comes to abnormal returns and transaction costs the results differ. This difference in results may be related to the different time period and different markets in the studies. The time period Seyhun's study covered ended approximately 30 years ago, making any real conclusion about the differences hard to make. The analyst coverage is much higher in today's corporate environment. With the evolution of Internet the information about companies is spread to the entire world instantaneously. These are just a few examples of what might have changed during the last 30 years that can explain the differences in results.

The results of this study are more similar to the findings of Jaffe (1974) who as well as Seyhun studied the US market. Jaffe incorporated the intensity of the trading in his study and find that in the case of intensive trading abnormal returns are possible for outsiders even after considering transaction costs. No variable about the intensity is included in this study making comparisons between the studies quite hard but the results are similar in the sense that outsiders are able to obtain abnormal returns by following insiders.

Brio and Miguel (2010) study the stock market in Spain and they find that the informational content of insider trading is more important than dividends changes. If the informational content were similar in Sweden it is more likely that the market adjusts fast when the insiders make transactions. Since abnormal returns are possible even after 30 days in several cases it is unlikely that the informational content of insiders trading is as high in Sweden as in Spain.

A more recent article by Korczak *et al.* (2010) find positive correlation between insiders purchasing stocks and the performance of the stock after a news announcement. The correlation is strongest for the group with most informed investors, also consistent with the findings of Inci *et al.* (2010). This study also finds a positive correlation between the informed insiders and the returns. Since both this study and Korczak *et al.* have similar time horizons and are made recently the similar results suggests that the Swedish market and the UK market are similar in at least some sense when it comes to insider trading. The more information the insiders have the more information is conveyed to the market when they transact. Looking at the CAAR for the different categories it can be seen that it is the highest when mimicking the CEO / Vice President, followed by Others and Board Members. Since abnormal returns are possible when following three of the four groups the Swedish stock market shows some signs of being at least partially inefficient.

In Appendix 8.7 the results are presented for the other prices included in this study. The results are similar as for the mid quotes. The more information the insider has the more informative are the transactions. Following large shareholders does not seem to be that good, but following the other three categories is associated with significantly positive CAARs in most cases.

According to the findings of this study it is a good investment strategy for outsiders to base their investments on insiders' transactions. The more information the insider has the more useful is the transaction when it comes to predicting future stock price movement.

5.2.3 Market-to-Book Value

The companies included in this study are divided into four different categories depending on Market-to-Book value. In this section the tests based on this categorization is presented.

5.2.3.1 Quartile 1 (0-25%)

Table 5.8 Cumulative Average Abnormal Return- Quartile 1

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,015	1,11E-04	1,406	0,080	1,689	0,045	0,001
1 Day After Report	0,002	1,22E-04	0,170	0,432	1,387	0,083	0,000
3 Days After Report	0,002	1,33E-04	0,181	0,428	1,319	0,094	0,000
5 Days After Report	0,000	1,44E-04	0,028	0,489	1,106	0,135	0,000
10 Days After Report	-0,001	1,72E-04	-0,105	0,542	0,798	0,213	0,000

As can be seen in the normality test the assumption about the normal distribution does not hold for any of the lengths of the event windows and therefore is Wilcoxon's test used. The CAAR ending on the day before the report is significantly positive but the other CAARs are not.

5.2.3.2 Quartile 2 (26-50%)

Table 5.9 Cumulative Average Abnormal Return- Quartile 2

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,010	1,03E-04	0,965	0,167	0,966	0,167	0,781
1 Day After Report	0,014	1,14E-04	1,355	0,088	1,731	0,042	0,017
3 Days After Report	0,010	1,24E-04	0,927	0,177	1,424	0,078	0,009
5 Days After Report	0,008	1,34E-04	0,667	0,252	1,127	0,130	0,036
10 Days After Report	0,003	1,60E-04	0,229	0,410	0,649	0,258	0,104

The result from the Shapiro-Wilk test suggests that Student's t-test should be used in the CAAR with the shortest event window and the longest. The three lengths in the middle are

analysed with the help of Wilcoxon's test. The CAARs ranges between 0,3-1,4% but none of the CAARs are significantly greater than zero.

5.2.3.3 Quartile 3 (51-75%)

Table 5.10 Cumulative Average Abnormal Return- Quartile 3

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,026	1,05E-04	2,518	0,006	2,639	0,004	0,000
1 Day After Report	0,030	1,16E-04	2,779	0,003	2,385	0,008	0,092
3 Days After Report	0,034	1,26E-04	3,024	0,001	2,462	0,007	0,026
5 Days After Report	0,034	1,37E-04	2,942	0,002	2,352	0,009	0,043
10 Days After Report	0,044	1,63E-04	3,428	0,000	2,666	0,004	0,009

As can be seen above, the different CAARs for the companies in the third quartile of the Market-to-Book value are all positive, ranging between 2,6-4,4%. Both Student's t-test and Wilcoxon's signed rank test are used and show significantly positive CAARs.

5.2.3.4 Quartile 4 (76-100%)

Table 5.11 Cumulative Average Abnormal Return- Quartile 4

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,001	1,07E-04	0,141	0,444	0,275	0,391	0,030
1 Day After Report	0,004	1,18E-04	0,385	0,350	0,119	0,453	0,751
3 Days After Report	0,006	1,28E-04	0,545	0,293	0,175	0,431	0,144
5 Days After Report	0,011	1,39E-04	0,950	0,171	0,502	0,308	0,020
10 Days After Report	0,016	1,66E-04	1,230	0,109	0,501	0,305	0,002

As can be seen above, the companies with the highest Market-to-Book values show positive CAARs for all lengths of the event window. The cumulative average abnormal returns are however not statistically significant.

5.2.3.5 Analysis: Market-to-Book

In Quartile 1, consisting of the companies with the lowest Market-to-Book values, only one event window show significant abnormal returns even if all but one show positive returns. It is the event window ending on the day before the report that is associated with positive abnormal returns whereas the other event windows show no significant abnormal returns. The possibility to obtain abnormal returns by mimicking insider transactions in value firms is thus quite limited.

The results in Quartile 2 show similar patterns. The event window ending the day after the report shows significantly positive abnormal returns but the other event windows show no sign of significant positive returns.

The results for the companies included in Quartile 3 are quite interesting. The Market-to-Book values are somewhat higher among these companies and the cumulative average abnormal return is significantly positive for all lengths of the event window. The CAARs ranges from 2,6-4,4% which is quite high considering the tight time frame. According to this it can be a good idea to follow insiders' transactions in glamour stocks, or stocks with high Market-to-Book values. This can perhaps to some extent be explained by the fact that glamour stocks are riskier than value stocks. If the market gets a signal that the stock is undervalued, as conveyed by insiders' transactions, it might overreact to this signal.

The results in Quartile 4 disrupt the previous pattern, that value stocks are associated with no abnormal return whereas glamour stocks are associated with positive abnormal returns. The companies included in this quartile, *i.e.* the companies with the highest market-to-book values, show no significantly positive CAAR for any of the event windows.

