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Can outsiders follow insiders to beat the market?

An Event Study on the Stockholm Stock Exchange

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Summary

Previous studies have indicated that information asymmetries exist on the financial markets. People with access to non-public information could use that information to their advantage when they trade financial instruments. The Swedish Financial Supervisory Authority (FI) is a public authority that works for stability and efficiency on the financial market. In their work for achieving an efficient market is FI trying to minimize the information asymmetries on the market by keeping a record of all trades being done by what the Swedish law classifies as insiders. The record is public information and a way to inform the market about insider transactions, which creates the question: *Can the public information on insider trades kept by FI help an investor to make better investments?* Yes, it can!

In order to examine the question have we performed event studies on different trading strategies that have been based on information from previous studies in the field. The event studies have focused on insider purchases in Small Cap and Mid Cap companies on the Stockholm Stock Exchange during 2007-2009. We choose to focus on insider purchases because of its higher relevance for other investors than insider sales. Insiders have several reasons to sell shares in their company, for example portfolio diversification and liquidity needs, but they have one main reason to buy shares, to earn money on their investment.

We created and tested three different trading strategies based on the insider purchases executed during 2007-2009. The first trading strategy was based on periods of intensive trading, the second strategy was based on large volume transactions and the third strategy was based on short periods of intensive trading where small purchases were excluded. The first two strategies were applied on Small Cap and Mid Cap separately, while the third strategy was applied on the Small Cap only. We have been using a well-established and highly referenced way to perform our event studies. To be able to test the average development statistically have the returns been aggregated through time and through securities. The trading strategies have been tested over 5, 10, 30 and 90 day periods.

The results that we have found indicate that outsiders have a possibility to earn abnormal returns in small companies by using the information provided by FI. The strongest positive result that we attained by our tests was an 1.367% cumulative average abnormal return (CAAR) for a 5 day period with the intensive trading strategy on Small Cap companies. It was surprising that all the tests executed showed negative abnormal return over 30 and 90 days, with some of them being negative statistically significant. The results imply that the trading strategies would not be successful for a time-period over 30 and 90 days. The large volume transaction strategy and the third strategy for Small Cap companies did not result in any statistically significant results but showed positive development for 5 day event periods.

We conclude through our study that reported insider trading is valuable for outsiders investing in small companies over short time-periods. The results that we found indicate that smaller companies are less efficiently priced than larger companies.

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Definitions

- **Insider**
  - An insider is a person that either through ownership or position in a company has access to non-public information. We have used the Swedish law on insider trading to define an insider, the law on insider trading is discussed in section 2.4.

- **Quasi Insider**
  - Investor that through their position as intermediaries or their close relationship with a firm can attain information before it reaches the public.

- **Outsider**
  - An outsider is a person that has no access to non-public information.

- **Swedish Financial Supervisory Authority (FI)**
  - Is a government agency which is by law given the task to regulate and oversee the capital market in order to create and maintain the trust and the efficiency of the market.

- **CAPM**
  - Capital Asset Pricing Model states that the return on a security is the risk free rate plus the risk premium. Meaning that an investor is compensated for their investment by time value and the risk they are taking.

- **Days**
  - When discussing time-periods in this paper is one day equivalent to a day when the capital markets are open for trades.

- **OMX Stockholm Small Cap (Small Cap)**
  - The group of companies based on market value which the *OMX Stockholm Small Cap GI* index is based on. Companies with a market value below 150 million euro are listed on the small cap list.

- **OMX Stockholm Mid Cap (Mid Cap)**
  - The group of companies based on market value which the *OMX Stockholm Mid Cap GI* index is based on. Companies with a market value between 150 and 1000 million euros are listed on the mid cap list.

1   Introduction

In the introductory chapter will we define the terms "insider" and "insider-trading" and give background in-formation about some important aspects about the Swedish regulations around insider trading. In the prob-lem section will we discuss the relevant problem and opportunities within the topic and the purpose section will be used to explain why and how we have done this research.

It is a common view that prices of securities should "fully reflect" all available information since Fama (1970) introduced the Efficient Market Hypothesis (EMH). According to the EMH would only new information change the view of the company and therefore the pric-es of the securities. The problem with the EMH is if some investors can get new infor-mation before the rest of the market, which would cause information asymmetries. Infor-mation asymmetries are discussed in the theoretical framework chapter of this paper.

Many researchers have studied the phenomena of information asymmetries in finance, meaning investigating if some investors have more information to base their trades on than other investors, and how they can use such information. There have been numerous stud-ies that have shown that some investors possess extra information, people that posses' non-public information could for example be board members, large shareholders, key em-ployees, top management and families to all people in those positions. Individuals with special insight of a company are called insiders and previous studies shows that they can use their extra information to gain a higher average return than other investors (Loire & Niederhoffer, 1968, Jaffe, 1974, Seyhun, 1998 and Acosta & Olofsson, 2006).

The indication that insiders possess extra information have created a big interest about in-sider trading from money managers which has lead to the creation of systems and newslet-ters with the purpose of providing the market with information about insider trades (Lakonishok & Lee, 2001).

The reason for the attention is summarized by this quote from an Individual Investor

"Company executives and directors know their business more intimately than any Wall Street an-alyst ever would. They know when a new product is flying out the door, when inventories are piling up, whether profit margins are expanding or whether production costs are rising... You always hear about the smart money. Generally, that is the smart money." (Individual Investor, Feb. 1998, p, 54 cited in Lakonishok & Lee, 2001).

Is all the interest about insider activities necessary? The information presented in this sec-tion implies that insiders possess extra information and that it could be favorable for other investors to use the information from insiders in their own trading, could it? This paper is investigating the possibilities to earn abnormal returns for outsiders by following invest-ment strategies based on insider trades.

The tests performed in this study conclude that insider purchases contain information that can help outsiders to earn statistically significant abnormal returns over short time-periods.

One trading strategy showed average abnormal return of 1.367% over 5 days. The results are non-positive over longer time-periods of 30 and 90 days.

1.1   Insider Trading

An insider is an individual that for different reasons have special insight in a company and have access to non-public information. We have been using the Swedish law which is regulating insider trading and its definition of an insider to define people as insiders in this paper. It is important to state that being an insider is not a crime, it is the way an insider uses the information that determines if the person is committing a crime or not.

In Sweden, insider trading is regulated by a law which is upheld by the Swedish Financial Supervisory Authority (FI). Companies that are listed on the Swedish Stock Exchange have to provide a list of people that have access to inside information of the company to the FI. People that are listed as insiders are by law obliged to provide FI with information about their trades and holdings of financial instruments for the company that they are listed as insider in. The list of insiders and the information about their trades and holdings is public information and available for everyone. The purpose of having these regulations is to prevent people with access to inside information in a company to trade on non-public information. The regulations are also a system to maintain an efficient capital market without information asymmetries.

The laws and regulations for insiders will be presented in more depth in section 2.4.

1.2   Problem Discussion

Previous research (Lorie & Niderhoffer, 1968, Jaffe, 1974, Seyhun, 1998 and Acosta & Olofsson, 2006) has found that insider has the possibility to earn abnormal returns because of information asymmetries between investors, which are contradictory to the EMH. The EMH is one of the most well-established and tested hypothesis in finance and it will be discussed more extensively in the theoretical framework section of this paper.

One of the tasks that FI has is to publish insider trades that have been executed on the capital market. The purpose of the publishing is to minimize information asymmetries and create a transparent market. This creates an opportunity to examine the possibility for an outsider to use the information from insider activities to earn abnormal returns. Can this opportunity be exploited to earn abnormal returns on the stock market?

Sjögren (2008) found signs that outsiders could benefit from imitating insiders in small firms, but the study failed to show results that was statistically significant. We will examine the opportunities by using a longer time-period and therefore have the possibility to use more data to create a more extensive test in our attempt to create a successful trading strategy based on insider trades.

There are three good reasons to study insider trading: profit, science and policy (Jeng, Metrick and Zeckhauser, 2003). The reason to study the profits from insider trading is to

create a trading strategy to earn abnormal returns by following the trades of insiders. Science investigates the implication the results of the study have on market efficiency. The policy studies is investigating the trading regulations, how effective they are and how the possible advantages insider has effect market performance and the fairness of the market.

1.3   Purpose

The purpose of this thesis is to investigate the possibilities to create a successful trading strategy based on the published insider purchases on the Stockholm Stock Exchange.

Event studies are performed on different trading strategies in order to fulfill our purpose. The event studies are examining the possibilities to earn abnormal return for outsiders by following the insider purchases published by FI. The tests are focused on insider purchases since there are several reasons for insider sales, such as portfolio diversification and/or liquidity needs (Lakonishok & Lee, 2001). Previous studies support that view when they conclude that insider purchases contains more information for outsiders than insider sales (Lakonishok & Lee, 2001 and Jeng et al. 2003). We have used an intensive trading criteria to filter out some of the insider transaction since previous studies (Jaffe, 1974, Seyhun, 1985 and Jeng et al. 2003) concluded that such a criteria was the best filter rule to disregard noise in the observations. Since there are recent studies (Lakonishok & Lee, 2001, Jeng et al. 2003) that concludes that high-volume transactions are containing more information about future stock price movement have we also conducted a test based on large volume purchases.

The companies were further divided into lists based on the OMX-listing on market value, and tests were done separately on the small cap and the mid cap lists to evaluate if and which of our trading strategies that would be the most successful. Companies listed on large cap were excluded from this research since a similar research on a big part of that group has already been done (Lindgren & Ohlsson, 2008), and because previous studies stress the fact that insiders transactions earn higher returns in smaller companies (Elliot, Morse & Richardson, 1984, Seyhun, 1985, Lakonishok & Lee, 2001 and Jeng et al. 2003).

Section 2 in this paper will present theories connected to the topic regarding prices of securities and introduce the Swedish law on insider trading. Section 3 will go on and present previous studies in the field of return and information from insider trading both internationally and in Sweden. Section 4 will explain the methods used in our research and provide information on how the tests were performed. Section 5 will present the results of the tests and the analysis of those results. Section 6 will conclude the findings from this research.

2   Theoretical Framework

The theoretical framework section will present important theories connected to efficient markets and information asymmetries which is relevant for our study. The section will also discuss insider trading in greater depth, and the rules and regulations regarding insider trading.

2.1   Efficient Market Hypothesis

Fama (1970) introduced the Efficient Market Hypothesis (EMH), according to the EMH is the capital markets primary role to allocate the capital of the market. The EMH is one of the most dominant and discussed theories in finance, it defines a market as efficient when the prices of the securities fully reflect all available information. Since the theory is hard to apply in reality did Fama (1970) introduce the following conditions as sufficient for a market to be considered efficient:

1. There are no transaction costs for trading securities
2. All information is free to access for all market participants
3. All market participants agrees on the implication of current information on current price and distribution of future prices.

The definition has through time changed to take transaction costs in to account and a more fair definition would be that prices should reflect information until the marginal costs of obtaining information and trading no longer exceed the marginal benefit (Elton, Gruber, Brown & Goetzmann, 2011). The stated conditions are sufficient for an efficient market, but not requirements. Meaning that it is enough that a sufficient number of investors agree on implication of information in price, and a sufficient numbers of investors have free access to the information for the market to be considered efficient (Fama, 1970).

Fama (1970) introduced three different forms of the EMH since the hypothesis that an efficient market would "fully reflect" all available information in security prices was very strong. The three different forms of EMH were first introduced 1970 but have been adapted through time when new evidence has been presented. The three form of EMH are:

➔ Weak form, the weak form states that all historical information is reflected in the prices of securities. Tests on the weak-form are generally done by using trends and historical values to try to predict future movement in stock prices.

➔ Semi-strong form, the semi-strong form states that all publicly available information is reflected in the prices of securities. Tests on the semi-strong form are often done by using event studies to examine how efficiently new information is incorporated in prices.

➔ Strong form, states that all information, public and private will be reflected in the prices of securities. Tests on strong form are generally done be examining if insiders and/or mutual fund managers has the possibility to earn abnormal returns,

which would indicate that they possess information that is not incorporated in stock prices.

According to Fama (1970 & 1991) have tests on the different forms shown a strong support for the EMH in the weak and semi-strong form while inside information is not reflected in prices, meaning that insiders can use that information to earn abnormal returns – contradictory to the strong-form of the EMH.

2.2 Random Walk Theory

The random walk theory shares some of the main points with the EMH. The random walk theory is based upon that future development cannot be predicted by past actions (Malkiel, 1999). The random walk theory assumes that securities are fairly priced, meaning that the prices are reflecting the available information. If a price is too high or too low, it would be forced up or down by investors using the mispricing to earn money until the price is fair (Fama, 1970). An assumption of fair prices would mean that the only price changes occur when new information reaches the investors, and since new information is unpredictable will also the movement of prices be unpredictable. Because of the random movement, the only way for investors to earn higher return is to expose themselves to a higher risk.

