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# Insider trading

Is the regulatory change a toothless tiger?

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## Abstract

No investor should be able to use private information for his/her own benefit. Market regulation is a crucial part of well functioning financial markets. To improve the efficiency of the Swedish stock market Finansinspektionen revised the Swedish insider trading laws in August 2005 making it illegal to make insider trades the month before semi-annual and annual reports. The purpose of this thesis is to examine whether the revision has fulfilled its purpose and reduced abnormal return for insiders. Approximately eleven thousand insider buy transactions have been investigated on the Stockholm stock exchange during three years before and after the new law was implemented. Our results show that there are positive abnormal returns before and after the regulatory change. However, these abnormal returns are lower after the law was implemented. We can conclude that the law has fulfilled its purpose to reduce the possibility for insiders to make a profit from their informational advantage.

**Keywords**: Insider trading, Insider regulation, Aktiebolagslag 2005:551, Efficient markets, Abnormal return, Cumulative abnormal return, Behavioral finance

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# 1 Introduction

*In this introductory section the background of the problem as well as the problem itself is discussed. Furthermore the objective and the research question are presented. We end this section with an outline of the remainder of the thesis.*

## 1.1 Background

During the fall and winter of 2008 an insider scandal of significant magnitude arose in Sweden. It was widely covered in the media and made us interested in the subject of insider trading. The big insider scandal is believed to be the biggest insider con in Sweden; both in terms of money and people. The suspects will be put to trial in the latter part of 2009 being accused of illegal insider transactions of 500 million SEK and earnings of 130 million SEK between 2004 and 2007 in a number of large Swedish companies (Di.se 2009-03-27). From illegal insider trading the step towards legal insider trading and its regulation was natural

Asymmetric information possessed by insiders makes the market unfair. The effects of this are that insiders get information before the rest of the market and can therefore make unfair abnormal returns. There are two sources of informational advantage for insiders; specific knowledge and market mispricing. To control the information advantage regulation is required. Insider trading is nothing new, but the regulations that control insiders are fairly new. Sweden was a pioneering country and had an insider trading law as early as 1972. After 1972 the Swedish insider trading laws have been revised several times. The most important revisions were made in 1985 (VML), 1990 insiderlagen (1990:1342) and 2001 when the insiderlagen was divided into insiderlagstiftningen (ISL) and Lagen om anmälningsskyldighet (AnmL). The latest revision was made in 2005. This revision makes it illegal for insiders to trade before interim and annual reports.

Looking abroad approximately 80% of developed countries use regulations against insider trading (Bhattacharya and Dauok 2002). Durnev and Nain (2006) state that countries with stricter insider trading laws have lower valued stock markets. Leland (1992) argues that typically insider trading has been more tolerated in less developed financial markets, and he concludes that insider trades can be both positive and negative. He states that it can improve the informational efficiency of the market.

In this thesis an investigation of a strengthened Swedish regulation is conducted. We believe that this important not only from a market perspective but also in order to build up confidence and fairness for investors.

## 1.2 Problem discussion

According to the efficient market hypothesis (EMH) stock prices will adjust instantaneously as new information arrive (Fama 1970). This implies that no one can use private information to forecast stock prices since no such information exists. This of course is an assumption that is inherently incorrect, since almost all CEOs and other management staff in companies have private information that can help them make a better estimation of the future stock price. Therefore insider trading has to be regulated for the market to function well. However, there is a tradeoff between the freedom required by investors and how strict the regulation is. Too little regulation will give insiders the opportunity to exploit profitable opportunities in an unfair manner because of their private information. On the other hand, if the regulation is too extensive investors will be discouraged which might harm the economy more than a relaxed insider trading regulation.

As shown by Seyhun (1986), Lakonishok and Lee (2001) and others, there have been possibilities for insiders to earn an abnormal return using their insider information. This abnormal return is generated because the insider has an informational advantage. This asymmetric information can never be reduced, however, the abnormal returns from insider trading can.

The regulatory institution in Sweden is Finansinspektionen (FI), and it is their duty to monitor the financial market and insider trading. The purpose for this is to make the market function as well as possible. The law regarding insider transaction that FI follows is the Swedish insider trading law *(2000:1087) om anmälningsskyldighet för vissa innehav av finansiella instrument*. Below is a summary of people who is considered as insiders and are obligated to report all their holdings and changes in these holdings to FI.

- Directors and managing directors
- The companies' auditor
- Partners
- People who might have access to information which may influence the share price
- Persons with a senior position in a subsidiary
- People that hold at least ten per cent of the share capital or votes in the company

This law was revised in 2005 (Aktiebolagslag 2005:551) in an attempt to make the market function better. The regulatory changes reduced insiders' possibility to conduct transactions one month before annual and interim reports. Since interim reports release a lot of information to the market there might be large stock price changes, which could be exploited and made profitable for those with superior information. The restriction for insiders to buy and sell the month before these reports is supposed to reduce the possibility to gain abnormal return by limiting the information advantage

that insider have. Prior to the revision the law was focusing on reducing short-term profits making it illegal to sell any holdings prior to three months after the purchase. This change focused on information sensitive periods that could be exploited by insiders to gain abnormal return instead of the short-term holding focus prior the revision. We believe that this strengthened regulation will reduce the abnormal returns for insiders. This is the base for our hypothesis that after the implementation of the new law the abnormal returns for insider are reduced. In this thesis it is investigated using event studies whether or not this revision has made the market fairer hence reduced the insiders' possibility to earn an abnormal return.

## 1.3 Research question

Has the revision of the insider regulation (2005:551) reduced, if any, abnormal return gained by insiders?

## 1.4 Objective

Our objective is to examine whether the revision of the Swedish insider trading law 2005:551 has fulfilled its purpose and reduced the abnormal return that insiders have historically gained. Conclusions how this stricter regulatory framework has affected the market efficiency should be drawn.

## 1.5 Outline

The introductory chapter covers the background, the problem discussion and the objective of our thesis. It also includes the research question. The forthcoming sections of this thesis are organized as follows: In section two we discuss the theoretical foundation for the thesis. We discuss the suitable methodology in section there. Thereafter the data is presented along with the delimitations. The last three sections cover the analysis, the conclusion and the suggestion for further research.

# 2 Theory

*In this section the theoretical frameworks that are used as foundation for the empirical work and analysis are presented. Previous studies on insider trading are also reviewed to get a better understanding of the subject.*

## 2.1 The efficient market hypothesis (EMH)

Efficient markets have been discussed as far back as the beginning of the century, but it was not until the mid 1960s that papers where written on the topic. The most famous paper on this subject is *Efficient Capital Markets* written in 1970 by Eugene Fama. It contains both the theory and the evidence of the EMH. In the paper Fama argues that stock prices are the aggregated probabilities of the future outcomes of the corresponding companies given the best possible information at hand. Further he states that for the market to be efficient, it has to fulfill three requirements:

1. Investors are rational and wealth maximizing
2. No buyer or seller can affect the price himself
3. All information is available to all investors and there are no transaction costs

These requirements are rather theoretical, and therefore Fama divides market efficiency in three categories, being weak, semi-strong and strong efficient.

### 2.1.1 Weak-form efficient

In the weak form of efficiency all historical information is included in the price. This means that it is impossible to gain an abnormal return since the prices follows a random-walk process. The rationale behind this is that if investors could use historical prices to find a trading strategy that both gives an abnormal return and is economically significant everyone would use it. Therefore the abnormal return will dissapear and tend to the normal return. Under some conditions statistically significant abnormal returns can be found even under the weak form of market efficiency.

### 2.1.2 Semi-strong efficient

The semi-strong form of market efficiency not only includes all historical information but also new information that is received by the market. This information can, by way of example, be an interim report, an extra dividend payout or a government report that will affect the value of some stocks. Event studies are often used to measure semi-strong markets. When investigating the semi-strong form using event studies one have to look both before and after the event that is investigated. The two most interesting scenarios to look at are if there are signs of adjustment to the market before the event. This implies that someone has better information than the market and can generate abnormal return. The alternative scenario is how fast the market reacts to the information that the event has. The faster the market reacts to the information and incorporates it into the price, the

more efficient the market is. Event studies are a great way to test whether the additional information that the filing to FI contains is absorbed into the market.

### 2.1.3 Strong-form efficient

In the strong form of market efficiency all information is included. The price includes all historical prices and both all the public and private information. In the strong form the market price will follow a random walk since we have no information that tells us if the price will go up or down. The implication is that if you have private information it is not worth anything since you cannot use it to gain an abnormal return. The fact that no one has the possibility to gain abnormal return has been proven wrong over and over again. Because of this we can conclude that we live in a world that is more semi-efficient than strong form of efficient.

## 2.2 Market reactions

Information affects stock prices and financial markets react to this information. However, it is the aggregated expectation on the news that will change the price. Corporate information that is not yet available to the market is considered inside information. Sometimes private information leaks out, and the price will adjust before the news is released. Further, information rumors will always exist in financial markets potentially influencing the stock price. Investors will always disagree on the value of the share. There will be those who think that it is worth more and will buy and those who think it is worth less and will sell. The market price is the point where the buying equals the selling. A company's value can be calculated using the present value of the expected cash flows over its lifetime. The price of the stock is the information available on the asset and the expectations about the future. Prices deviate from the value for three reasons according to Damodaran (2003):

1. Information available may be insufficient or incorrect
2. Investors may not do a good job of processing the information to arrive at expectations
3. Even if the information is correct there will still be investors who are willing to trade at prices that do not reflect these expectations

There are three ways of measuring market efficiency according to Damodaran (2003). These are:

1. To look at how much and for how long prices deviate from true value
2. Measure how quickly and completely prices adjust to new information
3. To measure whether some investors in markets consistently earn higher returns than others who are exposed to the same amount of risk

He further states that if market efficiency is defined as how much the price of an asset deviates from a firm's true value, and the closer the price is, the more efficient the market is. Market efficiency does not require that the market price always should be equal to the true value. Therefore prices can be greater than or less than true values as long as the deviations are random.

How quickly and how well do markets react to new information? The value of an asset should change when new information that affects value reaches the market. In an efficient market, the price of the asset will adjust instantaneously and on average correctly to the new information. Damodaran identifies three levels of efficiency: instantaneous, slow and overreacting. When investors are slow in assessing the impact of the information on value the price adjustment can be gradually over time. In slow learning markets there will for this reason be a drift in prices that are observed after the information is released. The third level Damodaran identifies is when the market adjusts instantaneously to the new information but overestimate the effect of the information on value. The price of the share will then increase/decrease by more than it should, and then trend up/down to the correct value. When investigating price reactions to news event studies is a commonly used procedure. Event studies trace out the abnormal return by insiders and can therefore identify how quick the market reactions are. This will be described in more detail in section 5.

## 2.3 Behavioral finance

The EMH is not a theory without critics, and the main criticism against the EMH comes from behavioral finance (BF). BF is a fairly new topic in finance and has a broader perspective than the EMH since it studies how psychological and social factors influence financial decisions such as insider transactions.