Dickgiesser and Kaserer (2009) studied the German stock market and among other things study insider transactions connected to the Market-to-Book values of the companies. They find that insiders are more active in stocks with bad past performance. They also find that insiders purchasing value stocks often are associated with large changes in the share price. In the case of glamour stocks insiders' purchases tend to be followed by small changes in share price.

The results from this study are both similar and different depending on which particular group that is considered. The value stocks are associated with small changes after insiders' transactions, which is in contradiction to the findings of Dickgiesser and Kaserer. The result for the third quartile is also in contradiction to their findings. Since the distinction between value stocks and glamour stocks only is relative in this study no clear comparison can be made to Dickgiesser and Kaserer's results when it comes to the two middle quartiles. The companies in the fourth quartile have the highest market-to-book values. It can be compared to Dickgiesser and Kaserer's general findings that insiders purchasing glamour stocks are associated with small changes. The findings from this study and theirs are thus comparable at least in that sense. As can be seen in the section with descriptive statistics, Small Cap companies are over-represented especially in Quartile 1 and 3 and it is quite evenly distributed in the other two quartiles. That might explain some of the result but are in that case only seemingly related to Market-to-Book values but the real explanation might be differences in firm size. Lakonishok and Lee (2001) for example find that insider trading is more informative in Small Cap stocks and that can explain some of the mixed result in this study.

In Appendix 8.8 the results for Close, Bid and Ask quotes are presented. The result is quite similar but diverges in some instances. The general finding is still the same; following insiders in companies in the lowest quartile are associated with significantly positive CAARs exceptionally, whereas it is quite common for Quartile 2-3. Only in one instance are there significant positive CAARs for Quartile 4.

Based on the results presented above it is hard to say if there is any real difference among the different types of companies. The results are quite mixed and no clear pattern is seen. The

results in this study might also be related to the chaotic financial crisis that is included in the study with companies of various backgrounds and belonging to different lists have had large swings in their Market-to-Book values. Based on the findings in this study it is unwise to base an investment strategy solely on insider transactions for different type of Market-to-Book companies.

5.2.4 Financial Crisis / Non-Crisis

In this section is the tests based on financial crisis / non-crisis presented. The reports released for fiscal years 2007 and 2010 are considered to be during non-crisis years, whereas 2008 and 2009 are considered to be during the recent financial crisis.

5.2.4.1 Financial Crisis

5.2.4.1.1 Year 2008

Table 5.12 Cumulative Average Abnormal Return- 2008

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,001	1,08E-04	0,091	0,464	0,482	0,325	0,039
1 Day After Report	0,000	1,19E-04	0,001	0,499	0,737	0,231	0,004
3 Days After Report	0,001	1,29E-04	0,117	0,453	0,522	0,301	0,075
5 Days After Report	-0,002	1,40E-04	-0,155	0,561	0,257	0,398	0,030
10 Days After Report	0,004	1,67E-04	0,327	0,372	0,328	0,372	0,016

During the first year of the financial crisis the CAAR ranges from -0,2-0,4%. Student's t-test is used for the CAAR ending three days after the report and Wilcoxon's test is used for the other CAARs. The CAARs are not significantly higher than zero for any of the observations.

5.2.4.1.2 Year 2009

Table 5.13 Cumulative Average Abnormal Return- 2009

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,002	2,01E-04	0,159	0,437	0,107	0,458	0,017
1 Day After Report	-0,011	2,21E-04	-0,733	0,768	0,585	0,276	0,048
3 Days After Report	-0,017	2,41E-04	-1,063	0,856	0,799	0,212	0,015
5 Days After Report	-0,012	2,61E-04	-0,724	0,766	0,491	0,312	0,233
10 Days After Report	-0,018	3,11E-04	-1,046	0,852	1,059	0,148	0,071

As can be seen in the table above, all CAARs except one was negative during the period around the report for fiscal year 2009. Both Student's t-test and Wilcoxon's test shows no significant abnormal return in either direction. Following insiders during financial crisis is thus unlikely to lead to abnormal returns.

5.2.4.2 Non-Crisis

5.2.4.2.1 Year 2007

Table 5.14 Cumulative Average Abnormal Return- 2007

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,028	5,33E-05	3,795	0,000	3,112	0,001	0,005
1 Day After Report	0,030	5,86E-05	3,886	0,000	3,246	0,001	0,000
3 Days After Report	0,034	6,39E-05	4,244	0,000	3,446	0,000	0,000
5 Days After Report	0,036	6,93E-05	4,299	0,000	3,608	0,000	0,000
10 Days After Report	0,037	8,26E-05	4,026	0,000	3,053	0,001	0,001

The normality test shows that the result from Wilcoxon's test is the most relevant since the assumptions behind Student's t-test do not hold. The CAAR ranges from 2,8-3,7% and is statistically significant at the 5%-level. Following insiders at the Swedish stock market during 2007 were associated with positive CAARs for the time around the release of the report.

5.2.4.2.2 Year 2010

Table 5.15 Cumulative Average Abnormal Return- 2010

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,013	1,05E-04	1,295	0,098	0,415	0,339	0,000
1 Day After Report	0,024	1,16E-04	2,202	0,014	1,745	0,040	0,004
3 Days After Report	0,021	1,26E-04	1,890	0,029	1,403	0,081	0,008
5 Days After Report	0,020	1,37E-04	1,700	0,045	1,432	0,076	0,073
10 Days After Report	0,022	1,63E-04	1,715	0,043	1,632	0,051	0,060

Wilcoxon's signed rank test is used for the three shortest event windows and Student's t-test is used for the two longest. The CAARs are positive in all cases, ranging from 1,3-2,4% and it is statistically significant for three of the different CAARs at the 5%-level. Following insiders at the Swedish stock market were associated with abnormal returns for the period around the release of the report for fiscal year 2010.

5.2.4.3 Analysis: Financial Crisis / Non-Crisis

The first year in the recent financial crisis is 2008. The CAARs are approximately zero for all the different event windows. No event window shows any sign of positive abnormal return. The results are quite intuitive; since the stock markets around the world were steadily decreasing it would be unlikely to get a result where the abnormal returns are positive, even during the time around reports announcement. Number of buy transactions during the year of

2008 decreased somewhat from the year before. Abmustafa and Nusair (2011) find in their study that aggregate insider trading increases during crisis, mainly due to increasing sell transactions. The number of sell transactions is approximately the same for all the years included in this study, which contradicts the results from Abmustafa and Nusair. They studied the US and Kuwait market and that can explain some of the differences in results. Still, one expects the sales to increase due to lower personal liquidity level.

In 2009, all CAARs except one are negative but none of them statistically different from zero. The number of buy transactions decreased quite substantially between 2008 and 2009, which can be due to personal liquidity needs. One reasons that the insiders does not increase the sell transactions might be due to them trying to avoid a sure loss. By decreasing the buy transactions instead they might be able to handle their liquidity needs anyway.