2.3 Complementary theories – Behavioral Finance

The research within financial theories has developed substantially since the EMH was first presented and seemed like the main and dominating theory within finance. When the research has evolved have new theories been presented and one of the most vital and studied topics the last 15 years has been the behavioral finance theory, which is contradictory to the EMH in many levels and therefore offers explanations to facts that the EMH cannot explain (Shleifer, 2000 and Shiller, 2003)

Behavioral finance is addressing problems from a social perspective, using psychology and sociology to explain financial markets and economy (Olsen, 1998 & Shiller, 2003). While the EMH assumes that investors acts rational, behavioral finance researchers (Kahneman & Tversky, 1979, Olsen, 1998, Shleifer, 2000, Shefrin, 2003 & Shiller, 2003) tend to think the opposite. For example do investors tend to be more risk-averse about possible gains, and more risk-seeking about possible losses, and not all investors manage to solve complicated optimization problems (Shiller, 2003), therefore are investors in many cases trading on noise instead of information (Shleifer, 2000). In many cases investors deviate from the passive buy and hold strategy that the EMH assumes uninformed traders are using. Kahneman and Riepe (1998) conclude that investors will deviate from assumed decision models for a numbers of reasons, for example: they follow the advice from financial gurus, they fail to diversify, they actively trade stocks, and they follow stock price patterns and other popular methods (cited in Shleifer, 2000).

The EMH is acknowledging that irrational investors exists, but argue that their effect on the market is limited because they trade randomly, and that the informed investors will take

opposite action keeping securities at their fundamental value (Shleifer, 2000 and Shiller, 2003). The argumentation for behavioral finance completely denies the argument that irrational traders are cancelling each other out. Behavioral Finance instead argues that these deviations from rationality tend to go in the same way (Kahneman & Tversky, 1986). Uninformed investors buy and sell actions are highly correlated and many of them would buy and sell the same securities at the same time, a problem that becomes even stronger when the investors are listening to rumors and following the trades of experts and analysists (Shiller 1984 in Shleifer, 2000). Shleifer (2000) also presents some examples of when professional money managers not behave fully rational. They may base their investment decision to minimize the risk of a worse result than the benchmark, and by basing trades on what competitors do they are creating a herd behavior.

Shleifer (2000) also present some theories arguing that the arbitrage theory is not working as efficient as it would have to do to fully compensate for the actions from uninformed investors and bring the prices back to fundamental values (efficient market). Arbitragers who sell, or short sell overpriced securities must be able to buy a similar security that can be used as a substitute which is not overpriced to create a fully arbitrage opportunity. There exist close substitutes for many securities, for example futures and options, but stocks and bonds arbitrageurs as a whole has a limited ability to bring prices back to fundamental values because of the lack of obvious substitutes. Shleifer (2000) also points out that fundamental risk remains with imperfect substitutes since surprises can occur on both sides of the trade. Even if arbitrageurs has the possibility to create a perfect hedge they still have to be prepared to accept the costs of the mispricing getting worse before it disappears, making a perfect arbitrage more risky and less desirable.

The behavioral finance is not trying to disregard EMH totally, but it provides a useful reflection that markets do not always work well and reflect the available information. Therefore should the interaction and psychology of investors be taken into account when analyzing financial markets.

2.3.1 Signaling theory

A part of the market's psychology is based on how the market reacts to signals from the companies. Such signals can for example be the choice of dividend policy and the selection of capital structure. The effects from signaling are based on the perception that the people taking the decisions (company managers) have more information than the rest of the market, and that they are signaling their attitude and beliefs through the decision they take (Levy & Lazarovich, 1995).

From the signaling theory is it possible to argue that the transactions made by insiders are signals on how insiders perceive the future of the company and that their action give the rest of the market a signal they can take in to account or ignore.

2.3.2 The Market for Lemons

One important discussion to have in mind is the discussion about information asymmetries among investors trading with financial papers, Akerlof (1970) introduced the discussion about information asymmetries on the market and was later awarded the Nobel Prize for his contributions to the field (nobelprize.org, 2012).

Akerlof (1970) used the market for used automobiles to make an example of the discussion on the problems with information asymmetries on a market. On the market for used automobiles will the seller that has used the product (the car) know more about the quality of the product than the buyer. The information asymmetry between the seller and the buyer will make the seller accept the buyers valuation (offer) if the product is of lower quality (value) than the offer and reject the buyer's offer if the product is of high quality (value) compared to the buyer's offer.

Information asymmetries presented above can be directly connected to what we are discussing in this thesis, information asymmetries on the financial markets would mean that insiders possess more information about the company (the product) and therefore have a higher possibility to make good valuation.

Information asymmetries undermine the trust of the market (Akerlof, 1970). A market with high uncertainties, lack of trust and information asymmetries will make business suffer, therefore are the regulations and rules of the market governed by FI important to be able to keep a stable and safe market.

2.3.3 Alchemy of Finance

The fund manager George Soros is presenting the importance of reflectivity for investment theories and strategies in his book "The Alchemy of Finance". Soros (1994) does not believe that the stock prices are reflecting fundamental values, or that the prices is moving towards its fundamental value. Soros (1994) instead assumes that

- ■ Markets are always biases in one direction or another
- ■ Markets can influence the event they are anticipating

Soros (1994) means that the combination of the two assumptions can explain why the market can seems to be correct when anticipating events.

Soros (1994) also discussed the underlying trend which influences the movement of the stocks, whether it is recognized or not by investors. When stock prices reinforce the underlying trend it is called self-reinforcing and the when the opposite happens, it is called self-correcting. When a trend is reinforced it starts to accelerate and the deviation between expectations and the actual stock prices movement gets wider and the opposite happens when it is self-correcting.

Soros (1994) means that the market is not able to reach equilibrium and that it is not even moving towards equilibrium. Depending on trends and the bias of investors' will the reaction of events going to be different depending on such factors. Soros (1994) theories mean that an outsider that tries to shadow insiders also has to consider the underlying trends in the market and in the industry, as well as the bias among investors in the company.

2.4 Insider Regulations

The provision (2000:1087) "Lag om anmälningsskyldighet för vissa innehav av finansiella instrument" of the Swedish law is regulating which kind of activities that has to be reported to FI, and which people that is obligated to report.

The law defines what kind of people/companies that are considered to be insiders and are obliged to report their financial standings in a company.

1. Board representative or alternate member in a company or the mother company
2. CEO or vice CEO in the company or the mother company
3. Auditor or alternate auditor in the company or the mother company
4. Owner of a trading company
5. A person with a role in the company that gives access to insider information that may have an effect on the stock price
6. A person with a role in an affiliated company that gives access to insider information that may have an effect on the stock price
7. An investor that owns at least 10% of the shareholder equity or voting rights
8. Relatives to the owner such as wife, husband or children which owns at least 10% of the shareholder equity or voting rights.

An investor defined as an insider by the law has to report their financial standings in the company when:

- When the company becomes publicly listed
- When the investor gets classified as an insider
- Changes their financial standing in a company
- When they are informed that a relative changes their financial standing

Insiders have to leave reports regarding changes in their possession of financial instruments within 5 bank days. People described in point 1 to 3 above are by the law forbidden to trade 30 days before an financial report is released including the day of the release. The law also states that FI has to keep a record of insider transaction and as soon as possible make the information public to the market.

2.4.1 Discussion points in the Swedish regulation

The insider regulations in Sweden have been a topic of discussion over a long period of time. One of the most discussed problems with the Swedish insider regulations is how the law is handling usage of foreign intermediaries and accounts to hide trades from the FI. There exist several possibilities for legal insiders to avoid supervision from the FI, for example by usage of endowment policy (Larsson, 2006).

The opportunity the endowment policy creates for insiders is a problem which FI is aware of and trying to control (Spängs, 2012 and Tidningarnas Telegrambyrå, 2012).

2.5 Quasi insiders

As stated before is one of the main objectives for the FI to uphold the trust and the efficiency of the Swedish capital market. The regulation of insider trading is one way to deal with one factor that creates an inefficient market, information asymmetries. When financial actors can trade on non-public information they have a comparative advantage to other investors. The comparative advantage is something that the regulations of insider trading try to prevent in order to have a market where every actor on the market has access to the same information.

The current financial regulation presented in the previous section only regulates the actions from some actors that may have access to inside information. Quasi insiders are not classified as insiders by the law, it can for example be analysts, banks and other actors on the market that can gain non-public information through their close relationship with a certain firm. Lerner (1995) defines two specific quasi insiders, banks and venture capitalists. Banks and venture capitalists have access to detailed knowledge about firms they invest in through their role as financial intermediaries.

Hirschey, Slovin and Zaima (1990) studied the banks role as quasi insiders. They argued that banks could be quasi insiders, they could receive private information through their relationship with different firms. Banks can be classified as quasi insiders and if an outsider knows what to search for could inside information be conveyed by the positions a bank takes in a firm. A loan from a bank with a good reputation is a signal to the market that the bank classified the company as stable and trustable. Hirschey et al. (1990) found evidence that if a firm has a large amount of bank debt when an unexpected managerial decision such as selloff is taken will the market react positively. That is because in such a situation the bank will take a considerable position in the firm to support their own evaluation of the firm.

Wong, Cheung and Wu (2000) concluded that quasi insiders on the Hong Kong stock market could earn abnormal return in small firm with relatively high insider trading volume. In their research they defined a quasi insider as an investor that had the means to gain information about insider trading at the transaction date, before the information became public.

The positions and amount of quasi insiders on the market is interesting because it changes the structure of the market and adds another step of information asymmetries. Quasi insiders are hard to sort out and classify and will not be a part of our tests, but they play an interesting role in the financial markets.

3 Previous Studies

The previous studies section will present different studies that have focused on insider trading. Most studies have focused on the US market but we have included studies from other markets as well. However is the research regarding the Swedish market much less comprehensive. The results from previous studies are diverse, and the studies are covering different time-periods and have different approaches on how to divide the trades done by insiders. We will present studies in the field in chronological order.

3.1 International Studies

In his research, Jaffe (1974) presented studies from Rogoff (1964) and Glass (1966) which showed that intensive insider trading in a company was a good prediction for the stocks development the following 6-7 months, similar results were found by Lorie and Niederhoffer (1968). Wu (1962) presented a study which concluded that there is no relationship between insider trading and future development in stock price (cited in Jaffe, 1974).

Because of the different results and problems with the previous studies (outdated, too small sample) Jaffe (1974) made his own test using more recent data and more powerful tools. The research showed that insider had information that could make them perform better than the average investor on the market. Periods with intensive insider trading generally resulted in abnormal returns after transaction costs. Further did the research show that outsiders could use the information from intensive insider trading periods to make an average of 2-3% higher return than the market after transaction costs.

Penman (1982) showed that insiders used their information to take profitable positions before earning announcements. Elliot et al. (1984) concluded that there was a bigger possibility for insiders in smaller firms to earn abnormal returns because the information was not accurately reflected in the stock price to the same extent as in larger firms.

Seyhuns (1985) extensive research with over 60 000 insider transactions supported previous research from Lorie and Niederhoffer (1968) and Jaffe (1974) which showed that insiders was good at timing the market, and that the most profitable insider trading occurred in small firms. The result from the study further supported the conclusion Jaffe made 1974 regarding that increase in abnormal profits was correlated to an increase in net number of insider purchases/sales, and that there was no clear relationship between size of insider transaction and value from the transaction. The research however showed that size of insider transaction could be a signal of future abnormal changes in stock price if the transaction size was measured in relative terms to the size of the company and the average size of the trades done by that insider. The test further showed that insiders who are expected to have more knowledge about the company were more successful in predicting future stock changes, the test showed that the board of directors was more successful than other insiders on many occasions.

Seyhun (1985) also examined the possibilities for other investors to follow the trades done by insiders to earn abnormal returns, the results were negative when transaction costs and the time-lag for making the information public were taken into account. Seyhun further tried to create a selective trading strategy based on his finding regarding the identity of insider, the volume of trades, the frequency of trades and the size of the company. The result from the selective trading strategy did not show any abnormal returns after transaction costs.

Rozeff and Zaman (1988) did further tests on the possibilities for outsiders to earn abnormal returns by using information about insider trades. They used an intensive trading criteria to reduce potential noise from trades because of portfolio rearrangement and diversification. They concluded that corporate insiders abnormal return was on average 3%-3.5% after transaction costs, which was statistically significant. For outsiders using the information from insider trades was abnormal profits non-existing or negative for 1, 3 and 6 months holding period using 2% round-trip transaction cost, but over a 12-month period an excess return of 3.7% per year was presented for outsiders following insider trades.

Chowdhury, Howe and Lin (1993) concluded that insiders use a contrarian strategy, meaning that they tend to go against the actions taken from other investors. Even if insiders have the ability to find profitable investments they are to a high degree caused by macroeconomic factors, meaning that the mispricing they find is in many cases not a mispricing of the specific security but rather the whole market, a similar observation was also presented by Seyhun (1985). The limited ability of insiders to find specific mispricing in their own companies mean that outsiders cannot use insider transactions to make a profitable prediction about the future.

Seyhun (1998) did a new test with new data and a longer time-period and concluded that aggregate insider purchases are follow by higher than average return for the coming 12 months, and insider sales are followed by lower return than average for the coming 12 months.

Eckbo and Smith (1998) used three different performance measures for insiders on the Oslo Stock Exchange and concluded that insiders did not earn abnormal returns.