BF seeks to extend standard theories by introducing behavioral aspects in the investment process. It also focuses on the implementation of the psychological aspects in order to improve financial decision-making according to Shiller (2000). The reasoning by Shiller is not that EHM and other financial models are totally wrong just because there exists an abnormal return. They instead reason that financial models could be improved to better fit reality.

Situations suggested by BF where these anomalies occur are for example insider trading and IPOs. They also occur because people are not as rational as traditional financial theory states, psychological factors explains anomalies better.

Another aspect of BF is overconfidence; investors believe that they are better at predicting future values than they really are. This is shown in Törngren and Montgomery (2004). The overconfidence

leads to a situation where the insiders' signals are not as informative as they seem. This is since the insider overestimates his ability to predict.

## 2.4 Asymmetric information and signalling

In his seminal work "*The Market for Lemons: Quality Uncertainty and the Market Mechanics*" (1970) Nobel prize laureate George Akerlof showed that information asymmetries are a possible cause for adverse selection in markets. Asymmetric information is one of the main problems dealing with insider trading. This is due to the fact that insiders can use their private information and because it can cause an adverse selection problem. One can solve the problem by forcing the insiders to signal their knowledge to the market by reporting their transactions to FI. The signalling solution has its base in the Nobel prize laureate Michel Spence seminal work "*Job Market Signalling*" (Spence 1973). His main idea comes from a setup where there is asymmetric information. One part has superior information (the insider in our case) and signals his private information. The non-insider can interpret this new information and act according to it. According to Kose Banikanta (1990) insiders have better information about the company they work at. The reason for this is that they have a position that gives them information about future products, unpublished sales figures etc. They also have a better possibility to evaluate this private information and determine what impact it may have on the company in the future. This advantage gives them a possibility to make a more informed choice when purchasing and selling securities in the company they have an inside position in.

Often insiders buy stocks because they are undervalued or mispriced. However, for sell transactions there is not one single dominant reason. The insider might sell due to tax reasons offsetting another investment or it might be a liquidity issue. For example the insider has a personal need for cash and therefore sells the stock (Jeng *et al* 2003). Because there is not one single reason for insiders to sell stock, insider sell transactions contain less private information about the traded company and therefore sell transactions are less informative than buy transactions.

## 2.5 Previous research

### 2.5.1 Event studies

Event studies are not a new field of study. One of the first event studies published was James Dolly's *Characteristics and procedure of common stock split-ups* in 1933, where he studied the price effect of stock splits. Thereafter the complexity of event studies increased until the late 1960s when Ray Ball and Philip Brown wrote *An Empirical Examination of Accounting Income Numbers* in 1968 where they studied earnings announcements and laid the base of what event studies are today. They used the capital asset pricing model as the benchmark in their event studies, which provided evidence that the

market seemed to anticipate information and most of the price changes in advance. The improvements since these studies have mainly been from the statistical assumptions used and the way to choose more specific hypotheses.

### 2.5.2 Insider trading

Ausubel (1990) analyze insider trades and comes to the conclusion that confidence is a major argument for efficiency. If outsiders feel that insiders will take advantage of them at later stages, then outsiders might choose to invest less in the beginning. Effective regulation of insider trading improves the return on investment of outsiders and promotes investment by outsiders from the start.

Several studies have been conducted on the possibility for insiders to gain an abnormal return. Most of these find that an insider can earn an abnormal return; hence the market is not strong form efficient. Seyhun (1986) conducted an extensive study using 60,000 insider trades done by companies listed on the New York stock exchange between 1975 and 1981. In this study he shows that insiders can predict future stock price changes. He argues that more informed insiders, such as a chairman of the board or top management are better informed and can therefore predict the future price changes better compared to analysts and other investors. He also found that since insiders are better informed about the importance of their information, a large inside transaction has more valuable information for an outsider than a small one. He also looked at a trading strategy where outsiders followed the insiders. What he found was that the strategy can receive an abnormal return but these abnormal returns are not large enough to cover the bid/ask spread and transaction costs, hence it is not economically significant for an outsider to follow the insiders.

Seyhun extended his research in 1998 when he published the book "*Investment Intelligence from insider trading"*. In the book he included all insider trades on all listed companies in the US during the period 1975-1994. In this study he found that the abnormal return was higher when the transaction size increased. He also found a strong negative relationship between the abnormal return and market capitalization, showing that insiders with the lowest market cap receive the largest abnormal return. This return was only statistically significant between six month and three years after the transaction took place. When separating buy and sell transactions he found that a sell transaction will reduce the increase price, but it will not make it negative. Because of this, sell transactions contain less information than buy transactions and are therefore gives less informative signals.

Lakonishok and Lee (2001) looked at more than one million trades during the period 1975 to 1995 and found that insider trades differ between different capitalizations. When an insider is trading in the small-cap group it is seen as less efficient. It is a stronger indicator when an insider is trading in

the large-cap group. These results are totally in line with Seyhun (1998). The authors also state that when insiders buy, the market is bullish while when they sell the market is bearish. In the article it is also discussed when a change in the stock price after an insider transaction can be observed. From their study they find that the information from insider trades are informative for a long period and therefore undervalued close to the given transaction. In total they found a risk adjusted abnormal return of 7.8 % over twelve months.

Jeng *et al* (2003) argue that insiders are better informed about the short-term development in their firm and therefore followers can gain from this. However, this is only valid for buy transactions since none of their methods found abnormal return for sales. They also state that if their performance evaluation methods are viewed as an equilibrium asset-pricing model, the buy transactions gives evidence against the strong form of market efficiency. Contrary to Seyhun and Lakonishok they find that firm size does not affect the abnormal return in a significant way, and low value transactions have smaller abnormal return than high volume.

According to Damodaran (2003) buying on the date the insider reports to the SEC investors could have marginal excess returns around 1%. There is, however, no excess returns with insider trading information when adjusting for transaction costs. There may however be value added, if we can break down insider trading into more detail. For example, he identifies large trades made by top executives or derivative securities rather than total insider trading. Therefore he identifies focusing on large trades by top managers at smaller less followed firms to be the most likely place to use insider transactions.

According to Leland (1992) the gainers of insider trades are the insiders themselves and the owners of the firm. The major losers when insider trading is permitted are liquidity traders and outside investors, which get a lower expected return because of the information asymmetry. However since the risks are revealed directly, the variance will be lower and the demand for stocks will be higher even though they have lower expected return. The net effects of insider trading according to Leland is that investment flexibility decreases, investor risk aversion increases, liquidity trading is more volatile and future price volatility increases. Kyle (1985) also states that information asymmetries can show characteristics of an efficient market.

As seen above most researchers have found positive abnormal return for insider transactions. However, Eckbo Smith (1998) evaluates the performance of insider holdings and trades on the Oslo Stock Exchange and rejects the hypothesis of positive abnormal performance by insiders. Therefore

all researchers are not in total agreement on the topic, however there is a vast majority that identify abnormal returns for insiders.

### 2.5.3 Regulation

Henry Manne's book *Insider Trading and the Stock Market* (1966) is considered as a big event in the economic analysis of corporate law. He proposed deregulation of insider trading and stunned the corporate law academia. Manne identified two main ways where insider trading benefits the society and the firm with insider trades. The firm benefits because the stock moves to the correct price if the information would be public. He proposed a compensation for managers having produced information, since the firm benefits directly and the society indirectly. This would give managers a greater incentive to release more information. Manne's work on insider trading played a major role as a base for corporate law and securities regulation during the 1980s and 1990s.

Jeng *et al* (2003) discuss what policymakers can conclude from theoretical research. They state that the regulatory system is sufficient since an insider can make an abnormal return but it only causes a loss for outsiders of 10 cents on a $10,000 scale. Removing the abnormal return entirely would damage more then it improves.

Bainbridge (1999) on the other hand identifies three main efficiency-based arguments for regulating insider trading:

1. Insider trading harms investors and destroys investor confidence
2. Insider trading harms the issuer of the affected securities
3. Insider trading result in theft of property belonging to the corporation

Because of these arguments Bainbridge believes that insider trading should be prohibited. There are four significant potential harms connected with insider trading that are worth considering;

1. Insider trading may delay the transmission of information or the taking of corporate action
2. It may hold back corporate plans
3. It gives managers an incentive to manipulate stock prices
4. It may injure the firm's reputation

Most of the above mentioned studies are conducted on the American market where the regulation is somewhat different. The American regulation was developed after the stock market crash of 1929. Congress enforced the Securities Act of 1933 and the Securities Exchange Act of 1934. The 1934 Act prohibits profits realized in any period less than six months by insiders. In 2002, the SEC adopted new

rules of the Exchange Act and implemented the Sarbanes-Oxley Act of 2002. It accelerated the deadline for reporting insider ownership. Transactions then have to be reported before the end of the second business day. Before the Sarbanes-Oxley Act insiders had to report within five days. Since most insider research comes from the U.S.A. and is conducted before 2002 the circumstances are similar to the Swedish ones i.e. a reporting period of five days. The American model does not allow for selling within six months are somewhat harder than the Swedish model of three months. The stricter rules in U.S.A. might give lower abnormal return in the American studies compared to the Swedish study we are conducting. (www.sec.gov)

Both the American and the Swedish insider trading laws have been strengthening in order to reduce the ability for insiders to use their information advantage. It is both interesting and important to see if they fulfill their purpose and we believe that these have in the past this lays as an inspiration for our hypothesis that the new regulation has fulfilled its purpose and reduced the abnormal returns

# 3 Methodology

*In the methodology section we explain the procedure when conduction an event study and why this type of method has been used. Also the calculation of abnormal returns, the statistical calculations and tests used are presented.*

## 3.1 Event study overview

Event studies can be used to look at many issues in finance. Any news or happenings that affect a firm's market value could be considered as an event. This event might be in the form of earnings reports, stock split announcements or changes of the rules and regulations in the marketplace. Event studies consider the semi-strong form of the efficient markets hypothesis. This type of study can be seen as a test to see the speed of adjustment of prices to new information. An event study averages the cumulative performance of stocks over time where the time before the event and after has to be specified. The performance for each stock is then measured after adjustments for security price movements have been made. The US Securities and Exchange Commission uses event studies to determine if there has been insider trading before an announcement (MacKinlay 1997).

Many researchers believe that event studies are a good procedure for evaluating market efficiency on specific events. Fama (1970), being one of these researchers, states that: “The cleanest evidence on market-efficiency comes from event studies, especially event studies on daily returns”. Further Binder (1998) states: "The event study methodology has, in fact, become the standard method of measuring security price reaction to some announcement or event."

In event studies one has to make some assumptions using the models. Firstly it is assumed that markets are efficient and stocks reflect all relevant information (Fama 1970). Also it is assumed that the event is unanticipated where abnormal returns are the result of the reaction. If the event is expected, the price reaction from it has already happened.