The year before the outbreak of the financial crisis was a very good year. The CAAR ranges between 2,8-3,7% and are significantly different from zero in all instances. There was an overall pressure upwards in many different segments and this can explain some of the substantial returns associated with following insiders during 2007. If outsiders are able to spot the upcoming changes in the market, following insiders prior to a downward movement is really good with large returns.

Three of the five different event windows in 2010 are associated with significantly positive CAARs. The overall recovery of the market was good during this year but some industries, such as the car manufacturing industry were still struggling.

Seyhun (1988) studied insider transactions during good and bad financial conditions. He find that no real conclusion can be drawn about when the transactions are most informative, but they can be used to spot overall changes in the market. This study differs somewhat from Seyhun's since the result from mimicking insiders is much better during the good or normal times than during financial crisis. Sell transactions were however not incorporated in this study and that can perhaps affect the result to some extent. Seyhun studied the US stock market and that can also explain some of the differences in the results. The remuneration in US firms is to a larger extent variable than it is in Swedish firms. If for example CEO:s have a large portion of their wealth tied in their company's stock and their fixed remuneration is quite low they might be forced to sell shares in order to handle their personal liquidity needs.

Jiang and Zaman (2010) study aggregate insider trading and the ability to predict future market movements by the use of this information. They find strong support of insiders' ability to predict future unexpected cash-flow news and they relate this to future stock price movements. They only study insiders and not the ability for outsiders to mimic insiders. By including that feature in this study it can be said that outsiders can use the information of insiders' transaction in order to spot future price movements.

The results for the different quotes are presented in Appendix 8.9. The overall result is the same even if some of the event windows differ.

The results from this study show that insiders' transactions should not be mimicked during a financial crisis. It can however be a good idea to follow the insiders during good or normal times. Since the annual reports are released after the movement of the market already is established it is quite straightforward to know when insiders' behaviour should or should not be mimicked.

6 Concluding Discussion

In this chapter there is a concluding discussion about the results in this study. Thoughts about the reasons for the particular results are expressed as well. There is also a part with proposals of further studies in the field of insider trading.

6.1 Concluding Discussion

The purpose of this study was to see if there was an easy straightforward way to obtain abnormal returns for investors. Since insiders are likely to have information that outsiders' have not, there can be information conveyed to the market when insiders transact. The time during the release of the companies' full year reports were considered since it is more likely that the stock price is affected in either direction at the time of the release.

In order to determine to what extent outsiders are able to mimic insiders to obtain abnormal return and when the possibilities are the best several separations were made. If outsiders can obtain abnormal returns by mimicking insiders' transactions the semi-strong form of the efficient market hypothesis can be rejected.

The result from this study suggests that outsiders can mimic the behaviour of insiders' transactions in order to obtain abnormal returns in some instances. Several separations were made in order to determine when the possibility for abnormal returns was the highest. The conclusion from this study is that it is best to mimic the insiders' with most information since this will lead to the highest abnormal returns and there is a detailed discussion about the different results in the previous chapter. It is intuitive that more information is conveyed to the market when insiders with more information make transactions. The abnormal returns associated with mimicking CEO/Vice President, Board Members and Others are significantly positive in most occasions. Following Large Shareholders is however not associated with any abnormal returns. It can be somewhat unexpected that mimicking the category Others shows positive results whereas Large Shareholders does not. We argue that this can be due to the persons in the category Others might have closer relationship to the most informed insiders and therefore have more information than Large Shareholders and Board Members. Large Shareholders on the other hand often have a portfolio consisting on several different stocks, making it hard for them to be that well informed about each company.

In this research field the signalling hypothesis is of high importance. By making a transaction, insiders convey information to the market about the future prospect of the firm. The informational content is likely to be the highest for the insiders with the most information, which also is confirmed by this study. We argue that insiders in high positions, such as CEOs, have to be careful when making transactions since their action will send strong signals to outsiders. At the same time it might also be used as an effective tool to mislead outsiders to invest in a stock even if the insider know that the inside information is not positive. That might lead to higher returns at least in the short term but in the long term the market will probably incorporate the true information leading to a decreased stock price.

Regarding the size of the firm this study shows that the abnormal returns are highest for Mid Cap firms, followed by Large Cap and Small Cap. The findings are partly in contradiction to previous research that shows that the abnormal returns are the highest when

mimicking Small Cap companies (e.g., Cheuk *et al.* 2006; Wong *et al.* 2000). The result from this study is in that sense quite unexpected since the information asymmetry is likely to be the highest for Small Cap companies and the information conveyed by the insiders should therefore be the highest for Small Cap companies. Since the recent financial crisis is incorporated in this study this might affect the result. Investors might be especially cautious and reluctant to invest in Small Cap firms that are considered to be riskier, during economic turmoil. As described in the section about validity and reliability there is also an issue of the explanatory power of the market model. The model performs very well for Large and Mid Cap firms, but the performance is poorer for Small Cap firms. This can affect the result in either direction and in this case it might be a downward bias.

The results based on the different Market-to-Book categories are quite mixed and no real conclusion can therefore be drawn. Previous studies suggest that there is a negative correlation between Market-to-Book ratio and abnormal return, *i.e.* mimicking insiders in value stocks is associated with higher returns. We find that the highest return is obtained when outsiders follow insiders in the two middle quartiles, which is in contradiction to the findings of Dickgiesser and Kaserer (2010). The two middle categories are likely to consist of firms with higher risk than pure value stocks but lower risk than pure glamour stocks. We believe that this can affect the result in this study since investors are reluctant to purchase shares in the riskiest companies but want returns higher than the ones expected in value stocks. By purchasing shares in companies in the two middle quartiles the expected returns is likely to be higher than for value stocks, at a risk lower than the one associated with glamour stocks. This seems like a reasonable explanation for the somewhat unexpected results that probably is influenced by the financial turmoil during part of the studied period.

The last thing considered in this study was if the possibilities for abnormal returns were affected by the condition of the financial markets. We find that the abnormal returns are higher during times when it is not financial crisis than during financial crisis and the abnormal returns were the highest for 2007, followed by 2010, whereas there were now abnormal returns for 2008-2009. This contradicts the findings of Seyhun (1988) that finds no difference depending on the condition of the financial markets. We think that the market model performs poorer during times of economic turmoil and this can of course influence the end result. Almost half of the companies included in this study are Small Cap companies and it is reasonable to think that they perform worse than Large or Mid Cap companies during crisis. We argue that the predominance of Small Cap companies can put a downward pressure on the abnormal returns, and this can partially explain the deviation from Seyhun's (1988) study.