Lakonishok and Lee (2001) made a comprehensive research using all insider stock trades for all companies on the NYSE, AMEX and NASDAQ during 1975 to 1995. The conclusions were in many ways similar to the results from previous research, for example that aggregate insider trading predicts future movement in stock prices. They explained that small companies are less efficiently priced than larger companies and therefore were insiders in smaller companies better at predicting future price movements than insiders in larger companies. The research also explained why purchases are more informative than sales. There could be several reasons for selling a stock, for example portfolio diversification or liquidity problems, but there is probably just one main reason to purchase stocks, and that is to earn money. Further did the research conclude that manager's trades were more informative

than large stakeholders and that companies with extensive insider purchases outperformed companies with extensive sales with 7.8% for the first 6 month after the transaction, with 2.3% the second year after the transaction, while there was no difference during the third year.

Lakonishok and Lee (2001) further studied the information from insider trades to find the best signals for outsiders. By implementing an intensive trading criterion they showed that insider's purchases in small and medium companies was predicting future results, information which could be used by other investors. They ended their research by concluding that insiders performed better than the average investor and that their trades were informative about future development, especially for small stocks. Unfortunately did they not perform any test on the possibilities for outsiders to earn abnormal returns by using information from insider trades. The researchers concluded that a strategy should be focused on low value stocks, and trading such stocks are costly, and therefore were they very doubtful about the performance of such a strategy.

Jeng et al. (2003) presented an extensive research that showed that a portfolio consisting of insider purchases outperformed the market with 11.2% per year, ¼ of the abnormal return occurred during the first five days after the trade and ½ of the abnormal return had occurred within a month after the purchase. The research did not find any evidence that insiders in a certain position would perform better or worse than any other investor. Further conclusion from the research showed that insider sales did not earn abnormal returns, that insider purchases in firms with low market value earned more than insider purchases in larger firms, and that larger purchases generally earned higher abnormal returns than low volume purchases.

Jeng et al. (2003) did not test how informative insider activities are for outsiders, meaning if other investors could use the information to earn abnormal returns. The researchers however conclude that an intensive trading criteria would be the ideal tool for outsiders that are trying to gain advantages from information about insider trading.

3.2   Swedish Market

There have been previous studies on the Swedish market, some of the studies have showed indications that the information from insider trades could be useful for outsiders, but that it is hard for outsiders to know how to value the information from insider trading.

Acosta and Olofsson (2006) did a study on smaller companies on Aktietorget and Nordic Growth Markets and found that insiders in these markets earned a higher average return than the market, they did not study the possibility for outsiders to use this information.

Lindgren and Ohlsson (2008) tried to create an investment strategy based on insider trading for OMX30, although they found a relationship between insider transactions and development of stock price they were not able to present a trading strategy for outsiders that

earned abnormal returns. Sjögren (2008) did research on the Stockholm Stock Exchange small cap list but could not find statistically significant evidence that is was possible to use the information from insider trading to earn abnormal returns.

3.2.1 Conclusion from previous studies

Table 1. *Summary of previous studies in the field.*

Researcher (year)	Market	Conclusion	Can Insiders/Outsiders earn abnormal returns
Jaffe (1974)	U.S.	Insiders earn abnormal returns, intensive trading periods contains more information.	Yes/Yes
Seyhun (1985)	U.S.	Insiders earn abnormal returns, outsiders cannot create a successful trading strategy based on insider transactions.	Yes/No
Rozeff & Zaman (1988)	U.S.	Outsiders can create a trading strategy earning abnormal returns in a long-time horizon based on intensive insider trading.	Yes/Over long time-period
Chowdhury, Howe and Lin (1993)	U.S.	Outsiders cannot use information from insider transactions to earn abnormal returns over an 8-week period.	Yes/No
Eckbo and Smith (1998)	Norway	Insider does not earn abnormal returns on their investments.	No/Did not test
Lakonishok & Lee (2001)	U.S.	Insider perform better than the average investor, it is not reasonable that an investment strategy based on insider transactions would be successful.	Yes/Did not test, but not reasonable
Jeng et al. (2003)	U.S.	Insiders outperform the market, most of the abnormal returns occur close to the transaction.	Yes/Did not test
Acosta & Olofsson (2006)	Sweden	Insiders in small firms earn abnormal returns.	Yes/Did not test
Lindgren & Ohlsson (2008)	Sweden	Outsiders cannot earn abnormal return by basing their investments on insider transactions.	Did not test/No

By studying the previous research did we create a good foundation from where we based our own research. Most researchers in the topic seems to agree that insiders possess information that can make them perform better than the market, but there is no clear consistency regarding which opportunities that create for other investors. One reason is that the stock prices quickly absorb the information of an insider transaction when it is announced and that outsiders have a short period of time to act on it.

Several researchers concluded that insider trades in small firms earned higher abnormal returns than in larger firms (Elliot et al. 1984, Seyhun, 1985, Lakonishok & Lee, 2001, Jeng et al. 2003). Which is explained by a lower liquidity in small firms which means that an insider transaction have greater effect on the stock by itself. The general knowledge on the market regarding small firms is lower than regarding larger firms, which increases the information asymmetries between insider and outsider for smaller firms. The previous studies showed that intensive trading periods are containing more information about the future (Jaffe, 1974, Seyhun, 1985 and Jeng et al. 2003). The recent studies from Lakonishok and Lee (2001) and Jeng et al. (2003) indicated that larger transactions contained more information about the future and that insider purchases were better at outperforming the market than insider sales.

With all respect to the previous research on the Swedish market did we want to create a strategy that was considering the findings from previous studies to a bigger extent (not focus on just large companies), and that was covering data for a longer time-period than Sjögren (2008). Previous research has also used different ways to handle transactions costs and to create their replication strategies and therefore did we think that there was a gap in the research on the Swedish market. We have tried to create strategies for how to follow insiders by using the knowledge we have gained from previous studies.

One important discussion to have in mind regarding the discussion of the results from insider transactions is that insiders probably have more knowledge about financial market than the average investor. Their positions in companies are probably attained because of high knowledge and good analyzing-skills. With that in mind could abnormal returns earned by insiders possibly be explained by a knowledge-gap compared to the average investors instead of an information-gap regarding the certain company. If insiders abnormal returns can be explained by superior skills, inside information or if it is a mix of both is hard to evaluate. Following insiders to try to use their knowledge is nevertheless an interesting trading strategy.

4 Method

The method section will describe the methodology and research methods that have been used in the thesis. The reader will receive insight to different approaches and methods as well as argumentation for why some methods have been chosen and others have been disregarded.

4.1 Methodology

There are two major paradigms called *positivism* and *interpretivism*, these are two frameworks in how we interpret the world around us. The *positivism* sees the world objectively which is governed by universal laws in a value free context. Researchers that are positivists stay separate from the subject they are studying and use quantitative methods and deductive reasoning to reach a conclusion. The *interpretivism* view the world subjectively where people experience and have individual interpretation of the world. Researchers that belong to *interpretivism* are very connected to the subject they are studying and use flexible and qualitative research to reach a conclusion (Burns & Burns, 2008).

Positivism has 5 major standpoints according to Müllern (2012):

1. Believes in a homogenous universe
2. All parts of the universe can be explained
3. We can learn and gain knowledge about the universe
4. We can build a system of knowledge
5. Mathematics is the universal language

Through positivism the world can be seen from two different perspectives, *induction* and *deduction*. *Induction* is based on the idea that a serial of separate events occur and from that one can make generalizations about the world and establish a framework (Andersen, 1990). More precisely we can say that inductively thinking is that we see something happening over and over again in different surroundings and the effects are the same. From that we can learn that the outcome will always will be the same, and we can generalize the world around us. *Induction* is a very popular scientific approach, but also in our everyday life, we tend to learn from what we experience (Graziano & Raulin, 2004). For a generalisation to hold according to *induction*:

1. Large enough number of observations
2. The observations has to be repeated in different circumstances
3. No observation can deviate from the generalization

(Walliman, 2001).

Deduction is that one perceives the world from an established theory and what happens is a consequence of the established theory/principles. *Deduction* moving from the general to the single, drawing a conclusion which usually built on logic, and the conclusion is valid through the proposition (Andersen, 1990). It can be seen as trial and error, a theory is tested and either accepted or rejected. If it is rejected then a new theory is proposed and the fittest theory survives. When using the *deduction* a hypothesis has to be stated in order to

test the validity of the theory. A hypothesis has to be falsifiable, meaning that it has to be logical (Walliman, 2001). Deductive thinking can then be seen as one starting from a certain generalisation of the world and applies it to predict future observations (Graziano & Raulin**,** 2004).

Induction and *deduction* is found in all types of theories but the theories tend to be drawn to one or the other. Inductive theories are characterized by that it tends to follow the data very closely and see where it leads. While deductive theories are based on certain beliefs, data is collected and the believes are tested through hypothesis testing.

In this paper have we approached the reality from already existing financial theories, so we have used a deductive approach for our research.

4.2   Qualitative and Quantitative research methods

A research can be based on qualitative or quantitative research methods or a combination of both. Quantitative method is used when a research starts with a theory or hypothesis and through various tests either confirm or reject the hypothesis or theory (Newman & Benz, 1998). Quantitative research methods emphasizes that data must yield proof or strong confirmation for a hypothesis to be true (Burns, 2000).

Quantitative research which is highly linked with *positivism* is using highly controlled research and experimentation to establish general laws or principals. The method is very strict in its framework and uses numerical data to do hypothesis testing to either confirm or reject an already existing theory or establish a new one. The data that is used have to strongly prove the theory or hypothesis. A researcher using the method knows clearly in advance what he/she is trying to find and the data is generalized in numbers and statistics but may lack in unveiling significant information (Burns & Burns, 2008).
Aliaga and Gunderson (2002) define quantitative research method as:

> "Explaining phenomena by collecting numerical data that are analyzed using mathematically based methods (in particular statistics)." (Citied in Mujis, 2004)

Quantitative research methods use numerical data and analysis to explain the phenomena that is being studied. The method takes its starting point from the idea that the world around us is governed by a set of rules. A researcher using quantitative research methods is not trying to develop new laws or theories about the world, the researcher is merely trying to find, or confirm the principles/laws. It uses statistics and numerical data to test different laws of the world to statistically accept or reject them based on the outcome. Quantitative research methods are strictly objective when it comes to the analysis and the researcher should be careful of not waging in personal theories that are not statistically significant.

Qualitative research methods employs a more lose control over the research setting. Using this kind of method the research can capture softer data such as feelings, values, needs etc which is not seen in the quantitative data. The researcher is the instrument of data gather-

ing and usually only have a rough sense of what he/she is looking for. The data collected is tough to generalize and it requires a significant amount of time to unfold all the information (Burns & Burns, 2008).

Qualitative research method has a different approach, it relies on the experience of individuals and subjectivity, the social reality is created of individual awareness. The method is not as structured as quantitative research methods, and less formal (Burns, 2000).

In this thesis is a null hypothesis used to examine if the abnormal returns from the trading strategies are different from zero. Since hypothesis testing is the best way to conduct the study was a quantitative method to prefer over a qualitative research.

4.3   Data Collection

Primary data is newly collected data for the specific research by the researcher. Secondary data is already collected data that have been collected by someone else such as governments, analysists and/or researchers. Secondary data is usually studied before any type of research is started since it gives some insight about the topic (Burns & Burns, 2008). Our data is collected from FI and the Stockholm Stock Exchange and is thus secondary data.

4.3.1   Collection of data

This study is based on secondary historical data in form of daily closing prices of stocks and indexes and registered insider transactions from 2007-01-01 to 2009-12-31, during this period of time has the indexes experienced periods of both increase and decrease which will help to assess the strategies. The development for the indexes during 2007-2009 can be seen in appendix 8.11.

The historical daily closing prices for stocks and indexes have been collected from the website for the Stockholm Stock Exchange. The stock prices are adjusted for actions taken by the companies (stock split, etc) by the Stockholm Stock Exchange. In this research will the breakdown of the companies with respect to their size be the same as on the stock exchange, the companies are divided into one small cap list and one mid cap list.

The data on insider purchases have been collected from FI's public register of insider trades, further was the insider purchases divided in to lists depending on what list (small cap or mid cap) the company was quoted on at the beginning of 2007.

4.3.2   Delimitation

As explained previously (section 1.3), is this study focusing on insider purchases because of its higher relevance than sales for outsiders, and since previous studies (Lakonishok & Lee, 2001 and Jeng et al. 2003) concluded that insider purchases better predicts future price movements than insider sales. We have accepted those results and the explanations made in previous research and therefore chosen to not include insider sales in our test, it could have been interesting to have the sale transactions included in some way but that would

have meant more data to process and we have chosen to study data for a longer time-period instead.

In the few cases where we have had missing observations in our data for either stock price or index price have we assumed the same closing price as the previous day, those occasions were very few and it is reasonable to assume that the closing price from previous day are the best observation to use.

4.3.3 Trading strategies

From the collected data have we divided the data into different categories and formed sub-samples to examine different trading strategies we have found interesting. All insider purchases that we have collected have first been divided in to a small cap list or a mid cap list depending on which list the company is quoted on at the Stockholm Stock Exchange.

The first test was based on an intensive trading criteria. The two subsamples are small cap and mid cap and are containing one event for every time three different insiders report a purchase in the same company within 5 bank days. The event day is defined as the publication date of the information that the third different insider had executed a purchase. We have been using an intensive trading-criteria since previous studies have (Jaffe, 1974, Seyhun, 1985 and Jeng et al. 2003) have found that it is one of the best ways to reduce noise in the registered insider trades.