## 3.2 Advantages and disadvantages of event studies

There are several advantages and disadvantages with event studies. Starting with the advantages; it is a methodology, which is powerful and has the ability to detect abnormal performance. Furthermore event studies are easy to interpret which makes them very useful.

Disadvantages are issues such as the basic assumptions used, and that the events have to be independent and unexpected. If the events are expected, then it is already considered in the price of the stock. Multiple announcements can be made during the estimation period, which can make the results biased. Furthermore, different event studies are difficult to compare to each other since the models can differ, the periods can differ and calculations for model parameters and CAR can differ.

## 3.3 Event Study procedure

Following the procedure of an event study according to MacKinlay (1997), it should be done in the steps described below.

1**. Definition of Event**: (Defining the event and the time period examined, the event window)

2. **Selection Criterion:** (Determine the basis for selecting the companies)

3. **Normal and Abnormal Returns:** (Define and identify)

4. **Define Estimation Procedure:** (Choice of the market model to estimate expected returns)

5. **Define the testing framework**: (Define the null hypothesis, determine the method for aggregating abnormal returns and define the statistical tests)

6. **Results: (**Hypotheses rejection or confirmation)

7. **Analysis and Conclusions**

### 3.3.1 Definition of event

The first step when conducting an event study is to clearly define the event that is examined and the time period for which the study is done. This time period is called the event window. The event window is usually chosen to be larger than the period of interest to be able to examine the period surrounding the event. Information asymmetry may cause problems when information about the event leaks out on beforehand. However, laws and regulations are supposed to minimize this, since we have the date of purchase for the insider this is not a problem for us. If an insider would leak information he would lose his own incentive to trade using his informational advantage. Since this is unlikely our event window begins at the day of purchase. Moreover, sometimes it takes time for the market to fully react to an event, defined as; semi-strong market efficiency. This makes it difficult to choose the length of the event window, and there is a tradeoff between short and long windows. If a short window is chosen not all information concerning the event might be captured. On the other hand using a long event window is more likely to capture irrelevant information. The results are therefore less sensitive to the choice of model with short window.

**Estimation window and event window**

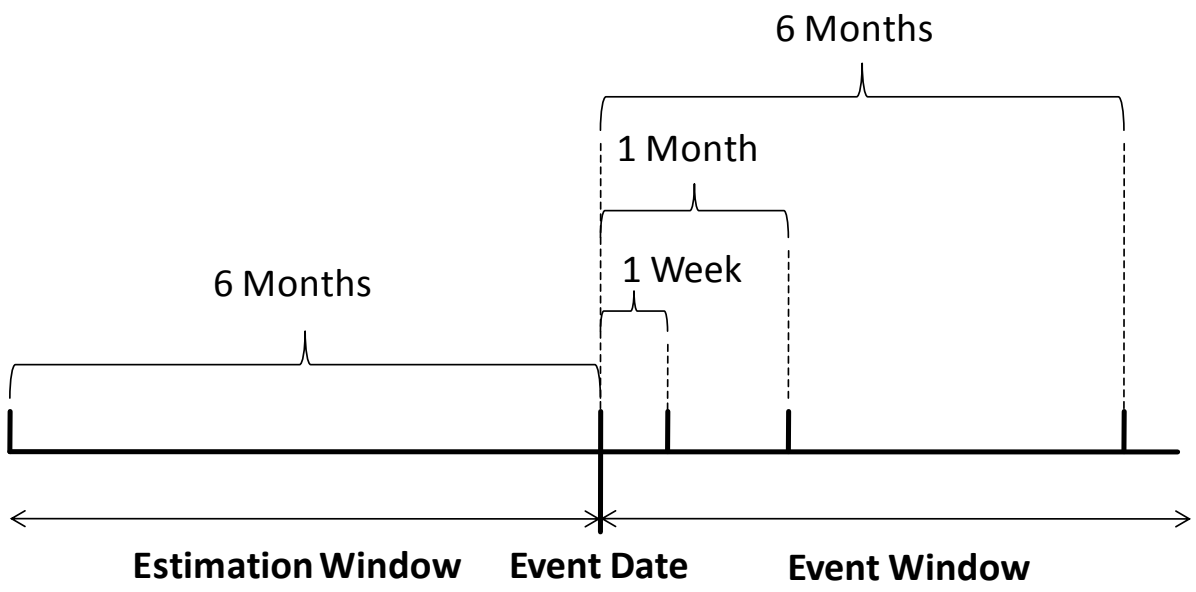


**Figure 1**

Because of the implications of choosing a proper event window we have chosen three different estimation windows in our study.

- Short window: Five trading days (One week)
- Medium window: 21 trading days (One month)
- Long window: 126 trading days (Six months)

As mentioned above a short event window is less sensitive to the choice of model, and therefore we have chosen five trading days as our shortest event window. We also choose five days as the shortest event window since insiders have five days to report to FI about his transaction. Having this as the smallest window makes sure that we at least catches some of the relevant information. We also use a medium window of 21 trading days to capture more information compare to the short window. Also this medium window does not receive as much noise as the long window. The long window of 126 trading days is included since it according to theory contains more information. The different event window is shown graphically in Figure 1

### 3.3.2 Selection criterion

The companies that we examine in our study are listed on OMX Stockholm All Share. We have chosen the companies from this index because it is a broad index that gives us a fair view of the Swedish market. This is critical since the regulatory change affects the entire Swedish market. There are also

price data available for the stocks listed in the index, which is a necessary condition for us to conduct the event study.

### 3.3.3 Expected, observed and abnormal returns

Measuring the impact of the event a measure of both the observed return and the expected returns is used. The observed return is calculated from each company's historical return, using logarithmic returns. We use logarithmic returns since these are additive, and are more compatible with the normality assumption that is required for the hypothesis testing (Strong 1992). We calculate the logarithmic returns using the formula:

$$R_{it} = ln\left(\frac{P_t}{P_{t-1}}\right)$$

(Equation 1)

$R_{it}$ = Return of security i at day t

$P_t$ = Price of the stock at day t

$P_{t-1}$ = Price of stock at day t-1

The expected returns are the returns that we would receive if the event had not taken place. There are several models used to calculate the normal returns including Capital Asset Pricing Model (CAPM), market model, index model and the constant mean model. The index model allows for general market movements but it assumes that each firm has the same average risk and return characteristics as the market as a whole. The market model and the CAPM both take market trends and firm's risk into account. Beta (β) is the risk measure and the sensitivity of this firm's return to the market return. Alpha (α) is the average return of the firm compared to the market average. Alpha and beta can however change over time because they are sensitive to the estimation period. This affects the long event windows since the Beta and Alpha measures are based on historical values. Looking far in the future can make the Alpha and Beta estimates more uncertain.

### 3.3.4 Define estimation procedure

We have chosen the market model because it is the statistical model that most often is used in event studies. The market model is superior compared to the CAPM since the CAPM has a tendency to overvalue the returns. Even though the market model is the best model there are critical issues as in all models. In the market model the beta value as a risk measure in the future has to be calculated. This is used to calculate the return from the event. However, since it is based on historical data it is only a proxy for future values.

To find the expected return we create dummy variables for each event date and run regressions for each dummy. The dependent variable is the market return and the independent variable is the stock return. Calculating the expected returns we do not include the event date because we want to measure the effects when the event has not occurred. We use an estimation period of 120 days starting the day before the event. The parameters that are calculated are the alpha and beta using Equitation 2.

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

(Equation 2)

$$E(\varepsilon_{it} = 0)\ \ Var(\varepsilon_{it}) = \sigma_{\varepsilon_i}^2$$

(Equation 3 and 4)

$E(R_{it}) =$ Return of security i at day t

$\mathrm{R_{mt}} =$ Market return at day t

$\alpha_\mathrm{i} =$ Intercept of the regression

$\beta_\mathrm{i} =$ Beta of the market

$\varepsilon_\mathrm{it} =$ Error term

To calculate the abnormal return for firm i with event date t, the abnormal return is the difference between the observed return $R_{it}$ and the expected return $E(R_{it})$

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

(Equation 5)

$\mathrm{AR_{it}} =$ Abnormal return of security i at day t

$\mathrm{R_{it}} =$ Observed return of security i at day t

$\mathrm{E(R_{it})} =$ Expected return of security i at day t

When we have found the abnormal returns we need the cumulative abnormal return (CAR). The cumulative abnormal return is the sum of the abnormal returns for stock i from time $t_{i1}$ to $t_{i2}$.

$$CAR(t_{i1}, t_{i2}) = \sum_{t=t_1}^{t_2} AR_{it}$$

(Equation 6)

The cumulative average abnormal return (CAAR) is used to find the abnormal return for all insider transaction for a given period. We have therefore calculated the CAAR values before and after the regulatory change. To calculate the CAAR we sum the CAR values and divide by the number of transactions (MacKinlay 1997).

$$CAAR = \frac{1}{N}\sum_{i=1}^{N} CAR(t_{i1}, t_{i2})$$

(Equation 7)

### 3.3.5 Define the testing framework

One has to test the empirical results in order to see if they are significant or if they are found due to coincidence. The results that we test are the cumulative abnormal returns.

Our null hypothesis is that there is no significant abnormal return for insider transactions. In the alternative hypothesis there is abnormal return. We conduct this test for the three event windows, both before and after the regulation.

$\mathrm{H}_0 = \text{No significant abnormal return for insiders}$

$\mathrm{H}_1 \neq \text{Significant abnormal return for insiders}$

To increase the reliability of our results we use both a parametric and a non-parametric test. The tests that are used to verify the empirical results are the t-test and Wilcoxon sign-rank test.

## 3.4 Tests

### 3.4.1 Normality

Normality is critical in many statistical methods and when this assumption is violated, results and interpretations might not be as reliable or valid. According to the central limit theorem, the sample mean tends to be a normal distribution regardless of the actual distribution of the sample. According to Aczel (1993) a sample of 30 or more points in the sample is large enough to accept the central limit theorem hence normality. Since we have approximately 5,000 cumulative abnormal returns we fulfill the requirement of using a two-sided t-test to test and verify the significance of our results. However, since stock returns are seldom normally distributed we also used the Shapiro-Wilks and the Shapiro-Francia normality tests to see if our data are in fact normally distributed.

### 3.4.2 T-test

To test the significance of our CAAR results we use a two-sided t-test. This test is used since our data is approximately normally distributed according to the central limit theorem. Since we use a two-sided test we test for both negative and positive values at a 5 % level. We use a two sided test even though we only look at buy transactions since we do not know what out result will give and do not

want to draw any early conclusions. Our critical values are +-1,96 so we reject our null hypothesis when the absolute t-values are larger than 1.96. We also calculate the p-values. These p-values tell us the lowest significance level for which the null hypothesis can be rejected.

$$t_t = \frac{CAAR - H_0 Value}{\left(\sigma_t^2/\sqrt{n}\right)}$$

(Equation 8)

$$\sigma_t^2 = \sqrt{\frac{\sum_{i=1}^{N}(CAAR_t - CAR_t)^2}{n-1}}$$

(Equation 9)

$\mathrm{CAAR} = \text{Cumulative average abnormal return}$

$\mathrm{CAR} = \text{Cumulative abnormal return for each transaction}$

$\mathrm{H_0Value} = \text{Zero since our null hypotheis is that there is no abnormal return}$

$\sigma_t^2 = \text{Variance}$

$\mathrm{n} = \text{Number of insider transactions}$

The t-test is a parametric test that assumes normal distribution and might therefore be less useful if the distribution is not normal.