As concluding remarks, it is best to follow the insiders with the most information, such as the CEO or the Vice President. This study finds no clear relationship between firm size and the possibility for outsiders to obtain abnormal returns by mimicking insiders. Regarding the Market-to-Book values of the companies the results of this study is quite scattered and no clear conclusion about the explanatory power of the Market-to-Book values can be drawn. The overall financial condition is important regarding the possibilities for abnormal returns, with bad overall financial condition associated with zero or even negative abnormal returns. The consideration of the Bid-Ask spread makes the result of this study more reliable than other master theses that have neglected this transaction cost. The Swedish stock market shows

sign of being at least partially inefficient according to the semi-strong form of the efficient market hypothesis. This inefficiency opens up possibilities to use other methods to forecast future stock price changes. We argue that the Swedish financial community ought to pay attention to the information conveyed by insiders' transactions. Insiders must also be careful when making their transactions since this sends a strong signal to the market, especially in the case of insiders with substantial information advantage.

6.1.1 Proposals for Further Research

This study has reached some conclusions about outsiders' ability to mimic insiders' prior to a news announcement. There are still some parts that are left untested or could be improved by future research:

- This study has done some breakdowns and separations and only looked at one variable at the time. One way to improve the result might be by including several variables at the same time. Future studies can run a multiple regression analysis and connect two or more variables, which might improve the predictability of the stock price movements.
- The results from this study are with certainty only applicable at the Swedish stock market. Future research could make a similar study at some other market to see if the results hold there as well. A lot of studies have investigated the US market, but it could be interesting to make studies similar to this one on smaller markets where the information asymmetry is likely to be higher.
- Instead of just study the net purchases a good idea could be to include the net sales and see if abnormal returns are possible when the share price goes down more than expected by the market. One way to do this would be through the usage of short sales when insiders sell their shares.
- This study only looked at the earnings announcement for the full fiscal year that comes through the fourth quarter report. During a year there are more reports that could be subject to similar investigation to see if the results hold for them as well.
- In this study the market model have been used to determine the normal stock price behaviour. The explanatory power of this model is quite low for Small Cap companies. Future studies might use other capital pricing models for the Small Cap companies, in order to improve the explanatory power of the model and thus the usefulness of the result.
- The only transaction cost considered in this study is the Bid-Ask spread, since that it the only cost common for all type of investors. It could be interesting to consider other transaction costs as well, such as commission fees and similar. Future research in this field might include these other transaction costs in order to make the result even more reliable.

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8 Appendices

8.1 Included Companies

8.1.1 Included Companies I- Currently Listed Companies

Large Cap	Tele2	Loomis	CellaVision	Nederman Holding
ABB	TeliaSonera	Medivir	Cision	Netonnet
Alfa Laval	Trelleborg	Mekonomen	<i>Cloetta</i>	Nordic Mines
Alliance Oil	Volvo	Net Insight	Concordia Maritime	Nordic Service Partner Holdings
Assa Abloy	Mid Cap	New Wave	Connecta	Note
Atlas Copco	AarhusKarlson	NIBE Industry	Consilium	Novestra
Autoliv	Active Biotech	Niscayah Group	CTT Systems	Novotek
Axfood	<i>Addtech</i>	Nobia	Cybercom Group	<i>Oasmia Pharmaceutical</i>
Boliden	<i>Arise Windpower</i>	Nolato	Dagon	OEM International
Castellum	Atrium Ljungberg	Nordnet	<i>DGC One</i>	Opcon
Electrolux	Avanza Bank	Orc Software	Digital Vision	Orexo
<i>Elekta</i>	Axis	PA Resources	Diös Fastigheter	Ortivus
Ericsson	<i>B&B Tools</i>	Proffice	Doro	PartnerTech
Fabege	BE Group	Rezidor Hotels	Duroc	Phonera
Getinge	Beijer Alma	Sagax	Elanders	Poolia
Hakon Invest	Betsson	SAS	Electra Gruppen	Precise Biometrics
Hennes & Mauritz	Bilia	<i>SkiStar</i>	ElektronikGruppen	Prevas
Hexagon	Billerud	Sweco	Elos	Pricer
Holmen	BioInvent International	Swedish Orpan	Enea	Proact IT Group
Hufvudstaden	Björn Borg	Systemair	<i>eWork Scandinavia</i>	Probi
Husqvarna	<i>Black Earth Farming</i>	Säkl	Feelgood Svenska	Profilgruppen
Industrivärden	Brinova Fastighet	TradeDoubler	Fingerprint Cards	RaySearch Laboratories
Investor	Bure Equity	Transcom	FormPipe Solution	ReadSoft
Kinnevik	Cardo	Unibet Group	Geveko	Rederi AB Transatlantic
Latour	<i>Clas Ohlson</i>	Wallenstam	<i>Global Health Care</i>	Rejlerkoncernen
Lundbergföretagen	<i>Corem Properties</i>	Wihlborgs Fastigheter	Havsfrun Investment	<i>RNB Retail and Brands</i>
Lundin Mining	<i>Diamyd Medicals</i>	<i>Vostok Nafta</i>	<i>Hemtex</i>	Rottneros
Lundin Petroleum	<i>Duni</i>	ÅF	<i>HMS Networks</i>	Rörvik Timber
Meda	<i>East Capital</i>	Öresund	Intellecta	<i>Sectra</i>
Melker Schörling	Eniro	Small Cap	Intoi	Semcon
Modern Times Group	Fagerhult	Acando	ITAB Shop Concepts	Sensys Traffic
NCC	Fast Partner	ACAP Invest	Jeeves Information Systems	Sigma
Nordea Bank	Fast. Balder	A-Com	Kabe	SinterCast
Peab	Fenix Outdoor	Addnode	Karo Bio	Softronic
Ratos	Gunnebo	<i>Aerocrine</i>	Know IT	Studsvik
SAAB	Haldex	<i>AllTele</i>	Lagercrantz Group	Svedbergs
Sandvik	Heba	Anoto Group	Lammhults Design Group	Swedol
SCA	<i>Hexpol</i>	Artimplant	LinkMed	<i>Svolder</i>
Scania	HiQ International	Aspiro	Luxonen SDB	Traction
SEB	Höganäs	<i>Avega Group</i>	Malmbergs Elektriska	Uniflex
Seco Tools	IFS	Beijer Electronics	Metro International	VBG Group
Securitas	Indutrade	<i>Bergs Timber</i>	Micronic Mydata	<i>Venue Retail Group</i>
Skanska	Intrum Justitia	BioGaia	Midsona	Vitrolife
SKF	JM	BioPhausia	Midway	XANO Industri
SSAB	<i>KappAhl</i>	Biotage	Mobyson	
Svenska Handelsbanken	Klövern	Bong Ljungdahl	<i>Morphic Technologies</i>	
Swedbank	Kungsleden	BTS Group	MSC Konsult	
Swedish Match	Lindab International	Catena	MultiQ International	

Companies in italics have been excluded at least one of the studied years for different reasons, among them; Missing information from Datastream and Missing information from FI.