The second test in this research was done on samples based on large volume transactions. The two subsamples based on large volume transactions are containing one event every time an insider made a purchase of 400 000 stocks or more. The event day is defined as the publication day of a purchase containing 400 000 stocks or more. We are using large volume purchases since recent studies from Lakonishok and Lee (2001) and Jeng et al. (2003) indicates that larger transactions contains more information about the future.

The third trading strategy conducted in this research was based on the results we obtained from the first two strategies, the third strategy is a mix of the two previous strategies. It is containing insiders purchases of 50 000 stocks or more in order to exclude noise created by smaller purchases, and is based on a short-term intensive trading criteria where two different insiders had to purchase a stock within three days for the event to occur. The third strategy is only focusing on the small cap list since the positive results in the previous studies was attained on the small cap. The event day in the third strategy is classified as the report of a second individual insider who purchased more than 50 000 stocks in a company within 3 bank days.

Transaction costs are not included in the calculations since differences exist in transaction costs among investors. Previous studies (Jeng et al. 2003 and Lindgren & Ohlsson, 2008) have also excluded transaction costs from their calculations because it is hard to calculate exactly and since different investors face different transaction costs, although it is important to remember that the transaction will come to some cost.

4.4   Event Study

Fama's article from 1970 introduced event studies, which has become the most common way to test the EMH. An event study examines the effect an event has on the return on securities. By looking on the development of the return on a security after a special event and compare that to a benchmark are the effects of the event evaluated.

A null hypothesis is set up to test if a market is efficient in reflecting information, and also to examine the wealth change for shareholders under certain events. The idea of event study is to examine the reaction on the market and specific stocks when events happens (MacKinlay, 1997).

MacKinlay (1997) presented a guideline for event studies in finance which this study is based on, following steps have been a part of the study.

1. *Definition of event and time-period of event*. The definitions of events for the different strategies were discussed in section 4.3.3. 5 days, 10 days, 30 days and 90 days time-periods have been used to estimate possible abnormal returns for different time-periods.

2. *Selection criteria of data*. This study includes all reported insider purchases on the Stockholm Stock Exchange from 2007-01-01 to 2009-12-31. Further have all the daily closing prices of stocks and indexes for those companies which had reported insider purchases between 2007-01-01 and 2009-12-31 been collected.

3. *Define the measure of abnormal return*. The adjusted market model is the measure of abnormal return in the tests, section 4.4.2 is discussing the choice and other measures.

4. *Define estimation window*. This study is based on a 1 month estimation window to estimate the variance and standard deviation of abnormal returns, which have been used in the statistical test.

5. *Statistical tests*. The test is a hypothesis test of the possibility of making an abnormal return, the statistical test is discussed in more depth in section 4.4.4.

6. *Interpretation and conclusions of the results from the statistical test*. The results have been summarized and interpreted to examine the possibilities for outsiders and are presented in chapter 5 and 6.

4.4.1   Defining the event period

This research is based on four different event periods trying to examine the effects over time. The estimation period before the event period which is used to estimate different parameters do not overlap with the event period because the parameters estimated should not be affected by the movement caused by the event (MacKinlay, 1997)

The parameter that has to be estimated to perform the research is based on an estimation period of the month before the event occurs. In event studies is it common that the event

period starts before the actual event day to capture movement just before the event takes place, in this specific research is the movement prior to the event date not important since this study is examining the possibilities for outsiders and those possibilities starts after the event takes place.

There are four event periods that have been examined in this research to study the possibility of earning abnormal return based on our trading strategies.

1. Day 0 → Day 5, which is a short term view to see how the market reacts to the signals sent from the insiders.
2. Day 0 → Day 10, is also short term view where it can be examined if the reaction from the 5 day period is continuing or drops off.
3. Day 0 → Day 30, is used to study the effect over a longer perspective.
4. Day 0 → Day 90, is the longest event period that has been used in our research. This semi-long view is used to examine the development of the stock-price over a longer period.

In our opinion could an even longer time-period also be interesting to examine to see if insiders possesses information of a long-term perspective for the company, but such a test has to be done with another approach since the use of event studies and its measures for abnormal returns creates a bias in a long-term perspective (Brown & Warner, 1985).

Figure 1. *Description of event periods.*
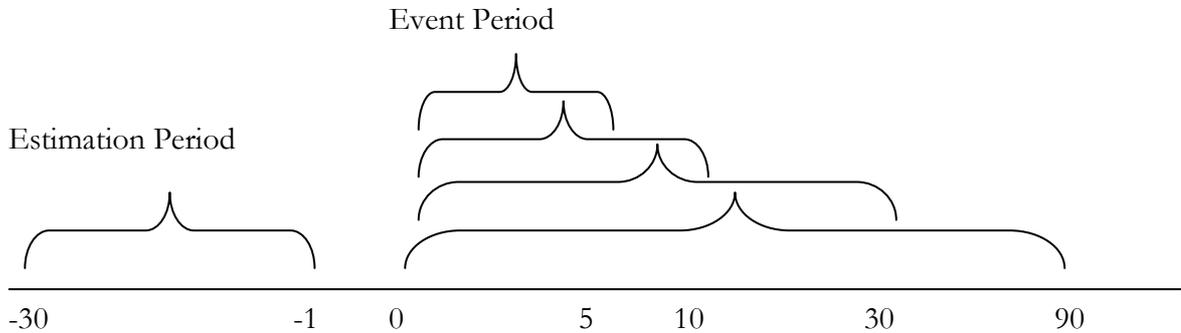
4.4.2   Abnormal returns

Since the abnormal return is defined as the actual return minus the expected return (MacKinlay, 1997) has the actual return to be measured against a benchmark which will represent the expected return (Brown & Warner, 1980). There are several ways to calculate and estimate expected return and from the expected return can the abnormal return be calculated by

$$AR_{it} = R_{it} - E(R_{it}) \tag{1}$$

Where i stands for the individual firm for time period t. AR_{it} is the abnormal return which is based on R_{it} which is the actual return while and $E(R_{it})$ which is the expected return for the time period.

There are different approaches to define and calculate the expected return. The most common in a historical perspective is the Capital Asset Pricing Model (CAPM) (Jaffe, 1974) but recently has the market model been the most used and argued for model (Rozeff & Zaman, 1988). The market model assumes a linear relationship between market return and security return.

The market model:

$$R_{it} = \alpha_i + B_i R_{mt} + \varepsilon_{it} \qquad (2)$$

R_{it} is the return on the security while the R_{mt} is the return on the market portfolio and ε_{it} is the error term. α_i, B_i and σ_ε^2 are the parameters for the market model. Indices are typically used to represent the market portfolio.

This study has used a simplified version of the market model, the adjusted market model. The adjusted model is a more restricted form of the market model, where α_i is equal to zero and B_i is equal to 1. The adjusted market model is used in similar event studies (Lakonishok & Lee, 2001) and the difference in results between different methods are very small (Brown & Warner, 1985). Even though the adjusted market model misses the estimation for systematic risk, it does provide an elimination of the movements caused by movement on the market, and the fact that two different indexes have been used should place securities with similar risk against the same benchmark.

The adjusted market model assigns an index as the expected return of the security, which means that the calculation of abnormal return is:

$$AR_{it} = R_{it} - R_{mt} \qquad (3)$$

Where AR_{it} the abnormal return for day t is, R_{it} is the return of the individual security at day t and R_{mt} is the return of the index on day t.

To calculate the daily return of the indexes and the securities has equation 4 been used.

$$\ln (R_t / R_{t-1}) \qquad (4)$$

The *OMX Stockholm Small Cap GI* index for the small cap events and *OMX Stockholm Mid Cap GI* index for mid cap events have been used as the expected return in the abnormal return calculation. Two different indexes have been used because it increases the accuracy in the definition and calculation of the abnormal returns.

4.4.3   Aggregation of abnormal returns

To be able to draw conclusions from an event study using abnormal returns has the abnormal returns to be accumulated (Brown & Warner, 1980 and MacKinlay, 1997). The abnormal returns are aggregated both through time and through securities. The aggregation of abnormal returns of an individual security is done by calculating the cumulative abnor-

mal return (CAR). The CAR capture movements in the stock return, it adds the previous cumulative abnormal return to the daily abnormal return.

The CAR formula is:

$$CAR_t = CAR_{t-1} + AR_t \tag{5}$$

Aggregation of abnormal returns are also done through securities, the cumulative average abnormal return (CAAR) is the average abnormal return for all the events for the event period. The formula for CAAR is:

$$CAAR = \frac{\sum CAR}{N} \tag{6}$$

CAAR is used in the hypothesis testing.

4.4.4   Hypothesis test

The hypothesis testing is used to statistically test if there is a possibility to earn abnormal returns by using information from insider purchases. The null hypothesis states that the abnormal return should be equal to zero, the hypothesis testing in this research are stated:

H0 = 0 → The null hypothesis is not rejected and we reject the possibility that the abnormal returns earned by the trading strategy are different from zero.

H1 ≠ 0 → The null hypothesis is rejected and we accept that the abnormal returns earned by the trading strategy are not equal to zero.

One important note is that the test is examining if it is possible for an outsider to earn abnormal return after the insider have made the purchase. To not reject the null hypothesis would state that the outsider cannot shadow the insider and make an abnormal return. With that said, insiders could still earn abnormal return.

The results and CAAR obtained using the trading strategies have to be measured statistically to evaluate the significance of the results. In order to test the hypothesis and evaluate the significance is a t-test performed. In order to perform the t-test is a measure of standard deviation for the events calculated in the estimation period just before the event occurs.

The formula for calculating the standard deviation for the event periods is a four step process based on the work of MacKinlay (1997). First is the variance on the abnormal return from the estimation period for each event calculated. The reason for not calculating the variance based on the abnormal returns in the event period is because of the influence the event can have on the variance. The formula for calculating the variance of abnormal return for each security during the estimation period is shown in equation 7.

$$\sigma_{\varepsilon i}^2 = (AR_i - \overline{AR}_i)^2 \tag{7}$$

AR_i is the abnormal return for a security, and $\overline{AR}_i$ is the average abnormal return for a security.

The next step is to adjust the variance for the different event periods, the longer an event period is the higher is the corresponding variance (MacKinlay, 1997). The formula for adjusting the variance is shown in formula 8.

$$\sigma_i^2 = \sigma_{\varepsilon i}^2 * (t_2 - t_1 + 1) \tag{8}$$

σ_i^2 is the estimated variance of CAR for security i during an event period. $\sigma_{\varepsilon i}^2$ is the variance of CAR for a security i during the estimation period, and $(t_2 - t_1 + 1)$ is the length of the event period tested plus one.

The next step is to aggregate the variances for each security and calculate the variance for the CAAR, which is according to MacKinlay (1997) done by using the formula in equation 9.

$$var(\overline{CAAR}) = \frac{1}{N^2} * \sum \sigma_i^2 \tag{9}$$

Where N is the number of event in the test.

Last step to calculate the standard deviation is to take the square root of the variance for CAAR, which is shown in the formula 10.

$$\sigma = \sqrt{var(\overline{CAAR})} \tag{10}$$

The standard deviation calculated in equation 7-10 is used to perform a statistical test on CAAR for the event periods. The calculation of the t-value for CAAR for the event periods are shown in equation 11.

$$t = \frac{CAAR}{\sigma} \tag{11}$$

We assume that the data collected is "large enough" for a t-test since all of our tests contain more than 30 observations, which is the least amount of observations needed to assume a normal distribution of the collected data (Aczel & Sounderpandian, 2009). The "large enough" number of observations means that the t-test formula presented in this section can be used.

In order to test the null hypotheses have two established significance levels been used. We have used significance levels of 0.05 and 0.10 in a two-tailed test, which means that the CAAR value that is being statistically tested can be either negative or positive different from zero.

The significance level also indicates the maximum probability of committing a type I error. A type I error is when a true null hypothesis is being rejected, while a type II error is when a false null hypothesis is being accepted (Aczel & Sounderpandian, 2009). In our case would a type I error mean that we accept that abnormal returns could be earned by using the trading strategy when it in fact could not. The probability of such an error with each significance level is 5% and 10%. Since we are testing different trading strategies is the acceptance for failure larger than in many other types of research. A significant positive t-

value at a 0.10 significance level for a trading strategy would mean that there is approximately a 10% probability that the strategy did not earn abnormal return during the time-period examined. Failure of the strategy in 10% of the cases does not mean that the strategy generally fails since the gain in 90% of the cases should cover those losses. In practice would a trading strategy that earned abnormal returns in more than 50% of the cases be a strategy that could be interesting. However is it not interesting to compute a statistical test at a 0.50 significance level because of its questionable relevance and all assumptions that would have to be made, and therefore have we been using well-established and accepted significance levels of 0.05 and 0.10.

The significance level of 0.05 corresponds to a critical t-value of ± 1.96, while the significance level of 0.10 corresponds to a critical t-value of ± 1.645. The critical values create an interval where the null hypothesis holds, any t-value outside the interval mean that the null hypothesis is being rejected (Aczel & Sounderpandian, 2009).

An important note is that if the null hypothesis cannot be rejected based on the tests it does not mean the null hypothesis is true, it just means that the data that have been collected cannot statistical verify that the null hypothesis does not hold.