### 3.4.3 Wilcoxon sign-rank test

When the distribution are not normally distributed a non-parametric test such as the Wilcoxon signed-rank test is a good alternative for better results, since it does not require normality. The Wilcoxon signed-rank test is a more powerful test than the t-test, however it requires that the population is symmetric. We conduct the test at the five percent level. This level of significance has a critical value of 1.645. The Wilcoxon test is as follows in Equation 10

$$Z = \frac{T^+ - [n\,(n+1)/4]}{\sqrt{n(n+1) * (2n+1)/24}}$$

(Equation 10)

$T^+$= Sum of positive ranks

$\mathrm{n} = \text{Number of insider transactions}$

# 4 Data

*In this section the source of the data, how it is treated and the reliability and validity of it is presented and described.*

## 4.1 Data on insider transactions

The insider trading dates used throughout the thesis was retrieved from Finansinspektionen (FI). As stated earlier insiders are required by law to report their transactions to FI at the latest five days after the transaction has been made. We use the transaction date as starting point and if the insider does not report his transaction the same day as he trades there will be a difference between our data point and the day when the information hits the market. This time gap has been solved by not testing any event windows shorter than five days, so when this time gap is at its maximum we will get signalling effect from one day. The fact that insiders are required by law to report insider trades and it is FIs responsibility to store and report the trades to the public we see them as good and reliable source.

The dataset we received from FI contained all types of insider transactions such as options, convertibles and warrants. We reduced this data set to only contain buy transactions on shares since according to Jeng *et al* (2003) buy transaction contain the most relevant information i.e. the strongest signals. We look at the companies listed on the OMX Stockholm All Share, so all insider trades done on companies that are listed on NGM, First North and other small lists where excluded. We also reduced some of the transactions since they occurred soon after the stock was listed and we needed historical data to be able to calculate the abnormal returns. We have discovered that some insider transactions have been reported too late. Since these are against the rules and there is a fine for this, we have taken these very few transactions out to not get biased results. Insiders are only required to report transactions that contain more than 200 shares or a value of 50,000 SEK. All insider trades that do not fulfill these requirements are not in our data. From the 263 stocks that were included in OMX Stockholm All Share we end up with 206 shares that have at least one insider transaction during this period, and fulfilled all our requirements. Totally our dataset contains around 11,000 transactions.

The figure below shows the number of insider transactions each month in our dataset as well as the six-month moving average.

We use insider transactions between 2002-06-07 and 2008-09-26. As seen in figure 2 above the

**Monthly insider buy transaction**

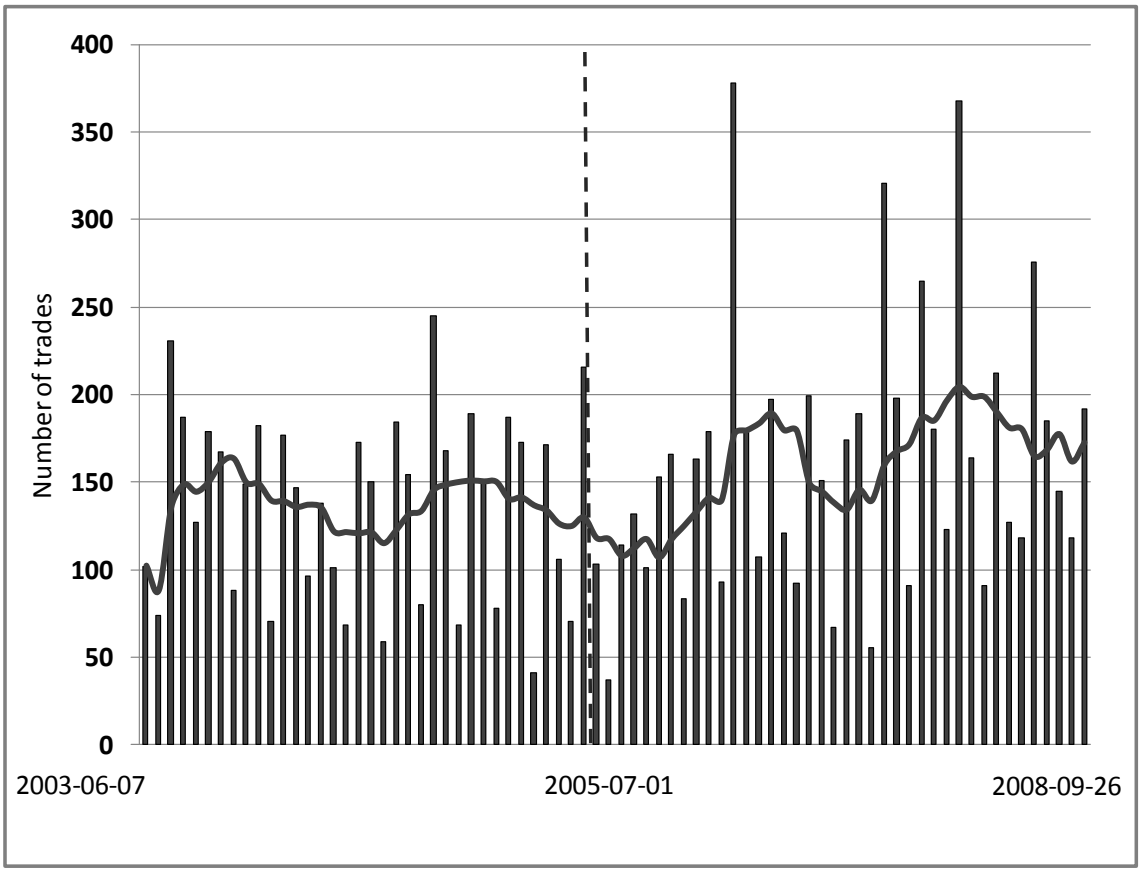


**Figure 2**

number of insider transactions before and after the regulatory change are quite evenly distributed; however there is a little more activity in the second period. The six-month moving average ranges between 100 and 200 transactions per month. Breaking up the transactions month by month we see that the number ranges from about 40 to almost 400.

We further divide the period before and after the regulatory change into three sub periods to look at the consistency of our results. These sub periods are of the same size and has the approximate length of six months.

## 4.2 Historical prices

To be able to calculate the abnormal returns we need the historical prices for the companies that have had insider transactions. The time period used is from 2002-02-01 hence; six-month prior to our first event. We have used a time period that is six months longer than the investigated period because of the length of the estimation window in the market model. The estimation window is the period used to calculate the excepted return. A more in depth discussion is conducted in section

3.3.1. The historical prices were retrieved from Thomson DataStream. We have used total return stock data adjusted for capital actions such as splits and dividends payouts. We want to catch the entire effect of the transactions and excluding dividends would not give us the opportunity to do this. Since we use the stocks that are included in an index we have the problem that some companies have defaulted or been part of a merger, and have therefore been removed from the index. The effect of this can be a survivorship bias since the defaulted companies have probably done worse than the rest. Their negative influence is not included in our results.

## 4.3 Index choice

The index chosen is the MSCI Sweden total return index. We choose this index since it is a broad index covering the entire Swedish market. We use the total return index as we have total return historical stock prices and the index used have to match the stock prices. During our sample we have seen some large fluctuation in the index. These fluctuations are visualized in the figure below. From the Figure we can see that new regulation was implemented when the market was bullish but the market turned and during the latter part of our sample the Swedish stock market has lost in value.

**MSCI Sweden index development**

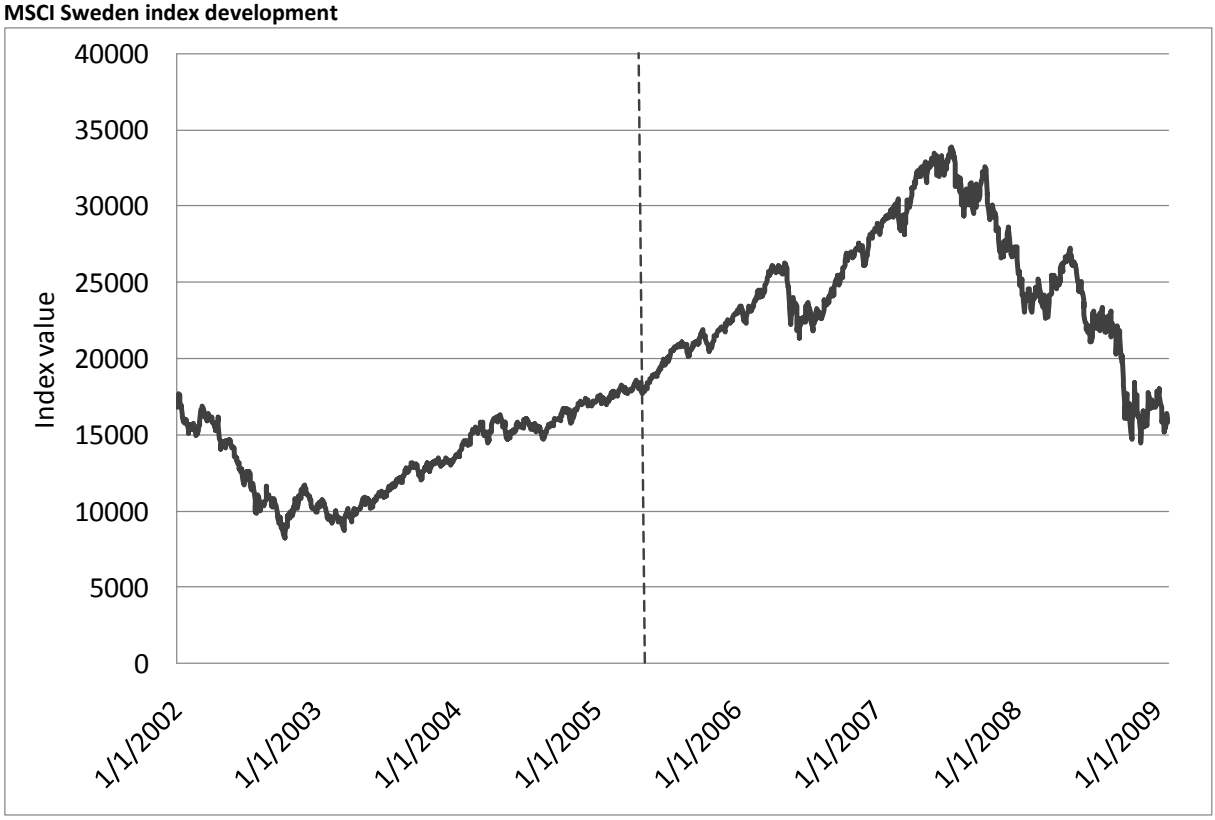


**Figure 3**

## 4.4 Transaction cost

In order to calculate the economical significance of our results we have deducted the transaction cost. To find this transaction cost we consider the cost at nine Sweden discount broker firms. We used two different investment profiles to find the cost that is most realistic for our trades. These profilers were a trader that did 100 trades of 10,000 SEK each and one that did three trades at 50,000 SEK each. Both these profiles were subject to the same cost, which is seen in table 7 in appendix 3.