8.1.2 Companies Included II- Delisted Companies

Large Cap	Q-Med	Din Bostad	Oxigene Inc
Nobel Biocare	Securitas Direkt AB	HL Display	Skanditek Industriförvaltning AB
Mid Cap	Telelogic	Human Care HC AB	Svithoid Tankers AB
Broström	Small Cap	KMT Group	SwitchCore AB
Cardo	AcadeMedia	LBI International	Teligent AB
Carnegie & Co AB	Affärsstrategerna AB	Ledstiernan	Ticket Travel Group
Fazer Konfektyr	Audiodev AB	Modul 1 Data	Tricorona
Gant	Biolin Scientific	Neonet	XponCard Group AB
Gunnebo Industrier	Borås Wäfveri AB	Netonnet	Zodiak Television AB
Home Properties	Boss Media	Nexus Technology AB	
HQ AB	Carl Lamm AB	Nilörngruppen	
Munters AB	CashGuard AB	NovaCast Technologies AB	

No information about the lists the companies belonged to prior to being delisted were found. An approximation was made by the help of the market values for the companies.

8.2 Excluded Companies

8.2.1 Companies Excluded I- Currently Listed Companies

Large Cap	Comment	Net Entertainment	Data missing from Datastream
AstraZeneca	No info from FI	Small Cap	Comment
Millicom	No info from FI	Coastal Contacts	Data missing from Datastream
Stora Enso	No info from FI	EpiCept	Data missing from Datastream
Tieto Oyj	No info from FI	Etrion	Data missing from Datastream
Oriflame Cosmetics	No info from FI	MQ Holding	Insufficient Information
Mid Cap	Comment	NAXS Nordic Access Buyout Fund	Data missing from Datastream
Bygghmax Group	Data missing from Datastream	Odd Molly	Data missing from Datastream
CDON Group	Data missing from Datastream	PSI Group	Data missing from Datastream
EnQuest PLC	Data missing from Datastream	Trigon Agri	Insufficient Information

8.2.2 Companies Excluded II- Delisted Companies

Company	Comment
ACSC	Insufficient information
Invik	Insufficient information
Kaupthing Bank	Insufficient information
Lindex	Delisted in January, FY ending in Aug
Mandator	Insufficient information
Nefab AB	Delisted in 2007
Old Mutual Plc.	Insufficient information
OMX AB	No info about report for FY07
Peab Industri	Data missing from Datastream
Protect Data	Insufficient information
SalusAnsvar	Data missing from Datastream
ScanMining	Data missing from Datastream
Teleca AB	Data missing from Datastream

8.3 Number of Signals

8.3.1 Divided by Lists

Number of Signals	CEO	Board Member	Large Shareholder	Other	Total
Large Cap					
Number of Buy Signals	38	63	11	56	100
Number of Sell Signals	10	18	3	25	34
Net Zero	1	8	3	3	70
Total Number of Observations	204	204	204	204	204
Mid Cap					
Number of Buy Signals	44	90	20	80	123
Number of Sell Signals	27	37	13	44	73
Net Zero	0	2	2	5	116
Total Number of Observations	312	312	312	312	312
Small Cap					
Number of Buy Signals	74	123	22	91	196
Number of Sell Signals	19	39	16	53	86
Net Zero	7	16	0	3	250
Total Number of Observations	532	532	532	531	532

8.3.2 Divided by Years

Number of Signals	CEO	Board Member	Large Shareholder	Other	Total
2010					
Buy	25	56	16	33	130
Sell	15	21	7	36	79
Net Zero	3	6	0	3	12
Total	43	83	23	72	221
2009					
Buy	23	50	11	43	127
Sell	11	23	10	29	73
Net Zero	2	4	2	5	13
Total	36	77	23	77	213
2008					
Buy	55	80	12	76	223
Sell	13	28	11	23	75
Net Zero	2	13	2	1	18
Total	70	121	25	100	316
2007					
Buy	53	90	14	75	232
Sell	17	22	4	34	77
Net Zero	1	3	1	2	7
Total	71	115	19	111	316

8.4 Number of Transactions

Number of Transactions	CEO	Board Member	Large Shareholder	Other	Total
Large Cap					
Buy	89	280	51	167	587
Sell	19	63	31	65	178
Total	108	343	82	232	765
Mid Cap					
Buy	187	334	157	308	986
Sell	81	167	84	147	479
Total	268	501	241	455	1465
Small Cap					
Buy	186	535	246	213	1180
Sell	76	173	88	132	469
Total	262	708	334	345	1649

8.5 Average Explanatory Power

8.5.1 Mid Price

	2007	2008	2009	2010
Large Cap	38,8%	41,6%	37,0%	55,0%
Mid Cap	21,4%	28,5%	17,7%	34,9%
Small Cap	12,2%	17,0%	7,5%	21,1%

8.5.2 Close Price

	2007	2008	2009	2010
Large Cap	39,4%	45,2%	36,9%	54,8%
Mid Cap	21,4%	32,5%	17,2%	32,8%
Small Cap	12,1%	18,8%	6,8%	17,8%

8.5.3 Bid Price

	2007	2008	2009	2010
Large Cap	40,0%	42,2%	40,0%	56,3%
Mid Cap	21,2%	28,2%	17,7%	34,7%
Small Cap	12,0%	16,7%	7,6%	20,8%

8.5.4 Ask Price

	2007	2008	2009	2010
Large Cap	39,4%	43,1%	38,1%	55,5%
Mid Cap	20,2%	26,8%	16,4%	33,4%
Small Cap	10,7%	14,2%	6,6%	18,3%

8.6 Tests based on Firm Size

8.6.1 Close Prices

Large Cap

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,008	7,57E-05	0,896	0,185	1,221	0,111	0,000
1 Day After Report	0,014	8,32E-05	1,526	0,063	1,822	0,034	0,028
3 Days After Report	0,016	9,08E-05	1,660	0,048	1,819	0,034	0,016
5 Days After Report	0,017	9,84E-05	1,687	0,046	1,719	0,043	0,055
10 Days After Report	0,009	1,17E-04	0,786	0,216	1,475	0,070	0,000

Mid Cap

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,018	8,59E-05	1,895	0,029	1,820	0,035	0,020
1 Day After Report	0,020	9,45E-05	2,102	0,018	2,179	0,015	0,010
3 Days After Report	0,021	1,03E-04	2,039	0,021	2,143	0,016	0,031
5 Days After Report	0,020	1,12E-04	1,888	0,030	2,024	0,021	0,048
10 Days After Report	0,025	1,33E-04	2,161	0,015	2,262	0,012	0,001

Small Cap

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,017	7,41E-05	1,950	0,026	1,973	0,024	0,006
1 Day After Report	0,012	8,15E-05	1,378	0,084	2,027	0,021	0,000
3 Days After Report	0,011	8,89E-05	1,179	0,119	1,636	0,051	0,000
5 Days After Report	0,014	9,63E-05	1,439	0,075	1,890	0,029	0,000
10 Days After Report	0,021	1,15E-04	1,954	0,025	1,708	0,044	0,000