4.5   Criticism of method

The event study in this research is following the steps from MacKinlay (1997) which is a highly referenced guideline for how to conduct event studies within business and finance. The problem with event studies is that it can be hard to isolate the effects from the event that is being examined, it is possible that other events that affect the return occur during the event period. The total effect from those other factors should be limited since the tests in this research are performed on the average return for several observations.

4.6   Reliability and Validity

According to Burell and Kylén (2003) will the reliability and the validity of the method affect the quality of the research.

The reliability of the research is based on the credibility of the data, with a high reliability should the result be the same if another researcher conducted the same test for the same period (Burell & Kylén, 2003). We consider the data collected as very reliable since it is collected from the organizations with the main responsibility over the data we are using. The way of conducting the tests and the models used are referenced in similar studies and evaluated against other models we have considered. Microsoft Excel has been used for processing the data, the calculations and the statistical tests. Since all the processing of the collected data has been done by us there is obviously a risk of human error. We have been as careful as possible to minimize the risks when processing the data, all calculations and statistical test have been controlled regularly to avoid mistakes. We have used indexes formed by the Stockholm Stock Exchange and the return on them as benchmarks, which further decrease the risk of doing mistakes when calculating expected returns.

The validity of the research is based on the reliability, unreliable methods do not present valuable research. The validity of a research is based on the relevance of the study, if the data collected and the methods used are representative for the field being researched (Burell & Kylén, 2003). We consider the validity of our research to be high, the method for event studies based on MacKinlay (1997) is widely used, and methods for calculations and tests are chosen based on extensive research on similar studies. Stock-prices and public information about insider transactions is the only data which can be used in a similar test and is therefore the valid data for our test, the *OMX Stockholm Small Cap GI* and the *OMX Stockholm Mid Cap GI* indexes used as benchmarks are also of high validity since they are formed by OMX to represent the development of the lists.

5   Results and Analysis

The result and analysis section will present the results for the three different trading strategies that we have used on the collected data. The results from the strategies will be presented separately together with a short but detailed analysis. The last part of the chapter will analyse our overall results and connect them to the theories and previous studies presented earlier in this paper.

As previously noted are the event periods examined in this research 5, 10, 30 and 90 days and the events are divided into one small cap list and one mid cap list.

5.1   Intensive trading criteria

The first event study examines if any abnormal return can be earned by purchasing stocks in a company when the third different insider purchase becomes official, the three insider purchases has to become official within an interval of 5 bank days for the event to occur. The report from FI of the third different insider purchase in the company becomes day 0 in the event period. The intensive trading criteria reduce noise, and the idea is that the signal for a positive development is more reliable when different insiders act in the same way.

The intensive trading criteria sample for the three years in our research included 111 events in small cap companies and 59 events in mid cap companies. The results for the events are presented in section 5.1.1 and 5.1.2. The standard deviation calculated for each event period used in the statistical test can be found in appendix 8.1 for the small cap list and 8.3 for the mid cap list.

5.1.1   Event study on the Small Cap Data

In table 2 are the results from the event study on the small cap data for each of the four periods presented. Both the 5 day and the 10 day event period show positive CAAR without transaction costs. The most interesting result in the test is the CAAR after 5 days that has a value of 1.367% and a t-value that rejects the null hypothesis at a 0.10 significance level. The significant CAAR value indicates that an investor could use the intensive trading criteria to make abnormal returns over a short time-period. The development of CAAR over time is negative and ends up with a negative CAAR value that is significant at both 0.05 and 0.10 level for the 90 day event period.

The results suggest that an investor could make positive abnormal return in the short term but the development for 30 and 90 days would be negative.

The individual CAR values resulted in some extreme high values and some extreme low values. The strongest single CAR found was -108.56% which occurred after 90 days and was the pharmaceutical company EpiCept. During the 90 day event period did EpiCept face several surprising setbacks, their poor results is affecting the total CAAR with around -1% for the 90 day event period. The development of EpiCept over the longest event period is a good example of the problem with isolating the event from other factors which have been discussed earlier. The data for CAAR and standard deviation can be found in

appendix 8.1, figures for the development over all event periods can be found in appendix 8.2.

Table 2. *Summary of event study of intensive trading criteria on small cap.*

Event Period	Highest	Lowest	CAAR	T-value
Day 0 → 5	35.17%	-20.30%	1.367%	1.9012*
Day 0 → 10	36.07%	-15.29%	1.372%	1.4096
Day 0 → 30	59.96%	-39.10%	-1.487%	-0.9094
Day 0 → 90	75.31%	-108.56%	-7.910%	-2.8246**

"*Event period" is the different periods that were tested, "highest" and "lowest" are the single most positive and negative CAR's for each period tested. "CAAR" is the cumulative average abnormal return in each period and "t-value" contains the t-value for each period. * Means that the result is significant at a 0.10 level and ** means that the results is significant at a 0.05 level.*

5.1.2 Event study on the Mid Cap Data

The results from the event study on the mid cap data can be found in table 3. In contrast to the results from the small cap data did the mid cap data not result in any positive CAAR values. The highest and lowest CAR values in each period are less extreme than for the small cap data.

The negative values for 5 and 10 day event periods are not strong enough to reject the null hypothesis at any of the significance levels that we have applied. The significant results obtained from the mid cap data were negative CAAR values for the 30 and 90 days event periods. The results indicate that the index outperformed a strategy based on insider purchases for the data examined in the test. Worth noting is that all the insiders transactions comes from 9 different companies. The data for CAAR and standard deviation can be found in appendix 8.3, figures for the development over all event periods can be found in appendix 8.4.

Table 3. *Summary of event study of intensive trading criteria on mid cap.*

Event Period	Highest	Lowest	CAAR	T-value
Day 0 → 5	9.66%	-10.66%	-1.126%	-1.2976
Day 0 → 10	16.31%	-22.06%	-1.607%	-1.3682
Day 0 → 30	17.41%	-33.81%	-4.108%	-2.0832**
Day 0 → 90	57.91%	-40.36%	-5.808%	-1.7192*

"*Event period" is the different periods that were tested, "highest" and "lowest" are the single most positive and negative CAR's for each period tested. "CAAR" is the cumulative average abnormal return in each period and "t-value" contains the t-value for each period. * Means that the result is significant at a 0.10 level and ** means that the results is significant at a 0.05 level.*

5.1.3 Analysis

The results obtained from the event studies based on the intensive trading criteria showed a negative development over time for both small cap listed companies and mid cap listed companies. The results show around 2.5-3% better performance for the events executed on the small cap list for the first three event periods, which is in line with previous research (Elliot et al. 1984, Seyhun, 1985, Lakonishok & Lee, 2001, Jeng et al. 2003) and explained by a lower liquidity in smaller firms and lower general market knowledge about the firms.

For the 90 day event period was the development on the small cap more negative than on the mid cap, the CAAR after 90 days was -7.91%. The event study on the mid cap data also resulted in two significant results, which was negative results obtained for the 30 and 90 days event period. The 90 day event period is the period with most exposure to time and can therefore include other events or negative news affecting the development of the stock price. An example is the EpiCept case discussed in section 5.1.1 which had a negative development caused by setbacks that could not have been foreseen.

The positive results over a short time-period on the small cap data indicates that the trading strategy would outperform the index in approximately 90% of the cases and that abnormal returns could be earned. It is important to note that an investor who would adopt this strategy would have to consider the transaction cost he is facing. The differences over the 5 and 10 day event periods between small cap and mid cap enhance our opinions presented earlier, that insider purchases have a greater effect on smaller firms and that there probably are outsiders acting on the signals sent by insiders in small firms when they purchase stocks in their own company.

5.2 Large volume criteria

The second trading strategy on reported insider transactions for 2007-2009 contained purchases of 400 000 stocks or more, this criteria is based on the findings that suggests that large volume transactions would signal higher expectations regarding future development of the company from the insider. The reporting date from FI of such a purchase become the event day in the tests. 37 events occurred in small cap companies and 41 events occurred in mid cap companies during the test period. The results for the event are presented in section 5.2.1 and 5.2.2. The standard deviation calculated for each event period used in the statistical test can be found in appendix 8.5 for the small cap list and 8.7 for the mid cap list.

5.2.1 Event study on the Small Cap Data

Table 4 contains the results from the test on large transactions on the small cap data. The test did not result in any statistical significant results, the null hypothesis holds over all the four event periods.

Based on the results in table 4 cannot any strong conclusions about the abnormal return of the trading strategy be made, the 5 day event period resulted in a positive CAAR but the results are in general statistically weak. The data for CAAR and standard deviation can be

found in appendix 8.5, figures for the development over all event periods can be found in appendix 8.6.

Table 4. *Summary of event study of large volume purchases on small cap.*

Event Period	Highest	Lowest	CAAR	T-value
Day 0 → 5	10.48%	-20.1%	0.433%	0.3613
Day 0 → 10	24.59%	-16.6%	-0.153%	-0.0946
Day 0 → 30	36.06%	-32.1%	-1.343%	-0.4933
Day 0 → 90	27.66%	-33.3%	-4.215%	-0.9035

"Event period" is the different periods that were tested, "highest" and "lowest" are the single most positive and negative CAR's for each period tested. "CAAR" is the cumulative average abnormal return in each period and "t-value" contains the t-value for each period. * Means that the result is significant at a 0.10 level and ** means that the results is significant at a 0.05 level.

5.2.2 Event study on the Mid Cap Data

Table 5 present the results from the test on the mid cap data using the large transaction criterion. The test shows no positive CAAR's, and are in general lower than the same test on the small cap list. The only significant result was the negative CAAR of -4.25% for the 30 day event period, which is significant at a 0.10 level. The data for CAAR and standard deviation can be found in appendix 8.7, figures for the development over all event periods can be found in appendix 8.8.

Table 5. *Summary of event study of large volume purchases on mid cap.*

Event Period	Highest	Lowest	CAAR	T-value
Day 0 → 5	9.29%	-14.22%	-0.413%	-0.4128
Day 0 → 10	8.19%	-12.48%	-2.062%	-1.5020
Day 0 → 30	18.31%	-24.18%	-4.245%	-1.8433*
Day 0 → 90	42.46%	-36.61%	-5.021%	-1.2710

"Event period" is the different periods that were tested, "highest" and "lowest" are the single most positive and negative CAR's for each period tested. "CAAR" is the cumulative average abnormal return in each period and "t-value" contains the t-value for each period. * Means that the result is significant at a 0.10 level and ** means that the results is significant at a 0.05 level.

5.2.3 Analysis

In line with the results obtained by the intensive trading criteria do the event studies on large volume purchases show negative development over time. The event study performed on the small cap data showed very small deviations from zero compared to the same test on the intensive trading strategy. None of the event periods had results that were statistically different from zero. The test performed on mid cap companies showed negative results for all event periods, with the 30 day event period being statistical significant at a 0.10 level.

The results show around 0.5-2% better results for the events executed on the small cap list compared to the mid cap list for all four event periods, which is in line with the result from the tests on the intensive trading criteria and the theories that insider trading are more successful in smaller companies.

The single highest and lowest CAR are generally more extreme on the test performed on the small cap data, except from the longest event period where the mid cap data had both the highest and the lowest observation.

Lakonishok and Lee (2001) and Jeng et al. (2003) found signs that the size of the insider transaction could be a predictor of future abnormal returns, we cannot conclude that following large purchases made by insiders would be a good trading strategy. Large purchases generally have less negative development over the long time-periods compared to the intensive trading strategy, while the intensive trading strategy generally outperformed the strategy based on large purchases in the short-term event periods of 5 and 10 days. A possible weakness with the large transaction criteria is that it is based on the volume being purchased, not the total value of the purchase. The criteria are based on volume instead of value because the report from FI includes the number of shares for each trade but not the total value of the trade. Previous studies evaluating the information of large transactions have also based their criteria on volume instead of value. It is possible that a "relative" large transaction criteria focusing on if the traded volume is large for the specific insiders and for the specific firm would be more successful than the criteria based on an absolute volume which classifies as large.

5.3 Intensive and Large Transaction Criteria on Small Cap

The third test is based on the results obtained by the test on the first two strategies and is formed by a short-term intensive trading criteria where small volume purchases are excluded. The event day is the reporting date of the second individual insider which purchases more than 50 000 stocks within 3 days. This test has only been executed on the small cap list because positive CAAR values were found on the previous tests on the small cap, but not on the mid cap. The test is containing 32 events and the results are presented in section 5.3.1, the standard deviation calculated for each event period used in the statistical test can be found in appendix 8.9.

5.3.1 Event study on the Small Cap data

The results from the last test based on the short-term intensive trading criteria where small purchases were excluded are presented in table 6. The results show the same development as the previous tests on small cap data with a positive CAAR for the 5 day event period and a negative development over time, however is not any of the CAAR values statistically significant.

The data show no real indications since none of the t-values are close to the critical values, a trading strategy would not have performed any different than the index during our re-

search period. The data for CAAR and standard deviation can be found in appendix 8.9, figures for the development over all event periods can be found in appendix 8.10.