Liquidity on a share is important for risks, cost and the value of the share. Liquidity can be measured by turnover, quantity of orders in the books and bid/ask spread. The spread is a significant factor since it indirectly is a transaction cost for buying and selling. Highly liquid shares have less spread and thus less transaction cost. The quantity of orders shows the number of buyers and sellers at one specific price. Many orders reduce the risk for large price moves. A small spread and many orders reduce the risk and make the share more attractive. It also makes a more correct price of the share and thus a more efficient market. However liquidity, spreads and other costs than transaction costs are not considered in this thesis it could be worth mentioning them.

## 4.5 Reliability and validity

Conducting a study it is of course important that the base data is reliable and correct. We believe that our sources and the information used in this study show a high degree of reliability and validity since we mainly use articles from highly recognized journals and authors. Our data also comes from reliable sources.

One parameter that might have affected our results is the human error of the treatment of large quantities of data in the programs used such as Excel and STATA. We have been very thorough in our treatment of data in order to not make any mistakes. But there is a possibility that wrong transactions have been eliminated. These eliminations are described in further detail in section 3.1.

# 5 Results and Analysis

*In this section we present and analyze the empirical results. A comparison before and after the regulatory change is conducted. Also economical significance and the regulatory environment are discussed.*

## 5.1 Statistical tests

According to the central limit theorem 30 observations in our sample should be enough to accept the normality assumption. We have approximately 5,000 CAR observations hence; we strongly fulfill the central limit theorem requirements. Our Shapiro-Wilks and the Shapiro-Francia normality tests that are also conducted on the CAR values and shows on the other hand that our sample is strongly non-normal. The Shapiro-Wilks and Shapiro-Francia test statistics are between 0.831 and 0.895. A value below 0.05 would indicate normality; hence we are far from that. All test statistics are presented in Table 8 in appendix 3.

These two ways of choosing testing procedure contradict each other so strong that we decided to use both the get as reliable results as possible. However, when we runt the t-test and the Wilcoxon sign-rank test they give the same results. Hence; when one of the tests rejects the null hypothesis the other one also rejects. We are therefore confident that our statistical results are reliable and valid. Both the result of the t-test and the Wilcoxon test results are presented in the tables in section 6.2 and 6.3.

## 5.2 Before the regulatory change

According to the efficient market hypothesis, no one, including insiders, should be able to earn an abnormal return due to their private information. Our results show a positive abnormal return in almost all periods and event windows. We can therefore state with certainty that the Swedish market do not qualify to be strong form efficient but are probably closer to semi-strong efficient.

Previous studies in both Sweden and abroad have shown that insiders can generate an abnormal return by using their private information (Jaffe 1974, Finnerty 1976, Lakonishok and Lee 2001 and Runfelt 1989). Our results before the revision of law 2005:551 are in agreement with the earlier studies since we have unambiguous evidence of positive abnormal returns. We can also reject our null hypothesis at a five percent level for both the t-test and Wilcoxon sign-rank test, making our results significant for all event windows in the period. P-values in our study are very low, rejecting our null hypothesis at a very low level of significance. This in turn indicates that the relationship between abnormal returns and insider trading is high.

In our study the CAAR values for this period with the short event window (five days) is 0.8 percent and increases to just above one percent for the one-month event window. For the six months event window the CAAR vales are 9.7 percent as seen in table 1. This tells us that we will have higher abnormal returns if we hold our insider-traded assets for a longer time period. This is consistent with the studies of (Seyhun 1998, Lakonishok and Lee 2001). As well as other researchers

**CAAR, T-statistic and Wilcoxon before the regulatory change**

| Event window | CAAR | T-statistic | P-value | Wilcoxon | Ho Reject |
|---|---|---|---|---|---|
| 5 Days | 0.83% | 8.250 | 0.000 | 6.421 | Yes |
| 1 Month | 1.01% | 5.370 | 0.000 | 2.954 | Yes |
| 6 Months | 9.63% | 14.980 | 0.000 | 13.587 | Yes |

**Table 1**

If we look at the CAR values for every consecutive day of the event windows, we see that for the two shorter event dates there is a big increase in the abnormal return during the period t+1 until t+7 in the figures 4 and 5. The relation between the insider information and the return can be explained by the signalling hypothesis. According to Chemmanur et al (1997) a company's actions are interpreted as signals about the future performance of the company. If investors see the insider transaction as

**One week event window before the regulatory change (CAR)**

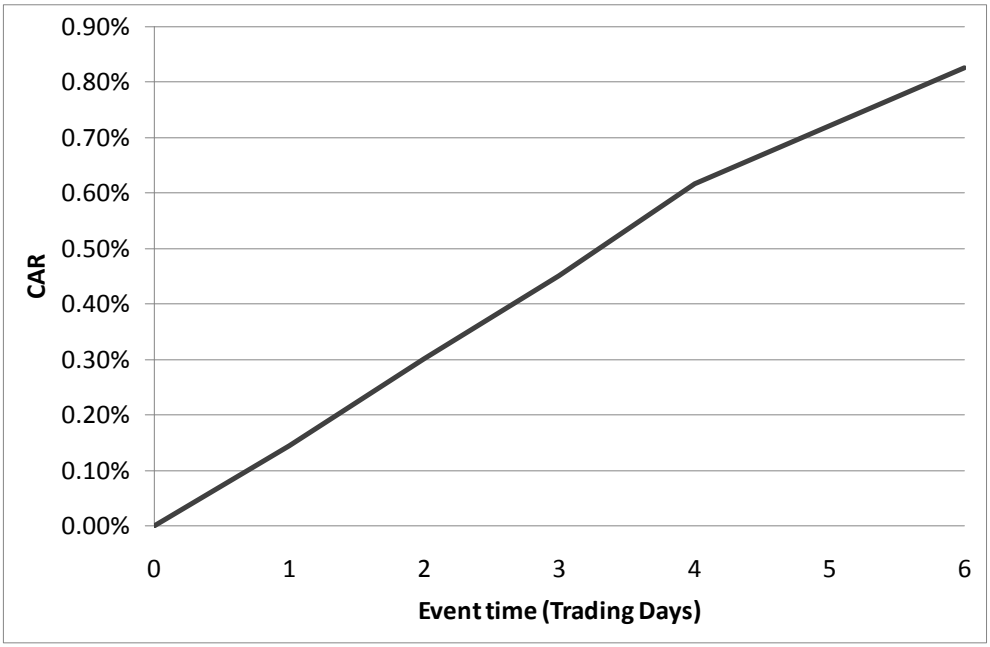


**Figure 4**

positive news they will follow and this will trigger the abnormal return.

Another explanation for this comes from behavioral finance and the fact that investors show herding behaviors when they follow other people that trade. They follow the insiders since they believe that insiders have made a good prediction of the future. Another behavioral finance explanation comes from positive feedback that says that an investor that already have a positive feel for a company will invest when they get even more positive feedback from the insider transaction.

When we look at the time period t+6 to t+10 in figure 5 we see a decline. A possible explanation for this could come from behavioral finance. Investors have a tendency to overvalue positive information and since several studies (Seyhun 1998, Lakonishok *et al* 2001) have shown that insiders earn an

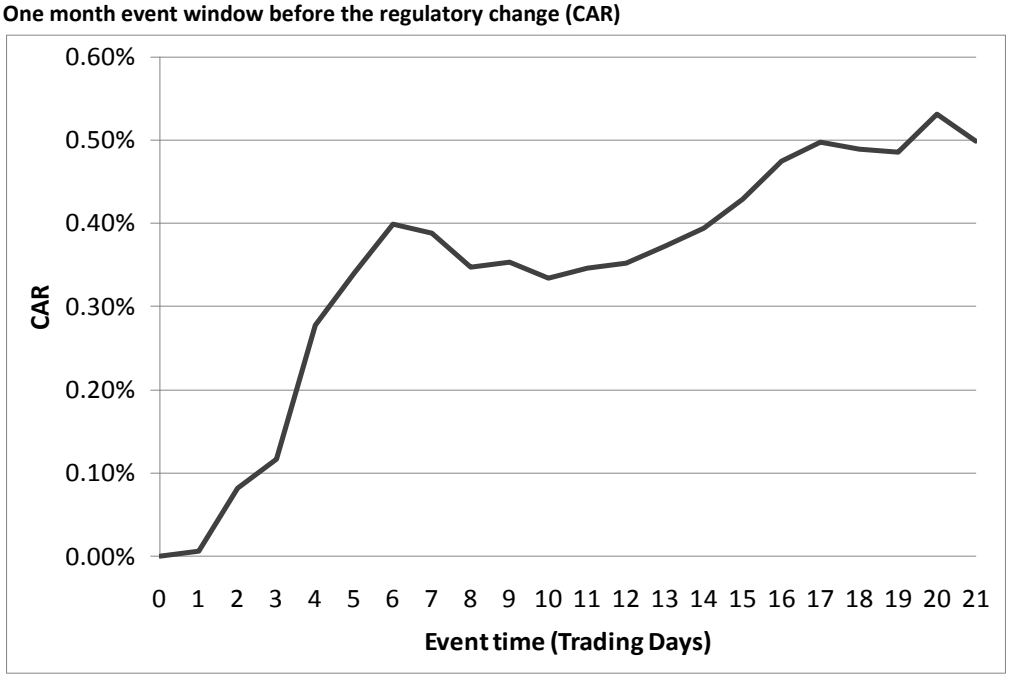


**Figure 5**

abnormal return it could inflate positivity. After the first five days some investors realize they were overly positive and liquidate their positions. An alternative explanation is that investors have a short investment horizon and want to realize the abnormal return that they have received. In the long perspective the patterns are in line with Lakonishok's and Seyhun's studies showing that the abnormal return increases in the long run and gets more significant with time as seen in Figure 6.

Many of the patterns that we discuss in the shorter periods could be explained by behavioral finance, but in the long run this is probably not the case. The dominant reason here is that insider has an information advantage and know things in advance. The insider can therefore buy stocks well in advance of this new information.