8.6.2 Bid Prices

Large Cap

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,007	7,74E-05	0,824	0,205	1,169	0,121	0,015
1 Day After Report	0,016	8,51E-05	1,758	0,039	2,091	0,018	0,019
3 Days After Report	0,018	9,29E-05	1,837	0,033	2,073	0,018	0,070
5 Days After Report	0,019	1,01E-04	1,899	0,029	2,060	0,019	0,021
10 Days After Report	0,012	1,20E-04	1,075	0,141	1,853	0,032	0,000

Mid Cap

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,010	1,08E-04	0,997	0,159	0,687	0,247	0,022
1 Day After Report	0,016	9,57E-05	1,673	0,047	1,771	0,039	0,044
3 Days After Report	0,016	1,04E-04	1,544	0,061	1,633	0,051	0,050
5 Days After Report	0,013	1,13E-04	1,193	0,116	1,320	0,094	0,073
10 Days After Report	0,018	1,35E-04	1,579	0,057	1,641	0,051	0,007

Small Cap

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,011	7,42E-05	1,220	0,111	0,941	0,174	0,000
1 Day After Report	0,008	8,16E-05	0,857	0,196	1,283	0,100	0,000
3 Days After Report	0,007	8,90E-05	0,720	0,236	0,924	0,178	0,000
5 Days After Report	0,012	9,64E-05	1,192	0,117	1,476	0,069	0,000
10 Days After Report	0,013	1,15E-04	1,236	0,108	0,981	0,163	0,000

8.6.3 Ask Prices

Large Cap

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,010	7,93E-05	1,166	0,122	1,506	0,067	0,000
1 Day After Report	0,016	8,72E-05	1,668	0,048	2,149	0,017	0,002
3 Days After Report	0,017	9,51E-05	1,790	0,037	2,128	0,017	0,005
5 Days After Report	0,019	1,03E-04	1,862	0,031	2,032	0,021	0,028
10 Days After Report	0,011	1,23E-04	0,982	0,163	1,764	0,039	0,000

Mid Cap

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,022	8,62E-05	2,356	0,009	2,464	0,007	0,101
1 Day After Report	0,021	9,48E-05	2,205	0,014	2,283	0,011	0,014
3 Days After Report	0,021	1,03E-04	2,056	0,020	2,063	0,019	0,065
5 Days After Report	0,018	1,12E-04	1,679	0,047	1,683	0,041	0,104
10 Days After Report	0,024	1,34E-04	2,085	0,019	2,166	0,015	0,010

Small Cap

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,015	7,53E-05	1,782	0,037	1,724	0,043	0,001
1 Day After Report	0,009	8,28E-05	0,984	0,163	1,550	0,061	0,000
3 Days After Report	0,010	9,03E-05	1,078	0,140	1,411	0,078	0,000
5 Days After Report	0,012	9,78E-05	1,183	0,118	1,560	0,059	0,000
10 Days After Report	0,018	1,17E-04	1,645	0,050	1,322	0,093	0,001

8.7 Kind of Insider

8.7.1 Close Price

CEO / Vice President

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,026	7,38E-05	3,078	0,001	2,835	0,003	0,302
1 Day After Report	0,030	8,11E-05	3,304	0,000	3,665	0,000	0,000
3 Days After Report	0,028	8,85E-05	2,963	0,002	3,313	0,001	0,001
5 Days After Report	0,029	9,59E-05	2,992	0,001	3,430	0,001	0,000
10 Days After Report	0,027	1,14E-04	2,534	0,006	2,476	0,007	0,002

Board Member

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,013	4,27E-05	1,965	0,025	2,257	0,012	0,000
1 Day After Report	0,011	4,70E-05	1,657	0,049	2,382	0,008	0,000
3 Days After Report	0,011	5,12E-05	1,556	0,060	1,927	0,027	0,000
5 Days After Report	0,013	5,55E-05	1,690	0,045	2,009	0,220	0,000
10 Days After Report	0,015	6,62E-05	1,813	0,035	1,734	0,041	0,000

Large Shareholders

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,016	1,75E-04	1,198	0,115	1,235	0,119	0,394
1 Day After Report	0,012	1,93E-04	0,836	0,202	1,022	0,154	0,254
3 Days After Report	0,005	2,10E-04	0,354	0,362	0,624	0,267	0,084
5 Days After Report	0,011	2,28E-04	0,752	0,226	0,766	0,222	0,471
10 Days After Report	0,018	2,71E-04	1,065	0,143	0,801	0,212	0,157

Others

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,017	5,11E-05	2,356	0,009	2,414	0,008	0,000
1 Day After Report	0,019	5,63E-05	2,565	0,005	3,603	0,000	0,000
3 Days After Report	0,023	6,14E-05	2,952	0,002	3,885	0,000	0,000
5 Days After Report	0,026	6,65E-05	3,189	0,001	4,128	0,000	0,000
10 Days After Report	0,028	7,93E-05	3,124	0,001	3,784	0,000	0,000

8.7.2 Bid Price

CEO / Vice President

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,019	7,22E-05	2,198	0,014	2,077	0,019	0,262
1 Day After Report	0,025	7,94E-05	2,755	0,003	2,984	0,001	0,001
3 Days After Report	0,022	8,67E-05	2,328	0,010	2,570	0,005	0,005
5 Days After Report	0,021	9,39E-05	2,216	0,013	2,651	0,004	0,000
10 Days After Report	0,020	1,12E-04	1,928	0,027	1,924	0,027	0,013

Board Member

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,007	4,40E-05	1,025	0,153	1,008	0,152	0,000
1 Day After Report	0,008	4,84E-05	1,154	0,124	1,783	0,037	0,000
3 Days After Report	0,008	5,28E-05	1,069	0,142	1,303	0,097	0,000
5 Days After Report	0,010	5,72E-05	1,291	0,098	1,593	0,056	0,000
10 Days After Report	0,008	6,82E-05	0,939	0,174	1,006	0,158	0,000

Large Shareholders

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,013	5,23E-05	1,754	0,040	1,029	0,152	0,377
1 Day After Report	0,010	5,76E-05	1,300	0,097	1,066	0,244	0,019
3 Days After Report	0,005	6,28E-05	0,636	0,263	0,774	0,219	0,008
5 Days After Report	0,005	6,80E-05	0,604	0,273	0,637	0,212	0,021
10 Days After Report	0,017	8,11E-05	1,937	0,026	1,102	0,135	0,640

Others

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,014	5,11E-05	2,016	0,022	1,742	0,041	0,000
1 Day After Report	0,019	5,62E-05	2,505	0,006	3,292	0,001	0,000
3 Days After Report	0,022	6,13E-05	2,748	0,003	3,286	0,001	0,000
5 Days After Report	0,025	6,64E-05	3,072	0,001	3,535	0,000	0,000
10 Days After Report	0,026	7,92E-05	2,967	0,002	3,127	0,001	0,000