Table 6. *Summary of event study of the third trading strategy*

Event Period	Highest	Lowest	CAAR	T-value
Day 0 → 5	22.79%	-19.61%	1.273%	0.8202
Day 0 → 10	17.67%	-15.88%	-0.704%	-0.4787
Day 0 → 30	25.88%	-30.20%	-2.601%	-0.7430
Day 0 → 90	29.59%	-35.93%	-6.125%	-1.0203

"Event period" is the different periods that were tested, "highest" and "lowest" are the single most positive and negative CAR's for each period tested. "CAAR" is the cumulative average abnormal return in each period and "t-value" contains the t-value for each period. * Means that the result is significant at a 0.10 level and ** means that the results is significant at a 0.05 level.

5.3.2 Analysis

The test based on a short-term intensive trading criteria together with exclusion of small purchases did not result in any statistical evidence that the null hypothesis should be rejected. The CAAR after 5 days was positive which was in line with the results from the tests on small cap data with the previous strategies. The CAAR becomes more and more negative for the longer event periods, which is in line with the previous results that we have found. The positive signals in short-terms could be explained by that the market reacts to the information, while those positive results disappear over a longer time-period since the market only trade on the information in short-term and not basing longer-term investments on the purchases from insiders.

One rather surprising result is that even though the result of the third strategy is positive for the 5 day event period the strategy have worse results for the 5, 10 and 30 day event period than the simple intensive trading criteria on the small cap data. The results of the third trading strategy are in line with the results from the test on the large volume criteria in small cap companies, which showed a small positive CAAR after 5 days and no statistical significant results. The results suggest that the volume of the purchases is not a strong indicator of future development.

5.4 Summary Analysis

According to the Random Walk Theory and the EMH presented earlier in this thesis should no investor be able to predict future returns since the prices of securities are reflecting the available information. Therefore can only higher return be earned if the investor is willing to take on more risk. The semi-strong form of the EMH and the Random Walk Theory stands in contrast to many of the previous studies (Jaffe, 1974, Rozeff & Zaman, 1988) which concludes that insiders can earn abnormal returns, and that outsiders can follow the trades of insiders to outperform the market.

We have found indications that periods of intensive insider purchases in small companies can help investors to earn abnormal returns over a short time-period. That result is in line with studies done by Jaffe (1974) and Penman (1982) that found that abnormal returns can be made by studying intensive periods of insider trading in smaller companies. It seems like investors act on the signals sent when several insiders act in the same way causing a short-term increase in the stock price, which is a great opportunity for investors to exploit.

It is important to acknowledge that all the positive results could be useful in practice, not only the statistically significant result. Even the trading strategies which showed positive results that was not statistically significant at a 0.10 significance level could contain information that could mean that abnormal returns could be earned in more cases than it is not. The fact that all our trading strategies on small cap companies have positive results for 5 days suggests that it takes time for the market to react to the information of insider purchases, which creates a small window of time to earn money on the new information. Careful consideration about transaction costs and other factors which could strengthen the signs from the strategy are very important when the strategies are being considered.

Even if we have found some positive indications were most of our results not significant which indicates limited opportunities to earn abnormal returns for outsiders following insiders in general. None significant results are in line with the results from Seyhun (1985), Chowdhury et al. (1993), Eckbo and Smith (1998) and Lindgren and Ohlsson (2008).

Previous studies done by Elliot et al. (1984), Seyhun (1985), Lakonishok and Lee (2001) and Acosta and Olofsson (2006) have shown that small companies are generally not as efficiently priced as bigger companies and that insiders in small companies are better at predicting future stock price movement than insider in large companies. Our results generally confirm those previous conclusions. We have previously discussed a number of reasons as explanations for the superior opportunities for insiders in smaller firms compared to larger firms, for example lower liquidity and less attention from analysts and media.

One could argue that the behavioral finance theory could be an explanation for why insider purchases in smaller companies have greater effect than in larger companies. Since an outsider probably have less information about a small company will the insider transactions be a bigger part of the available information. In lack of contradictory information could outsiders trust the purchase from an insider as a signal for a future positive development for the company.

Except from the test on small cap data for 5 days with the intensive trading criteria did we fail to find any statistical positive value, which makes us consider the pricing of small companies as rather efficient. The fact that the companies we have included in our study are established on the Stockholm Stock Exchange should mean that they are studied and governed by analysts and the rest of the market, with today's speed of information is news about these "smaller" companies rather easy to attain. The general knowledge about the firms can be one reason for why we do not find any more positive values of abnormal return which are significant.

Most of the results that we have found are not statistical significant meaning that the null hypothesis holds over the different event periods. The information asymmetries in the markets seems to be rather small since the publication of information about insider purchases does not generally affect the market in any way. The limited effects could mean that the market is generally efficient and that outsiders do not value the information about insider purchases. It could also mean that the regulations on the Swedish market are inefficient and does not find the true effects of insider trading. It is possible that some parts of the market (for example quasi insiders) trades on the information about insider trading before it comes public, and therefore reduce the effect insider trades would have if it reached all market participant at the same time. It is also possible that insiders try to hide the trades they assume will be the most profitable from the rest of the market by using endowment policy and other loopholes in the regulations to avoid getting scrutinized. The opportunity the endowment policy creates for insiders is a problem which FI is aware of and trying to control (Spängs, 2012 and Tidningarnas Telegrambyrå, 2012).

All the tests executed showed negative development over time, as previously discussed is the length of the event periods a factor which is affecting the results. Longer event periods contain more factors which will affect the development during the event period, an example is the Epicept case where we found a negative return of -108% after 90 days, caused by several surprising news that no one could have foreseen. Dividend payment is a factor which generally decreases the stock price and can therefore be one factor that partly explains the negative results over 30 and 90 days. Our data showed in general a negative development over time which can be explained by that the event periods contained more negative than positive news in general, even if most of the results not were statistical significant.

Since insiders should know more about their company and its value should they also be good at predicting the future development of the company. However did our results show that there was hard to find any clear statistical significant evidence that the information from insider purchases would mean an increased stock price in general, there could be several explanations for the non-significant results that we found:

- Insider does not interpret well/ the information is not valuable enough

Insiders in general can have trouble to interpret what the information will do to the stock price, or the information is not important enough to help the company outperform the market.

- Insider have longer time-period in mind/perspective

It is reasonable to believe that purchases made by insiders could be based on a belief that the company will perform well over a long time-period. Since insiders act as contrarian investors (Chowdhury et al., 1993) is it reasonable to believe that a long-term investment from an insider would come during a period of downturn for the stock, which could explain the negative results for 30 and 90 day event periods in our tests. A positive develop-

ment over a longer time-period would mean that insiders information is valuable but not seen in our tests.

- Laws and regulations fail to capture trades based on inside information

The laws and regulations do not capture all the trades being based on inside information, for example trades done by quasi insider which are not regulated by the law, or insiders which are regulated by the law but who use loopholes such as endowment polices to avoid getting scrutinized.

6 Conclusion and future research

The last chapter will presents conclusions and reflections concerning the results presented in chapter 5. We will use our results to draw conclusions connected to our purpose, discuss the development of policies regarding insider trading and what future research could focus on.

6.1 Conclusion

The purpose of this thesis was to study the possibilities to create a trading strategy based on insider purchases reported by FI. It is FI's responsibility to work for an efficient capital market without information asymmetries, in order to achieve their task are they publishing all reported insiders transactions so that all market participants have access to that information. Previous studies have indicated that insiders earn abnormal returns on their investments and that there is value for outsiders in the reported insider trades. We used the information from previous research to create three trading strategies which were tested on the small cap and mid cap companies on the Stockholm Stock Exchange during 2007-2009.

All three strategies showed positive results for small cap companies over a 5 day event period. This indicates that the market reacts to the signals from insider purchases and that there could be opportunities for short-run investments for outsiders. The only positive statistical significant result was generated over a 5 day event period with the intensive trading strategy for small cap listed companies. The CAAR was statistically significant at a 0.10 significance level meaning that the strategy earned abnormal return in approximately 90% of the cases. The result reinforced the conclusions from previous studies that an intensive trading criteria is the best criteria to sort out insider trades.

The other positive results should not be disregarded because they are not statistically significant, they could still contain valuable information for outsiders since a trading strategy with lower significance still can earn positive abnormal return in more cases than it does not. An important note to the result is that they are excluding transaction costs, any investor would have to consider their own transaction costs when taking on any investment. Transaction costs and other factors that could help strengthen the buy-signal generated by the trading strategies have to be closely considered before such a strategy is applied, especially in the cases where the results not were statistically significant.

Our three trading strategies all showed negative development over time for the periods examined, all results over 30 and 90 days were negative. In the analysis we discussed the negative results over longer periods, which could partly be explained by that insiders in many cases act on a contrarian strategy. That means that insiders want to invest in the company when it is undervalued by the market. The negative results over 30 and 90 days could be explained by that insiders invest during a time of a price dip in order to earn more over a longer time-period than we have tested. The event periods of 30 and 90 days also contain more factors of uncertainty which affect the results.

To base a trading strategy on reported insider trading is clearly not easy, even though FI reports clearly contain valuable information regarding the short-term development of prices for stocks in small companies. For investors with preference for investing over a couple of months is following insider purchases not interesting, it rather seems to result in a negative result. For investors willing to take on short-term investments is insider purchases in small companies containing valuable information that could be used, one thing to keep in mind is that the transaction cost matters, so the strategy may not suite everyone based on what transaction cost they face.

It is logical to assume that the rules and regulations do not catch all trades done on inside information. FI is continuously working on improving the regulations to try to stop illegal insider trading in order to keep the market fair and efficient. It would be very interesting to see the return of the trades based on insider information which is not captured by FI. That would show how much the information asymmetries in the market actually are worth. The problem for someone who wants to conduct such a research would face the same problem as FI is facing, there are loopholes and ways to make those trades impossible to find and classify as insider trading.

6.2 Suggestions for future studies

During our study have different ideas emerged on how other researchers can build on our finding and contribute to the overall knowledge in the field. There are a lot of different parts that could be interesting to study when it comes to insider trading. We would find following topics very interesting:

- A similar study which focus on the time-period before the actual trade, and the period between the trade and the publication of the trade.
- A similar study on less developed markets. Are the effects clearer on a less developed market than the Stockholm Stock Exchange?
- A similar study focusing on longer time periods. How is the development over 2 years, 5 years, 10 years? Does insiders having a long-term perspective in mind when they invest?
- A study with deeper focus on the laws and regulations. Which results could be explained by the different laws? Which results could be explained by loopholes in the laws (for example endowment policy)? How could the laws be improved? Are the results different in different countries depending on their laws?

7   References

Aczel, A. D., & Sounderpandian, J. (7th ed). (2009). *Complete Business Statistics.* McGraw-Hill.

Acosta, V., & Olofsson, J. (2006). Insynshandel i tillväxtbolag. *Företagsekonomiska Institutionen, Stockholm Universitet.*

Akerlof, G. (1970). The Market for "Lemons": Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Economics, 84*(3), 488-500.

Andersen, H. (3rd ed.). (1990). *Vetenskapsteori och metodlära: En introduktion.* Samfundslitteratur.

Brown, S. J., & Warner, J. B. (1985) Using Daily Stock Returns. *Journal of Financial Economics, 14*(1), 3-31.

Brown, S. J., & Warner, J. B. (1980). Measuring security price performance. *Journal of Financial Economics, 8*(3), 205-258.

Burell, K., & Kylén, J-A. (2003). *Metoder för undersökande arbete Sju-stegsmodellen.* Bonnier.

Burns, R. B. (2000). *Introduction to Research Methods.* Pearson Education Australia Pty Limited.

Burns, R. B., & Burns R. A. (2008). *Business Research Methods and Statistics Using SPSS.* London: SAGE Publications Ltd.

Chowdhury, M., Howe, J. S., & Lin, J-C. (1993). The Relation between Aggregate Insider Transactions and Stock Market Returns. *The Journal of Financial and Quantitative Analysis, 28*(3), 431-437.

Eckbo, E., & Smith, D. C. (1998). The Conditional Performance of Insider Trades. *The Journal of Finance, 53*(2), 467-498.

Elliot, J., Morse, D., & Richardson, G. (1984). The association between insider trading and information announcements. *The RAND Journal of Economics, 15(*4), 521-536.

Elton, E. J., Gruber, M. J., Brown, S, J,. & Goetzmann, W. N. (8th ed). (2011). *Modern Portfolio Theory and Investment Analysis.* Jon Wiley & Sons, Inc.

Fama, E. F. (1970). Efficient Capital Markets: A review of theory and empirical work. *The Journal of Finance, 25*(2), 383-417.

Fama, E. F. (1991). Efficient Capital Markets: II. *The Journal of Finance, 46*(5), 1575-1617.

Finansinspektionen.   Insynsregistret
http://www.fi.se/Marknadsinformation/Insynsregistret/

Graziano, A. M., & Raulin, L. M. (5th ed). (2004). *Research Methods: A process of inquiry.* Pearson Education Group, Inc.

Hirschey, M., Slovin, M. B., & Zaima, J. K. (1990). Bank debt, insider trading, and the return to corporate selloffs. *Journal of Banking and Finance, 14*(1)*,* 85-98

Jaffe, J. F. (1974). Special Information and Insider Trading. *The Journal of Business*, *47*(3), 410-428.

Jeng, L. A., Metrick, A., & Zeckhauser, R. (2003). Estimating the Returns to Insider Trading: A Performance-Evaluation Perspective. *The Review of Economics and Statistics, 85*(2), 453-471.

Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica, 47*(2), 263-292.