Considering the figures 4, 5 and 6 it can be seen that the Swedish market is not strong form of

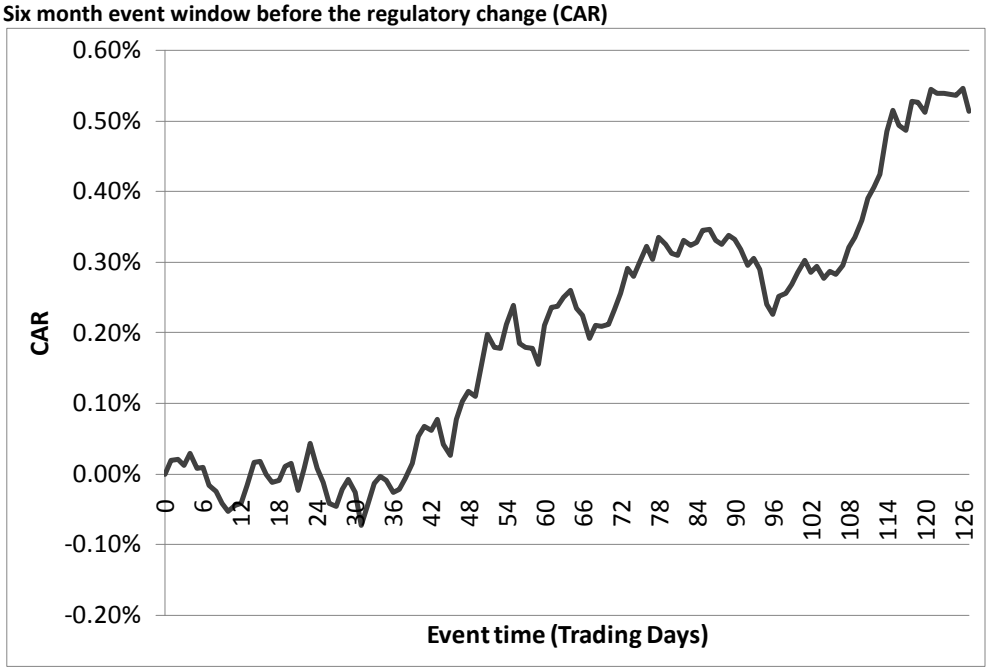


**Figure 6**

efficient, since the market reaction is drifting after the event. This could be what Damodaran (2003) describes as a slow learning market. In slow learning markets there will be a drift in prices that are observed after the information arrives, which is precisely what we see in the figures.

## 5.3 After the regulatory change

Since we are interested in the effects of the revision of law 2005:551 we have to compare to the abnormal return after the rules of the game has changed. When calculating the CAAR values after the regulatory change the evidence is not as clear-cut as before the change. We find positive abnormal returns for both the event windows one week and one-month. However, we can only reject the null hypothesis i.e. proof of abnormal return statistically at a five percent level for the five days event

**CAAR, T-statistic, P-value and Wilcoxon after the regulatory change**

| Event window | CAAR | T-statistic | P-value | Wilcoxon | Ho Reject |
|---|---|---|---|---|---|
| 5 Days | 0.50% | 6.930 | 0.000 | 6.271 | Yes |
| 1 Month | 0.21% | 1.560 | 0.119 | 0.792 | No |
| 6 Months | -1.81% | -4.270 | 0.000 | -3.395 | Yes |

**Table 2**

window. Hence, we do not find any statistically significance abnormal return for the one-month event window. On the other hand looking at the six-month event window we can reject the null hypothesis but instead of positive abnormal return we have negative return. An explanation for the negative six-month effect and to some extent the low one-month CAAR value could be because of the model. This is because the market model uses historical values to determine the normal return.

These historical values are collected from a period when the market was bullish, while the event dates occur when the market is bearish. This gives us a normal return that is positive while the event

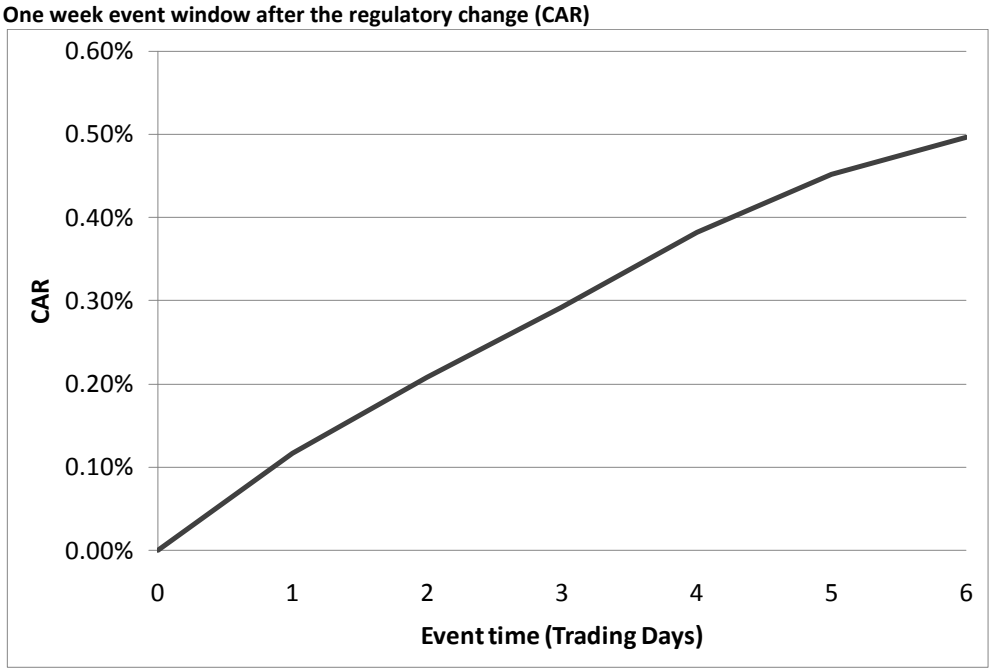


**Figure 7**

window dates have negative return. Therefore comparing these values might be unfair.

After the regulatory change we see the same pattern for the period t+2 until t+7 as before the change. The first days are those where the most abnormal return can be achieved.

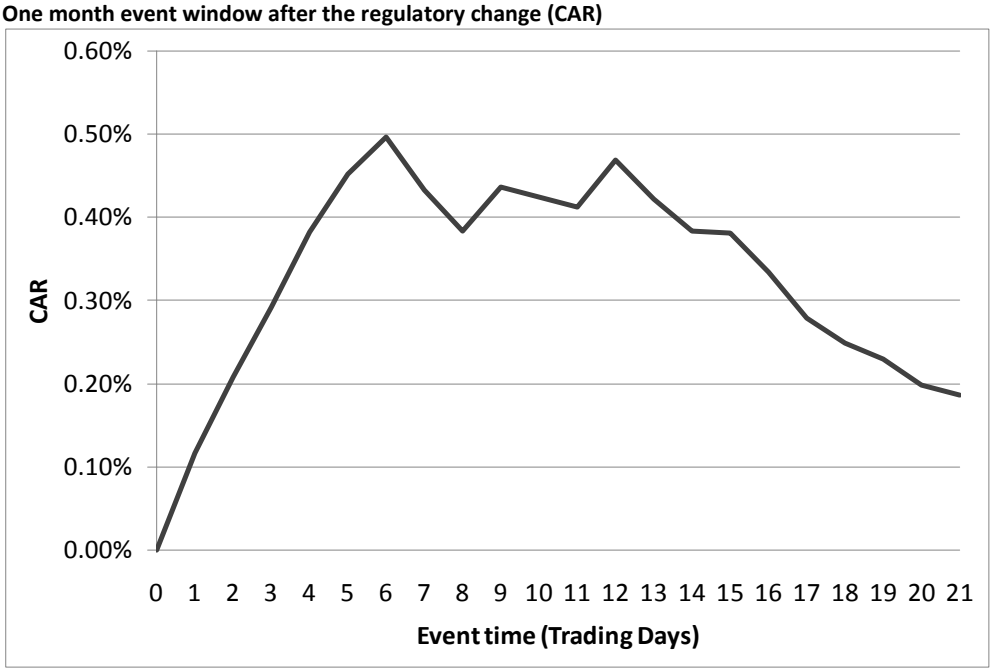


**Figure 8**

The only difference after the regulatory change is that the pattern also fits the long six-month event window (see figures 6,7 and 8).

**Six months event window after the regulatory change (CAR)**

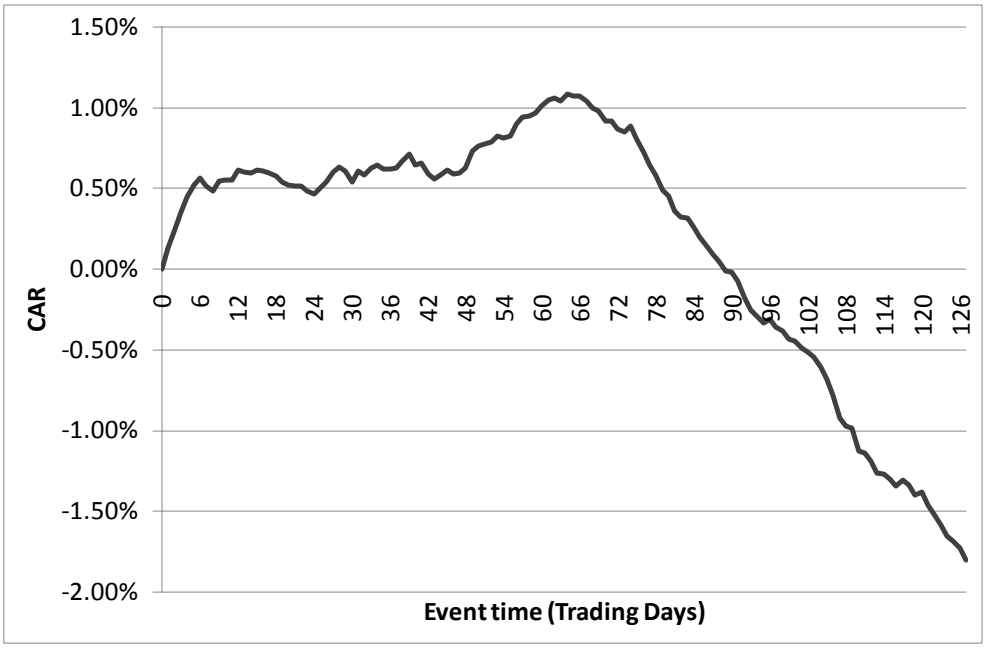


**Figure 9**

Looking at time period t+6 to t+10 the same pattern as before the regulatory change can also be observed.

In the long perspective we also see a different pattern than before the change. The CAR values decline significantly from t +65 compared to the first period when the CAR values continue to increase. This is clearly showed in Figures 6 and 9.