8.7.3 Ask Price

CEO / Vice President

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,026	7,08E-05	3,048	0,001	2,916	0,002	0,707
1 Day After Report	0,029	7,79E-05	3,250	0,001	3,526	0,000	0,000
3 Days After Report	0,028	8,50E-05	3,009	0,001	3,369	0,001	0,000
5 Days After Report	0,028	9,21E-05	2,929	0,002	3,311	0,001	0,000
10 Days After Report	0,026	1,10E-04	2,488	0,006	2,505	0,006	0,004

Board Member

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,013	9,13E-05	1,376	0,084	2,214	0,014	0,000
1 Day After Report	0,010	1,00E-04	0,993	0,160	2,342	0,009	0,000
3 Days After Report	0,012	1,10E-04	1,124	0,131	2,076	0,019	0,000
5 Days After Report	0,012	1,19E-04	1,072	0,142	1,977	0,024	0,000
10 Days After Report	0,014	1,41E-04	1,155	0,124	1,693	0,045	0,000

Large Shareholders

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,018	1,90E-04	1,303	0,096	1,456	0,073	0,475
1 Day After Report	0,013	2,09E-04	0,919	0,179	1,173	0,121	0,137
3 Days After Report	0,007	2,28E-04	0,477	0,317	0,861	0,189	0,022
5 Days After Report	0,010	2,47E-04	0,622	0,267	0,916	0,180	0,120
10 Days After Report	0,020	2,95E-04	1,139	0,127	1,076	0,141	0,337

Others

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,019	5,10E-05	2,611	0,005	2,683	0,004	0,001
1 Day After Report	0,021	5,61E-05	2,812	0,002	3,746	0,000	0,000
3 Days After Report	0,023	6,12E-05	2,989	0,001	3,804	0,000	0,000
5 Days After Report	0,026	6,63E-05	3,148	0,001	3,805	0,000	0,000
10 Days After Report	0,028	7,90E-05	3,137	0,001	3,575	0,000	0,000

8.8 Market-to-Book Values

8.8.1 Close Price

Quartile 1

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,016	1,22E-04	1,480	0,069	1,733	0,042	0,034
1 Day After Report	0,003	1,34E-04	0,264	0,396	1,597	0,055	0,000
3 Days After Report	0,003	1,46E-04	0,214	0,415	1,516	0,065	0,000
5 Days After Report	0,003	1,58E-04	0,216	0,414	1,472	0,071	0,000
10 Days After Report	0,005	1,89E-04	0,362	0,359	1,231	0,109	0,000

Quartile 2

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,014	1,08E-04	1,379	0,084	1,317	0,094	0,266
1 Day After Report	0,019	1,18E-04	1,717	0,043	2,138	0,017	0,020
3 Days After Report	0,015	1,29E-04	1,343	0,090	1,798	0,036	0,021
5 Days After Report	0,012	1,40E-04	1,050	0,147	1,551	0,061	0,025
10 Days After Report	0,006	1,67E-04	0,446	0,328	1,016	0,155	0,003

Quartile 3

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,025	1,11E-04	2,394	0,008	2,712	0,004	0,000
1 Day After Report	0,033	1,22E-04	2,949	0,002	2,395	0,008	0,041
3 Days After Report	0,034	1,33E-04	2,970	0,001	2,295	0,011	0,014
5 Days After Report	0,037	1,44E-04	3,085	0,001	2,258	0,012	0,011
10 Days After Report	0,046	1,72E-04	3,526	0,000	2,659	0,004	0,001

Quartile 4

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,005	1,20E-04	0,454	0,325	0,115	0,454	0,021
1 Day After Report	0,006	1,32E-04	0,534	0,297	0,379	0,352	0,895
3 Days After Report	0,010	1,44E-04	0,815	0,207	0,559	0,283	0,302
5 Days After Report	0,015	1,56E-04	1,215	0,112	1,157	0,123	0,069
10 Days After Report	0,024	1,87E-04	1,741	0,041	1,207	0,114	0,004

8.8.2 Bid Price

Quartile 1

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,010	1,19E-04	0,875	0,191	0,826	0,204	0,001
1 Day After Report	-0,001	1,31E-04	-0,048	0,519	1,223	0,110	0,000
3 Days After Report	-0,006	1,43E-04	-0,486	0,687	0,733	0,232	0,000
5 Days After Report	-0,003	1,55E-04	-0,275	0,608	0,850	0,198	0,000
10 Days After Report	-0,006	1,85E-04	-0,476	0,683	0,756	0,225	0,000

Quartile 2

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,011	1,06E-04	1,060	0,144	1,163	0,123	0,675
1 Day After Report	0,021	1,17E-04	1,912	0,028	2,212	0,014	0,011
3 Days After Report	0,019	1,27E-04	1,679	0,047	2,065	0,019	0,021
5 Days After Report	0,015	1,38E-04	1,252	0,105	1,744	0,040	0,016
10 Days After Report	0,008	1,64E-04	0,587	0,279	0,980	0,163	0,065

Quartile 3

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,011	1,06E-04	1,060	0,144	1,163	0,123	0,675
1 Day After Report	0,021	1,17E-04	1,912	0,028	2,212	0,014	0,011
3 Days After Report	0,019	1,27E-04	1,679	0,047	2,065	0,019	0,021
5 Days After Report	0,015	1,38E-04	1,252	0,105	1,744	0,040	0,016
10 Days After Report	0,008	1,64E-04	0,587	0,279	0,980	0,163	0,065

Quartile 4

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	-0,006	1,27E-04	-0,500	0,691	0,887	0,188	0,085
1 Day After Report	0,001	1,40E-04	0,045	0,482	0,213	0,415	0,314
3 Days After Report	0,002	1,53E-04	0,145	0,443	0,192	0,424	0,119
5 Days After Report	0,009	1,65E-04	0,693	0,244	0,366	0,357	0,010
10 Days After Report	0,016	1,97E-04	1,135	0,128	0,420	0,337	0,001

8.8.3 Ask Price

Quartile 1

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,005	1,17E-04	0,433	0,333	1,093	0,138	0,010
1 Day After Report	-0,006	1,29E-04	-0,491	0,688	0,391	0,350	0,000
3 Days After Report	-0,005	1,41E-04	-0,437	0,669	0,317	0,376	0,004
5 Days After Report	-0,011	1,53E-04	-9,18E-01	0,821	0,273	0,393	0,001
10 Days After Report	-0,005	1,82E-04	-0,391	0,652	0,195	0,423	0,010

Quartile 2

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,032	1,24E-04	2,877	0,002	2,842	0,002	0,003
1 Day After Report	0,040	1,36E-04	3,391	0,000	3,353	0,000	0,455
3 Days After Report	0,036	1,49E-04	2,945	0,002	2,873	0,002	0,960
5 Days After Report	0,035	1,61E-04	2,732	0,003	2,886	0,002	0,971
10 Days After Report	0,035	1,92E-04	2,499	0,006	2,679	0,003	0,720