Kahneman, D., & Tverky, A. (1986). Rational Choice and the Framing of Decisions. *The Journal of Business, 59*(4), part 2, S251-S278.

Lakonishok, J. & Lee, I. (2001). Are insider trades informative?. *The Review of Financial Studies*, *14*(1), 79-111.

Larsson, S. (2006). Luckor i insiderlagstiftningen. Göteborgs Universitet.

Lerner, J. (1995). Venture Capitalist and the Oversight of Private Firms. *The Journal of Finance, L(1).*

Levy, H., & Lazarovich, E. (1995). Signaling theory and risk perception: An Experimental study. *Journal of Economics and Business, 47*(1)*,* 39-56.

Lindgren, S., & Ohlsson, P. (2008). Följa John: En studie om möjligheten att nå överavkastning genom att följa insidertransaktioner. Umeå Universitet.

Loire, J. H., & Niederhoffer, V. (1968). Predictive and Statistical Properties of Insider Trading. *Journal of Law and Economics, 11*(1), 35-53.

MacKinlay, A. C. (1997). Event Studies in Economics and Finance. *Journal of Economic Literature, 35*(1), 13-39.

Malkiel, B. G. (7th ed). (1999). *A random walk down Wall Street: including a life-cycle guide to personal investing.* Norton, cop, New York.

Müllern, T. (2012). *Video module: The origin of science – an introduction.* Retrieved 2012-03-01, from Jönköping International Business School website. http://hj-lxstream.hj.se/doplay/module1history_part1

Mujis, D. (2004). *Doing Quantitative Research in Education with SPSS*. SAGE Research methods. Online http://srmo.sagepub.com.bibl.proxy.hj.se/view/doing-quantitative-research-in-education-with-spss/n1.xml?rskey=dftDvP&row=7

Nasdaq OMX. http://www.nasdaqomxnordic.com/nordic/Nordic.aspx

Newman, I., & Benz, C. R. (1998). *Qualitative- Quantitative Research Methodology.*

Nobelprize.org. (2012). The Official Website of the Nobel Prize. *All Prizes in Economic Sciences.* Retrieved 27 Apr 2012 from http://www.nobelprize.org/nobel_prizes/economics/laureates/

Olsen, R. A. (1998). Behavioral Finance and Its Implications for Stock-Price Volatility. *Financial Analysts Journal, 54*(2), 10-18.

Penman, S. H. (1982). Insider Trading and the Dissemination of Firms' Forecast Information. *The Journal of Business, 55*(4), 479-503.

Rozeff, M. S., & Zaman, M. A. (1988). Market Efficiency and Insider Trading: New Evidence. *The Journal of Business*, *61*(1), 25-44.

Seyhun, N. H. (1985). Insiders' profits, costs of trading, and market efficiency. *Journal of Financial Economics*, *16*(1986), 189-212.

Seyhun, N. H. (1988). The Information Content of Aggregate Insider Trading. *The Journal of Business, 61*(1), 1-24.

Seyhun, N. H. (1998). *Investment Intelligence from Insider Trading.* First MIT Press.

Shefrin, H. (2003). *Beyond Greed and Fear.* Oxford Scholarship Online.

Shiller, R. J. (2003). From Efficient Markets Theory to Behavioral Finance. *The Journal of Economic Perspectives, 17*(1), 83-104.

Shleifer, A. (2000). *Inefficient Markets: An Introduction to Behavioral Finance.* Online: Oxford Scholarship Online (2003).

Sjögren, A. (2008). Ta rygg på insiders?. Umeå Universitet.

Soros, G. (1994). *The Alchemy of Finance: Reading the Mind of the Market.* John Wiley & Sons, Inc

Spängs, T. (2012, January 13). FI vill få stopp på kryphål för insiders. *Dagens Nyheter.* Retrieved 2012-04-20 from http://www.dn.se/ekonomi/fi-vill-fa-stopp-pa-kryphal-for-insiders.

Sveriges riksdag. (2000). *Lag (2000:1087) om anmälningsskyldighet för vissa innehav av finansiella instrument.* Retrieved March 2, 2012, from http://www.riksdagen.se/sv/Dokument-Lagar/Lagar/Svenskforfattningssamling/Lag-20001087-om-anmalningss_sfs-2000-1087/?bet=2000:1087

Tidningarnas Telegrambyrå. (2012, Mars 26). Insiderlucka täpps. *Privata Affärer.se.* Retrieved 2012-04-20 from http://www.privataaffarer.se/nyheter/insiderlucka-tapps-330661.

Walliman, N. (2001). *Your research project: a step-by-step guide for the first-time researcher.* SAGE Publications.

Wong, M. C. S., Cheung, Y-L., & Wu, L. (2000). Insider Trading in the Hong Kong Stock Market. *Asia-Pacific Financial Markets, 7*(3), 275-288.

8   Appendix

8.1   Table of CAAR for Small Cap intensive

Event Period	CAAR	Standard deviation	T-Value
Day 0 → 5	1.367%	0.0072	1.9012*
Day 0 → 10	1.372%	0.0097	1.4096
Day 0 → 30	-1.487%	0.0164	-0.9094
Day 0 → 90	-7.910%	0.0280	-2.8246**