## 5.4 The effects of the regulatory change

We can clearly see from table 1 and 2 that the revision has fulfilled its purpose since the CAAR values in the second period is lower than the first period. Since we are comparing two different time periods, we wanted to see if there is a significant difference between the two periods. To see if there is a significant statistical difference between the CAAR values in the two periods we performed a two-sample t-test for all three event windows. In the test the hypothesis is that the periods are the same. Clearly the t-statistics tells us that we can reject the zero hypotheses. We can therefore confirm that there is a statistical difference between the CAAR values in the two periods. This supports that the new regulation has fulfilled its purpose, and reduced the abnormal returns.

**T-test before VS after the regulatory change**

| Event window | T-statistic | Std Err | Ho Reject |
|---|---|---|---|
| 5 Days | 2.6725 | 0.0012 | Yes |
| 1 Month | 3.4973 | 0.0011 | Yes |
| 6 Months | 14.862 | 0.0037 | Yes |

**Table 3**

The difference before and after the revision in the short event window is 0.33 percent, 0.81 percent in the medium event window and 11.44 percent for the long window.

## 5.5 Incremental periods before and after the regulatory change

Even though our results points to the fact that the regulatory change have fulfilled its purpose, we have divided the period before the change and the period after the change into three sub periods. This is to see how the abnormal returns have change during the two main periods.

In the first sub period the CAAR values increases very much when the event window increases. The reason for this could be that during the estimation window, the overall market was declining while during the last months of the six-month event window the total value of the market increased significantly. An example of this is the opposite of the six-month event window situation we had in period two. Sub periods two and three are significant and show positive CAAR values. In sub period four the CAAR values are lower than in sub period three. This supports the conclusion that the regulatory change has decreased the abnormal return for insiders. Sub period five and six also have CAAR values that are lower than in sub period one two and three. If we look at sub period five and six we can see the same pattern for the six-month event window namely a negative but significant abnormal return, since this is consistent with the period two results. We believe that the reason for this anomaly is the same. As discussed above we receive deviant CAAR values for the long event windows, since the model uses historical values to estimate the normal return. This is clearly shown in Figure 10 where we see that the positive CAAR values in sub period one declines rapidly in the beginning since the normal return is too low. In figure 11 we see the same pattern, but here we get negative CAAR values since the normal return is too high. In period three when the event window and estimation window have a better fit, we see that the values start turning more positive once again. The sub period five and six are periods that are affected by the sub-prime crises. During these periods the markets are doing generally poorly; and when markets are doing bad insiders tend do receive a lower abnormal return. This is something that Lakonishok and Lee (2001) also found. Investors have a tendency to invest in things they know more about. By way of an example, several studies have shown that private investors do not diversify sufficiently and only invest in their home country.

Since insiders are very familiar with their own company and have superior information about the

**CAR values for sub period 1-3**

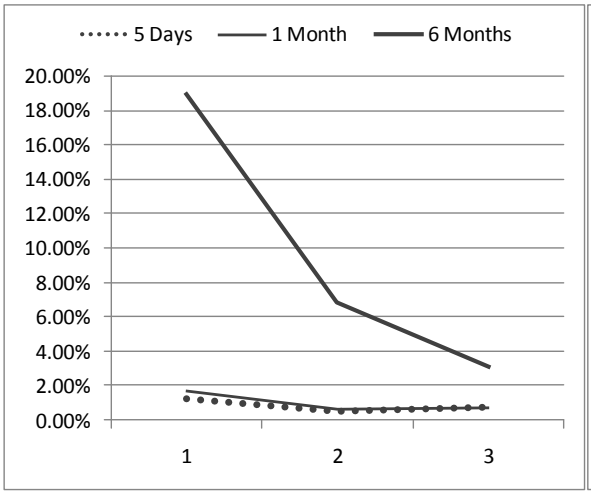


**Figure 11**

**CAR values for sub period 4-6**

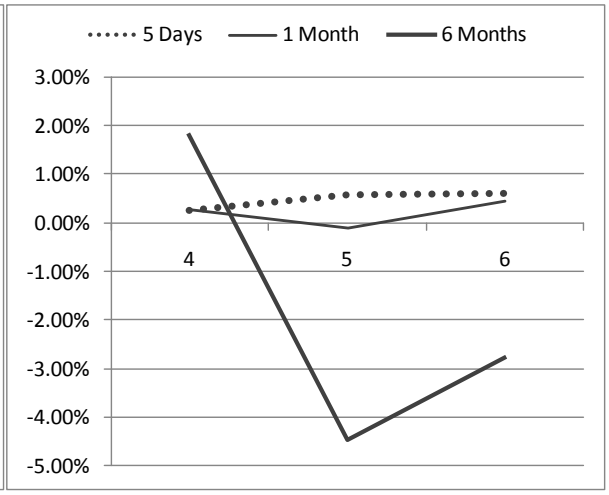


**Figure 10**

company. They might have fallen in love with their own company, and is not accepting that the company is not doing as well as they believe.

## 5.6 The regulatory environment

Regulation of insider transactions is somewhat special in the sense that it does not focus on contractual agreements between insiders and the shareholders. However, most regulations focus on improving confidence or trust in the market. Who should have the most to say about the regulation of the markets? The lawyers who want justice want everyone to have access to the information at the same time. Economists base their arguments more on efficient working markets. There is a thin line between too heavy regulation that might damage the market and the willingness of investors to invest. Investing might be reduced if insiders are able to generate abnormal returns. If regulation would rise, there could be a shift of gains. It could shift from insiders who no longer can make abnormal gains to professionals who react fast and rationally to new news.

As regulation has increased information on insider trades has become more accessible and then also less useful. Lately there has been a rise in derivative instruments such as option programs. These have introduced a substantial amount of noise in the reporting system since a large proportion of insider trades now are associated with managers exercising options and then selling a portion of their stock holding for liquidity and diversification reasons.

## 5.7 Economical significance

We have found that the abnormal returns are significant from a statistical point of view. This is of course important. For an investor this has no significance if the abnormal returns are eaten up by the

transaction costs when buying and selling the stocks. When deducting the transaction costs, we do it twice since the insider first have to buy the stocks and pay the fee, and then sell the stock and pay the fee once again in order to realize the potential profit. This way of thinking is in line with Seyhun (1998) that found statistically significant abnormal returns, but not economically significant abnormal returns.

In table 7 we can see that the transaction cost is only 0.24% for a round trip trade. This reduces the abnormal returns, but in period one the results are still economically significant for all event windows. In period two the one-month event window is not economically significant after adjusting for transaction costs.

**CAAR less the transaction cost before the regulatory change**

| Event window | CAAR | Transaction cost | CAAR -cost |
|---|---|---|---|
| 5 Days | 0.826% | 0.24% | 0.586% |
| 1 Month | 1.012% | 0.24% | 0.772% |
| 6 Months | 9.635% | 0.24% | 9.395% |

**Table 4**

**CAAR less the transaction cost after the regulatory change**

| Event window | CAAR | Transaction cost | CAAR -cost |
|---|---|---|---|
| 5 Days | 0.497% | 0.24% | 0.257% |
| 1 Month | 0.206% | 0.24% | -0.034% |
| 6 Months | -1.807% | 0.24% | -2.047% |

**Table 5**

These results are only adjusted for transaction costs, (which is the largest cost when trading) and not bid/ask spreads, taxes and alike. Therefore the costs associated with the trades are probably a somewhat higher than we show, and we would like the reader to have this in mind.

The implication of economical significance for our regulatory issues is that if the abnormal returns that an insider receives are eaten up by costs. They cannot use their information advantage for personal gain and the regulation is then sufficient and well working. This is shown empirically in table 4 and 5 where the returns after transaction cost is positive before the revision of law 2005:551 and around zero or negative after the revision.

# 6 Conclusion

*In this section we present our conclusions of this study. We discuss the answer to the research question along with the contribution of our work.*

The purpose of this paper is to investigate if the revision of the insider law 2005:551 has reduced the possibility for insiders to gain an abnormal return. We find that insiders gain an abnormal return both before and after the regulatory change however after the change the abnormal returns are lower; hence the law has fulfilled its purpose.

We find that insiders gain an abnormal return of approximately one percent for the two short event windows and almost ten percent for the long event window before the regulatory change. After the regulatory change the abnormal returns are approximately a half percent for the two short windows and negative for the long window. Also after dividing the two periods into sub period we can see that there are lower cumulative average abnormal return values in the sub-periods after the law was implemented. This strengthens our results further.

Taking transaction cost into consideration, returns are close to zero or negative after the regulatory change. This further supports that the revision of the law has reduced and almost eliminated abnormal returns for insiders. Our results before the regulatory change are in line with several papers that have found positive abnormal returns for insiders in both Sweden and abroad. These returns are one of the factors that show that the market is not strong-form efficient. However, our results in the period after the revision do not show the same level of return. Therefore the Swedish market is moving towards including inside information in the stock prices.

Investigating when the abnormal returns arise shows that most of the return is achieved during the first two weeks. After those two weeks the abnormal return tends to be reduced. These results could be explained by a behavioral finance aspect such as positive feedback. It could also be explained by that the market is working semi-efficiently in the sense that it reacts slowly to news instead of a direct price jump after the news. Investors might look at the recent activity for insider trading, and invest themselves when there have been insiders buying. The long run results on the other hand are better explained by the real information advantage that insiders have.

There is a thin line between to heavy regulation that might damage the market and the willingness of investors to invest might go down if insiders are able to generate abnormal returns. We believe that the law has increased the confidence for the market. This along with our results can conclude that the law has fulfilled its purpose to reduce the possibility for insiders make a profit from their informational advantage. Since these regulatory changes have had impact the regulatory change not a toothless tiger but an effective hunter of unfair market conditions.

# 7 Further Research

*In this final part of the thesis we present in our view some interesting topics for further research within the field.*

It would be interesting to further investigate clustering on insider trading and if there is more abnormal return when many insiders buy at the same time.

One could also break down insider trades into different categories and investigate if for example large trades made by top executives or derivative securities abnormal return rather than total insider trading.

Another interesting topic could be to look at cross-cultural studies with a focus on stock markets operating in countries where insider trading is either legal or more loosely treated.

Furthermore the impacts of sell transactions before a default of a company could be another interesting topic to consider.

At last it would be interesting to see the effect of insider trading on investor confidence if it is just big scandals that harm their confidence or if their abnormal returns are affected by investor confidence.