Quartile 3

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,020	1,18E-04	1,830	0,034	1,286	0,099	0,002
1 Day After Report	0,025	1,29E-04	2,205	0,014	2,136	0,017	0,202
3 Days After Report	0,028	1,41E-04	2,392	0,008	2,390	0,008	0,006
5 Days After Report	0,033	1,53E-04	2,639	0,004	2,529	0,006	0,136
10 Days After Report	0,046	1,82E-04	3,379	0,000	2,559	0,005	0,010

Quartile 4

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,010	1,11E-04	0,985	0,162	1,657	0,048	0,008
1 Day After Report	0,000	1,22E-04	0,021	0,492	1,000	0,158	0,000
3 Days After Report	0,002	1,33E-04	0,156	0,438	0,793	0,214	0,000
5 Days After Report	0,006	1,44E-04	0,464	0,321	1,117	0,132	0,000
10 Days After Report	-0,002	1,72E-04	-0,153	0,561	0,746	0,228	0,000

8.9 Financial Crisis / Non-Crisis

8.9.1 Close Prices

2010

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,011	1,23E-04	1,029	0,152	0,086	0,466	0,000
1 Day After Report	0,020	1,35E-04	1,693	0,045	1,213	0,113	0,000
3 Days After Report	0,019	1,47E-04	1,545	0,061	1,113	0,133	0,001
5 Days After Report	0,019	1,60E-04	1,469	0,071	1,175	0,120	0,002
10 Days After Report	0,021	1,90E-04	1,520	0,064	1,386	0,083	0,007

2009

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,008	1,91E-04	0,546	0,293	0,595	0,276	0,013
1 Day After Report	-0,005	2,10E-04	-0,353	0,638	0,012	0,495	0,042
3 Days After Report	-0,012	2,29E-04	-0,760	0,776	0,346	0,365	0,009
5 Days After Report	-0,005	2,49E-04	-0,332	0,630	0,117	0,454	0,097
10 Days After Report	-0,007	2,96E-04	-0,418	0,662	0,197	0,422	0,057

2008

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,004	1,20E-04	0,385	0,350	0,745	0,228	0,180
1 Day After Report	0,004	1,32E-04	0,313	0,377	0,989	0,161	0,009
3 Days After Report	0,002	1,44E-04	0,198	0,421	0,639	0,261	0,214
5 Days After Report	0,000	1,56E-04	0,030	0,488	0,391	0,348	0,078
10 Days After Report	0,008	1,86E-04	0,610	0,271	0,646	0,259	0,007

2007

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,031	5,90E-05	3,995	0,000	3,530	0,000	0,018
1 Day After Report	0,034	6,49E-05	4,275	0,000	3,806	0,000	0,000
3 Days After Report	0,039	7,08E-05	4,692	0,000	4,173	0,000	0,000
5 Days After Report	0,042	7,67E-05	4,811	0,000	4,247	0,000	0,000
10 Days After Report	0,043	9,15E-05	4,484	0,000	3,738	0,000	0,000

8.9.2 Bid Prices

2010

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,010	1,15E-04	0,974	0,165	0,064	0,475	0,000
1 Day After Report	0,020	1,27E-04	1,744	0,041	1,396	0,081	0,000
3 Days After Report	0,017	1,38E-04	1,433	0,076	1,062	0,144	0,000
5 Days After Report	0,016	1,50E-04	1,326	0,092	1,146	0,126	0,000
10 Days After Report	0,018	1,78E-04	1,358	0,087	1,391	0,082	0,000

2009

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	-0,011	2,14E-04	-0,732	0,768	1,035	0,151	0,005
1 Day After Report	-0,022	2,35E-04	-1,461	0,928	1,283	0,099	0,020
3 Days After Report	-0,025	2,56E-04	-1,576	0,942	1,479	0,069	0,018
5 Days After Report	-0,019	2,78E-04	-1,116	0,868	0,877	0,190	0,152
10 Days After Report	-0,033	3,31E-04	-1,829	0,966	1,317	0,094	0,000

2008

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	-0,003	1,19E-04	-0,317	0,624	0,047	0,481	0,037
1 Day After Report	-0,001	1,31E-04	-0,069	0,528	0,444	0,328	0,000
3 Days After Report	-0,001	1,43E-04	-0,101	0,540	0,242	0,404	0,002
5 Days After Report	-0,003	1,55E-04	-0,269	0,606	0,047	0,481	0,001
10 Days After Report	0,003	1,84E-04	0,223	0,412	0,070	0,472	0,001

2007

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,032	5,79E-05	4,266	0,000	3,428	0,001	0,000
1 Day After Report	0,039	6,37E-05	4,896	0,000	4,225	0,000	0,000
3 Days After Report	0,042	6,95E-05	5,019	0,000	4,164	0,000	0,000
5 Days After Report	0,046	7,53E-05	5,274	0,000	4,544	0,000	0,000
10 Days After Report	0,048	8,97E-05	5,115	0,000	3,923	0,000	0,000

8.9.3 Ask Prices

2010

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,012	1,10E-04	1,151	0,125	0,369	0,357	0,000
1 Day After Report	0,019	1,21E-04	1,700	0,045	1,266	0,102	0,003
3 Days After Report	0,018	1,32E-04	1,568	0,058	1,089	0,138	0,007
5 Days After Report	0,016	1,43E-04	1,375	0,084	1,094	0,137	0,120
10 Days After Report	0,018	1,71E-04	1,381	0,084	1,228	0,110	0,142

2009

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,015	2,07E-04	1,028	0,152	1,668	0,048	0,029
1 Day After Report	-0,002	2,28E-04	-0,157	0,562	0,277	0,391	0,091
3 Days After Report	-0,010	2,48E-04	-0,616	0,731	0,251	0,401	0,015
5 Days After Report	-0,006	2,69E-04	-0,384	0,649	0,053	0,479	0,149
10 Days After Report	-0,010	3,21E-04	-0,543	0,706	0,440	0,328	0,073

2008

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,003	1,27E-04	0,237	0,406	0,606	0,272	0,092
1 Day After Report	0,000	1,40E-04	0,029	0,488	0,987	0,162	0,010
3 Days After Report	0,002	1,53E-04	0,158	0,437	0,681	0,248	0,081
5 Days After Report	-0,001	1,66E-04	-0,055	0,522	0,363	0,358	0,034
10 Days After Report	0,006	1,98E-04	0,425	0,336	0,548	0,292	0,023

2007

CAAR	CAAR var(CAAR)		Student's t-test		Wilcoxon		Shapiro-Wilk
			t	p-value	Z	p-value	
1 Day Before Report	0,031	5,69E-05	4,154	0,000	3,399	0,001	0,007
1 Day After Report	0,033	6,26E-05	4,223	0,000	3,552	0,000	0,000
3 Days After Report	0,039	6,83E-05	4,749	0,000	3,908	0,000	0,000
5 Days After Report	0,041	7,40E-05	4,766	0,000	3,999	0,000	0,000
10 Days After Report	0,044	8,83E-05	4,726	0,000	3,651	0,000	0,000