# 8 References

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http://www.sec.gov/answers/insider.htm

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## Data

ThomsonReuters Datastream

Finansinspektionen's insider trading database

**Laws**

1985 (VML), 1990

Insiderlagen (1990:1342)

Insiderlagstiftningen (ISL)

Lagen om anmälningsskyldighet (AnmL)

Lag (2000:1087) om anmälningsskyldighet för vissa innehav av finansiella instrument

Aktiebolagslag (2005:551)

# 9 Appendix

## Appendix 1

**CAAR, T-statistic, P-value for sub periods**

Sub period 1

| Event wind | CAAR | T-statistic | P-value | Ho Reject |
|---|---|---|---|---|
| 5 Days | 1.22% | 5.540 | 0.000 | Yes |
| 1 Month | 1.68% | 4.370 | 0.000 | Yes |
| 6 Months | 18.93% | 15.500 | 0.000 | Yes |

Sub period 2

| Event wind | CAAR | T-statistic | P-value | Ho Reject |
|---|---|---|---|---|
| 5 Days | 0.51% | 2.960 | 0.003 | Yes |
| 1 Month | 0.63% | 1.830 | 0.068 | Yes |
| 6 Months | 6.83% | 5.840 | 0.000 | Yes |

Sub period 3

| Event wind | CAAR | T-statistic | P-value | Ho Reject |
|---|---|---|---|---|
| 5 Days | 0.75% | 6.430 | 0.000 | Yes |
| 1 Month | 0.72% | 3.170 | 0.002 | Yes |
| 6 Months | 3.14% | 3.580 | 0.000 | Yes |

Sub period 4

| Event wind | CAAR | T-statistic | P-value | Ho Reject |
|---|---|---|---|---|
| 5 Days | 0.26% | 2.440 | 0.015 | Yes |
| 1 Month | 0.27% | 1.500 | 0.135 | No |
| 6 Months | 1.81% | 2.920 | 0.004 | Yes |

Sub period 5

| Event wind | CAAR | T-statistic | P-value | Ho Reject |
|---|---|---|---|---|
| 5 Days | 0.61% | 4.750 | 0.000 | Yes |
| 1 Month | -0.10% | -0.420 | 0.675 | No |
| 6 Months | -4.46% | -6.160 | 0.000 | Yes |

Sub period 6

| Event wind | CAAR | T-statistic | P-value | Ho Reject |
|---|---|---|---|---|
| 5 Days | 0.63% | 4.570 | 0.000 | Yes |
| 1 Month | 0.45% | 1.720 | 0.085 | No |
| 6 Months | -2.78% | -3.350 | 0.001 | Yes |

**Table 6**

## Appendix 2

**Transaction cost**

| Company | Active Investor | Savings Investor |
|---|---|---|
| Avanza Bank | 0.13% | 0.15% |
| Aktiedirekt | 0.15% | 0.15% |
| Aktiespar | 0.15% | 0.15% |
| Aktieinvest | 0.10% | 0.10% |
| Nordnet | 0.15% | 0.15% |
| SEB | 0.09% | 0.09% |
| Danskebank | 0.10% | 0.10% |
| E-trade | 0.09% | 0.09% |
| Swedbank | 0.09% | 0.09% |
| Average | 0.12% | 0.12% |

**Table 7**

## Appendix 3

**Shapiro-Wilks and Shapiro-Francia normality tests**

| Variable | Obs | W | V | Z | Prob>z |
|---|---|---|---|---|---|
| CAR | 4926 | 0.832 | 450.08 | 16.023 | 0.000 |
| Shapiro-Francia Before the regulatory change one week | | | | | |
| **Variable** | **Obs** | **W** | **V** | **Z** | **Prob>z** |
| CAR | 4926 | 0.831 | 197.798 | 4.234 | 0.000 |
| Shapiro-Wilks Before the regulatory change one month | | | | | |
| **Variable** | **Obs** | **W** | **V** | **Z** | **Prob>z** |
| CAR | 4853 | 0.851 | 393.2 | 15.661 | 0.000 |
| Shapiro-Francia Before the regulatory change one month | | | | | |
| **Variable** | **Obs** | **W** | **V** | **Z** | **Prob>z** |
| CAR | 4853 | 0.85 | 175.2 | 4.282 | 0.000 |
| Shapiro-Wilks Before the regulatory change 6 months | | | | | |
| **Variable** | **Obs** | **W** | **V** | **Z** | **Prob>z** |
| CAR | 4242 | 0.886 | 265.6 | 15.571 | 0.000 |
| Shapiro-Francia Before the regulatory change 6 months | | | | | |
| **Variable** | **Obs** | **W** | **V** | **Z** | **Prob>z** |
| CAR | 4242 | 0.885 | 136.4 | 4.865 | 0.001 |
| Shapiro-Wilks After the regulatory change one week | | | | | |
| **Variable** | **Obs** | **W** | **V** | **Z** | **Prob>z** |
| CAR | 5686 | 0.920 | 242.5 | 14.465 | 0.000 |
| Shapiro-Francia After the regulatory change one week | | | | | |
| **Variable** | **Obs** | **W** | **V** | **Z** | **Prob>z** |
| CAR | 5686 | 0.919 | 91.4 | 3.446 | 0.000 |
| Shapiro-Wilks After the regulatory change one month | | | | | |
| **Variable** | **Obs** | **W** | **V** | **Z** | **Prob>z** |
| CAR | 5686 | 0.949 | 155.5 | 13.294 | 0.000 |
| Shapiro-Francia After the regulatory change one month | | | | | |
| **Variable** | **Obs** | **W** | **V** | **Z** | **Prob>z** |
| CAR | 5686 | 0.948 | 58.848 | 3.361 | 0.000 |
| Shapiro-Wilks After the regulatory change 6 months | | | | | |
| **Variable** | **Obs** | **W** | **V** | **Z** | **Prob>z** |
| CAR | 5413 | 0.985 | 43.99 | 9.95 | 0.000 |
| Shapiro-Francia After the regulatory change 6 months | | | | | |
| **Variable** | **Obs** | **W** | **V** | **Z** | **Prob>z** |
| CAR | 5413 | 0.985 | 17.65 | 3.149 | 0.001 |

**Table 8**

## Appendix 4

| Companies in the study | | | |
|---|---|---|---|
| ABB | ELECTROLUX_B | LATOUR_INVESTMENT_B | PROFILGRUPPEN_B |
| ACADEMEDIA_B | ELEKTA_B | LBI_INTERNATIONAL | QMED |
| ACANDO_B | ELEKTRONIKGRUPPEN_BK_B | LEDSTIERNAN_B | RNB |
| ACAP_B | ELOS_B | ATRIUM_LJUNGBERG_B | RATOS_A |
| ACOM | ENEA | LUNDIN_MINING_SDB | RATOS_B |
| ACTIVE_BIOTECH | FASTIGHETS_BALDER_B | LUNDBERGFORETAGEN_B | RAYSEARCH |
| ADDTECH_B | ENIRO | LUNDIN_PETROLEUM | READSOFT_B |
| AFFARSSTRATEGERNA_B | ERICSSON_B | MALMBERGS_ELEKTRISKA | REJLERKONCERNEN_B |
| ALFA_LAVAL | FABEGE | MEDA_A | ROTTNEROS |
| ADDNODE_B | FAGERHULT | MEKONOMEN | RORVIK_TIMBER |
| ARTIMPLANT | FEELGOOD_SVENSKA | MICRONIC_LASER_SYS | SAAB_B |
| ASPIRO | FINGERPRINT_CARDS_B | MIDWAY_HOLDINGS_A | SANDVIK |
| ASSA_ABLOY_B | FENIX_OUTDOOR | MIDWAY_HOLDINGS_B | SAS |
| ATLAS_COPCO_A | FAST_PARTNER | MODUL_1_DATA | SCA_B |
| ATLAS_COPCO_B | GETINGE | MSC_KONSULT_B | SCANIA_A |
| AUDIODEV_B | GEVEKO_B | MTG_B | SCANIA_B |
| AVANZA | GUNNEBO | MULTIQ | SEB_A |
| AXFOOD | HENNES_och_MAURITZ_B | MUNTERS | SECO_TOOLS_B |
| AXIS | HQ | NCC_A | SECTRA_B |
| BEIJER_ALMA_B | HALDEX | NCC_B | SEMCON |
| BEIJER_ELECTRONICS | SVENSKA_HANDBKN_A | NORDEA_BANK | SENSYS_TRAFFIC |
| BERGS_TIMBER_B | SVENSKA_HANDBKN_B | NEONET | SIGMA_B |
| BochB_TOOLS_B | HAVSFRUN_INVESTMENT_B | NET_INSIGHT_B | SINTERCAST |
| BETSSON_B | HEBA_B | NETONNET | SKANSKA_B |
| BILIA_A | HEXAGON_B | NEW_WAVE_GROUP_B | SKF_A |
| BILLERUD | HIQ_INTERNATIONAL | TECHNOLOGY_NEXUS | SKF_B |
| BIOINVENT | HL_DISPLAY_B | NIBE_INDUSTRIER_B | SKISTAR_B |
| BIOGAIA_B | HOGANAS_B | NILORNGRUPPEN_B | SOFTRONIC_B |
| BIOLIN | HOLMEN_B | NOBIA | SSAB_A |
| BIOPHAUSIA_A | HOME_PROPERTIES | INTOI | SSAB_B |
| BIOTAGE | HUFVUDSTADEN_A | NOLATO_B | SWECO_A |
| BOLIDEN | IBS_B | NORDNET | SWECO_B |
| BONG_LJUNGDAHL | INTELLECTA_B | NOTE | SWEDBANK_A |
| BORAS_WAFVERI_B | INDL_&_FINL_SYS_A | NOVACAST_TECHS_B | SWEDISH_MATCH |
| BRINOVA_FASTIGHETER | INDL_&_FINL_SYS_B | NOVESTRA | STUDSVIK |
| BRIO_B | INDUSTRIVARDEN_A | NOVOTEK_B | SVOLDER_A |
| BTS_GROUP | INDUSTRIVARDEN_C | OEM_INTERNATIONAL_B | SVOLDER_B |
| BURE_EQUITY | INTRUM_JUSTITIA | OPCON_B | TELE2_B |
| CASTELLUM | INVESTOR_B | ORC_SOFTWARE | TELIASONERA |
| CLAS_OHLSON_B | JEEVES_INFO_SYSTEMS | ORESUND_INVESTMENT | TICKET_TRAVEL |
| CONSILIUM_B | JM | ORTIVUS_B | TRACTION_B |
| CTT_SYSTEMS | KABE_HUSVAGNAR_B | PROACT_IT_GROUP | TRELLEBORG_B |
| CYBERCOM_GROUP_EUROPE | KARO_BIO | PA_RESOURCES_B | TRICORONA_B |
| DAGON | KINNEVIK_A | PARTNERTECH | UNIFLEX_B |
| DIAMYD_MEDICAL_B | KINNEVIK_B | PEAB_B | WALLENSTAM_B |
| DIN_BOSTAD_SVERIGE | KUNGSLEDEN | PHONERA | VBG_GROUP |
| SECURITAS_B | KLOVERN | POOLIA_B | WEST_SIBERIAN_RES_SDB |
| DORO | KNOW_IT | PRECISE_BIOMETRICS | WIHLBORGS_FASTIGHETER |
| DUROC_B | LAGERCRANTZ_B | PREVAS_B | VOLVO_A |
| DIGITAL_VISION | LAMMHULTS | PRICER_B | VOLVO_B |
| ELANDERS_B | LATOUR_INVESTMENT_A | PROBI | XANO_INDUSTRI_B |

**Table 9 Companies in the study**