## 8.2   Small Cap intensive trading graphs

Figure 8.2.1. CAAR for 5 days.
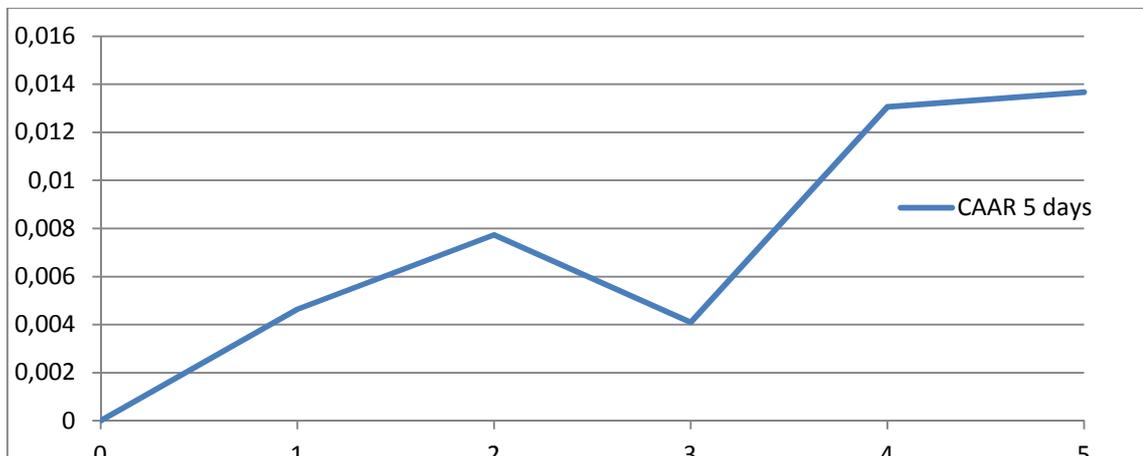
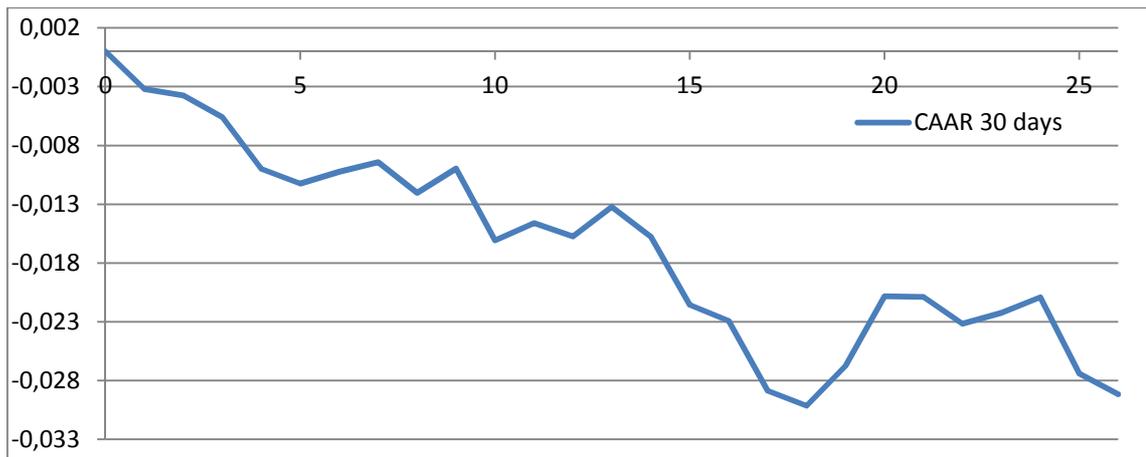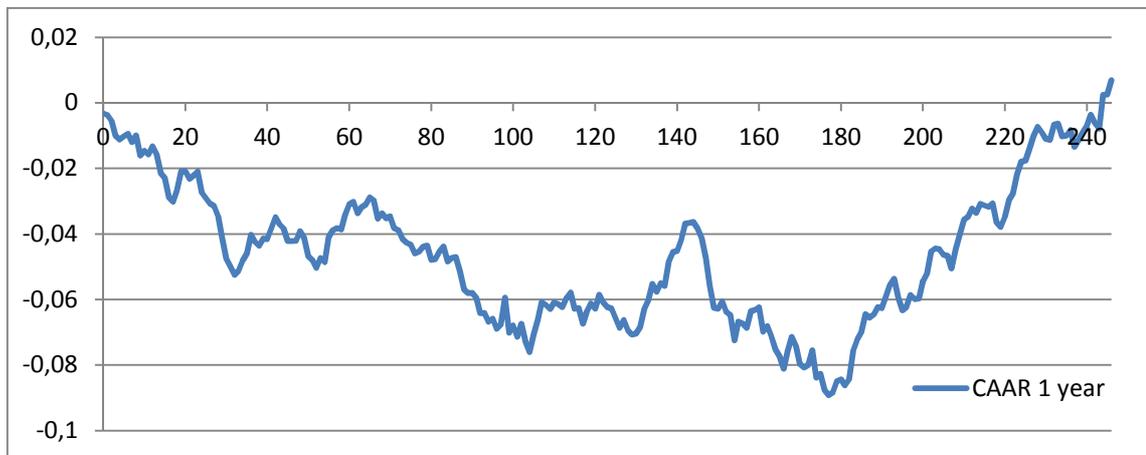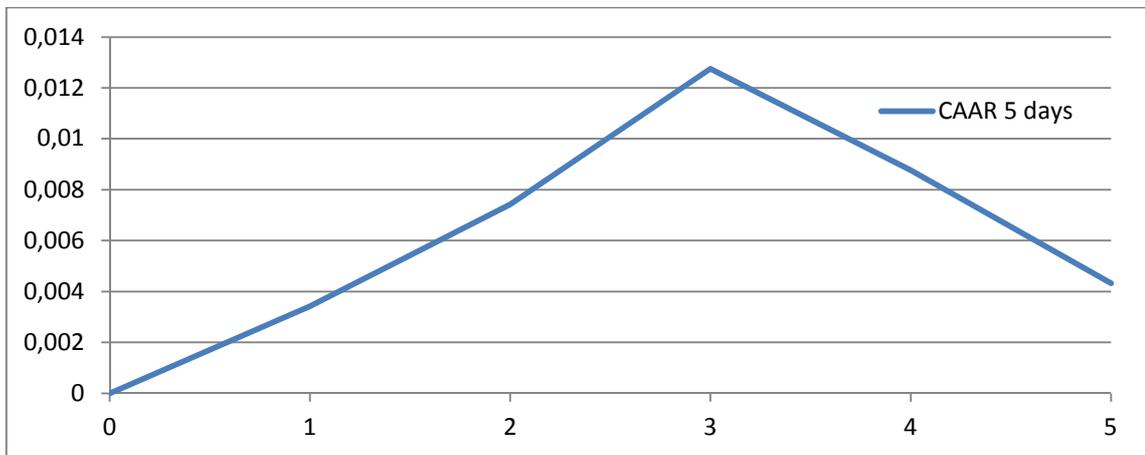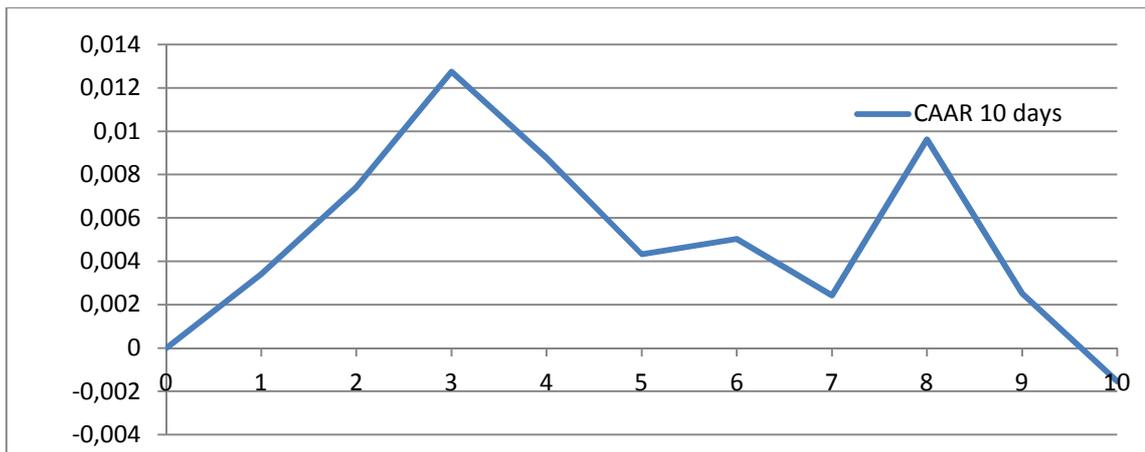Figure 8.2.2. CAAR for 10 days.
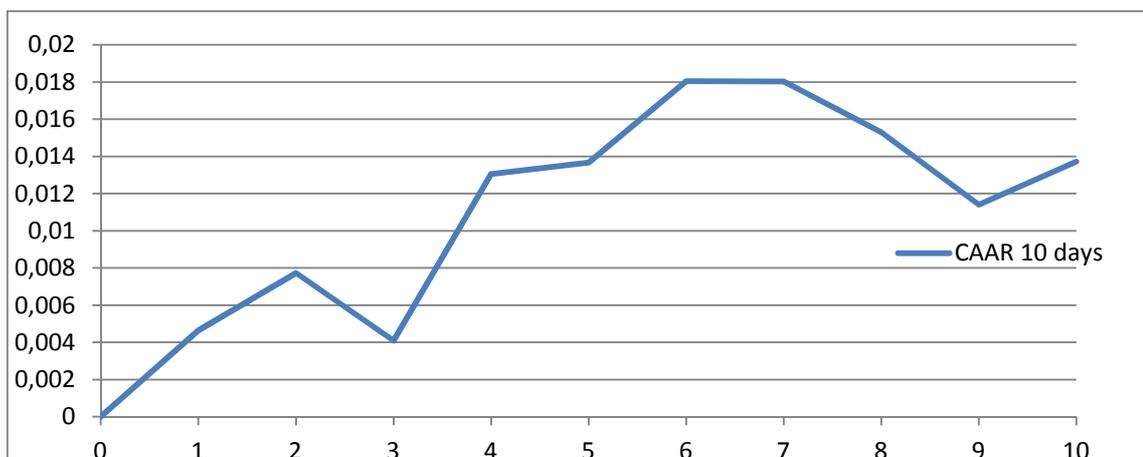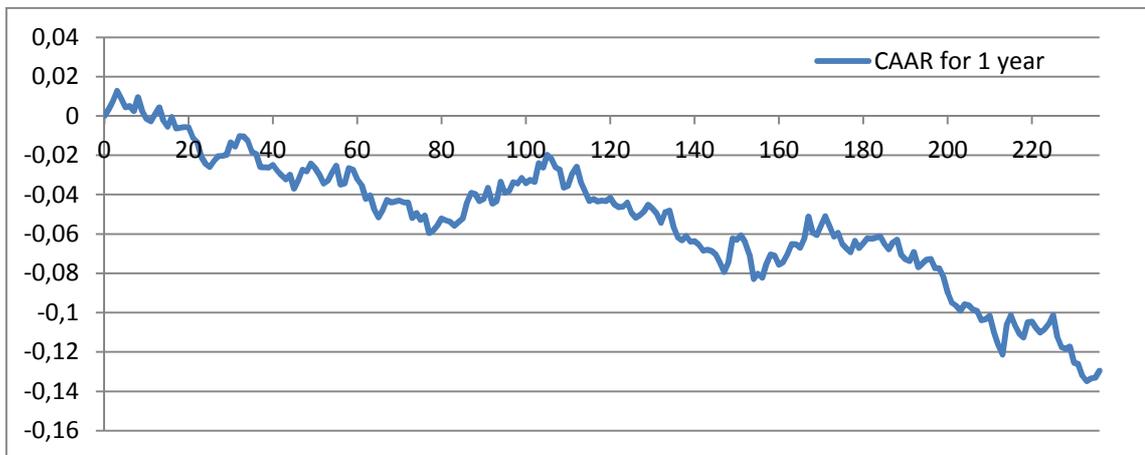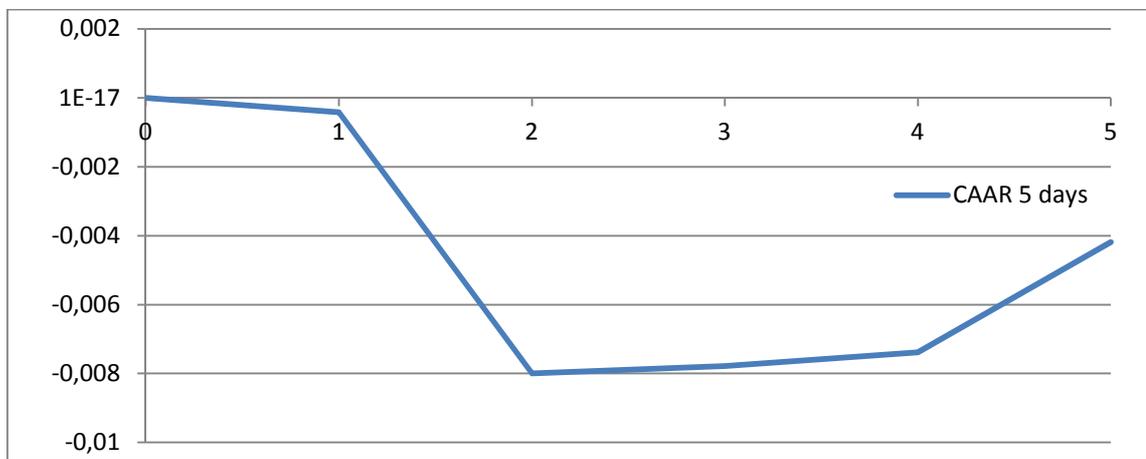
Figure 8.2.3. CAAR for 30 days.
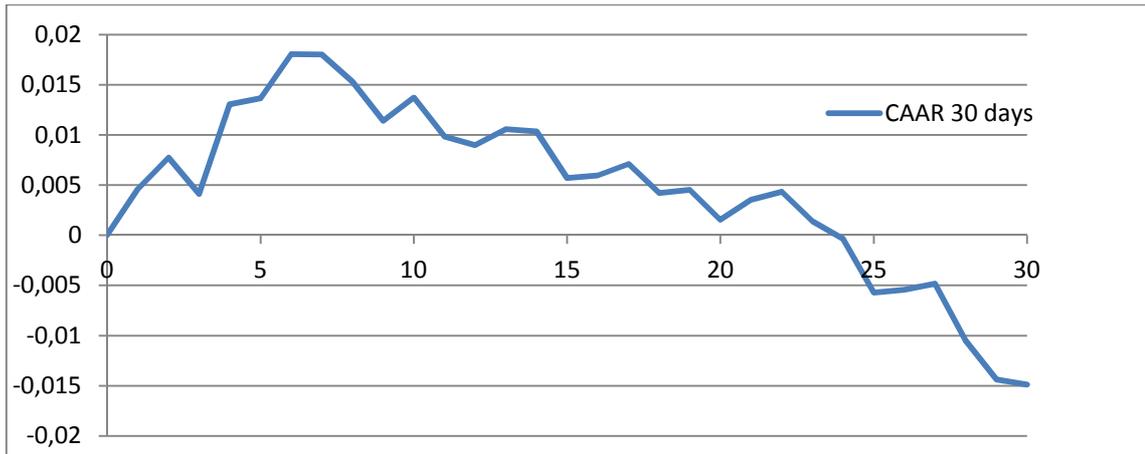
Figure 8.2.4. CAAR for 90 days.
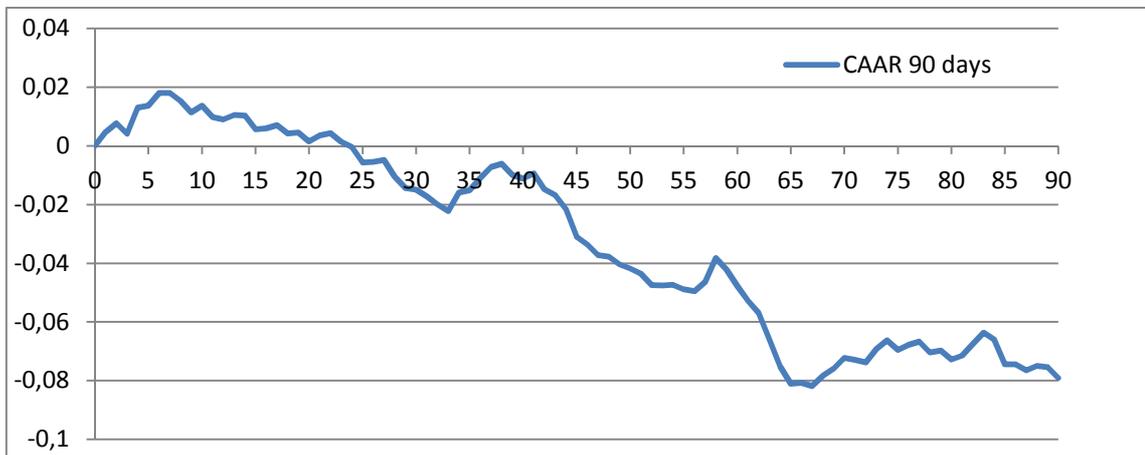
Figure 8.2.5. CAAR for approximately 1 year.
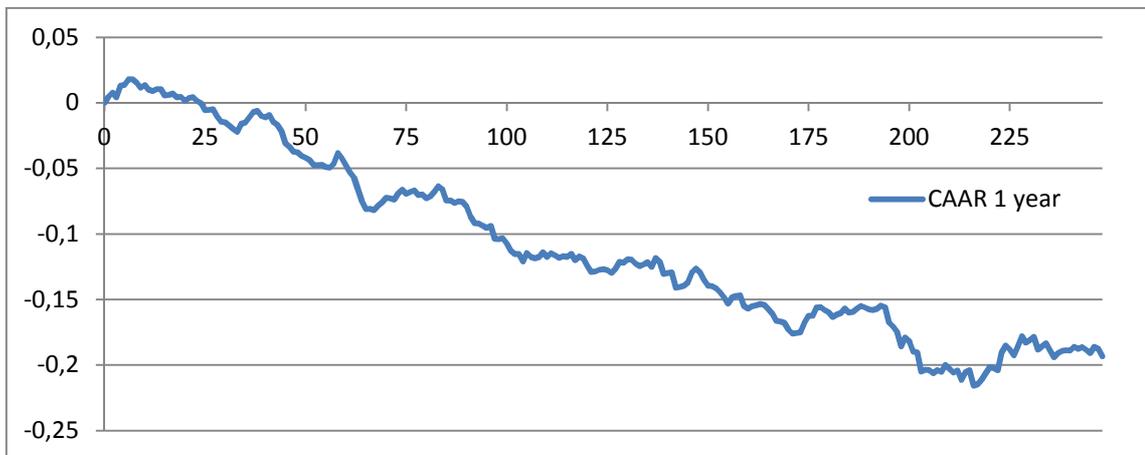
8.3 Table of CAAR Mid Cap intensive

Event Period	CAAR	Standard deviation	T-Value
Day 0 → 5	-1.126%	0.0087	-1.2976
Day 0 → 10	-1.607%	0.0118	-1.3682
Day 0 → 30	-4.108%	0.0197	-2.0832**
Day 0 → 90	-5.808%	0.0338	-1.7192

8.4 Mid Cap Intensive trading Graphs

Figure 8.4.1. CAAR for 5 days.
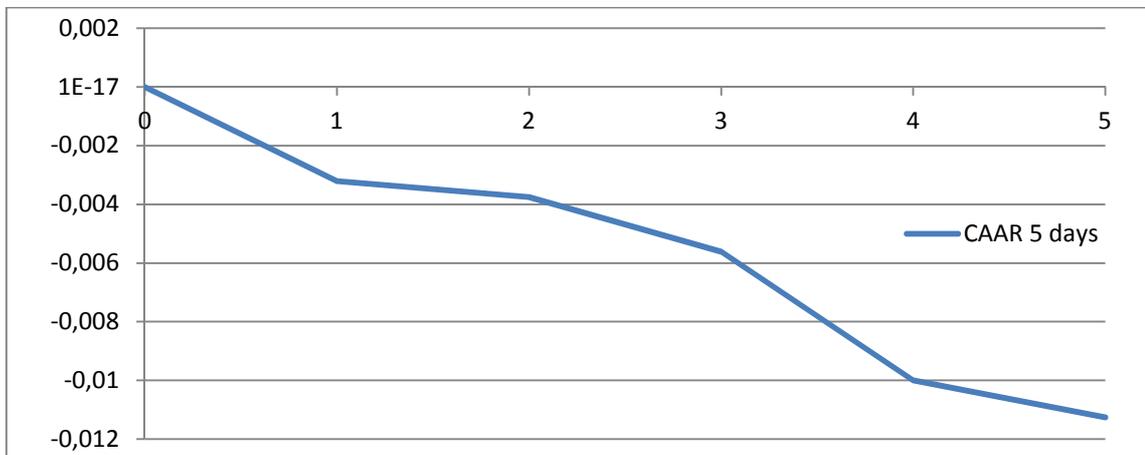

Figure 8.4.2. CAAR for 10 days.
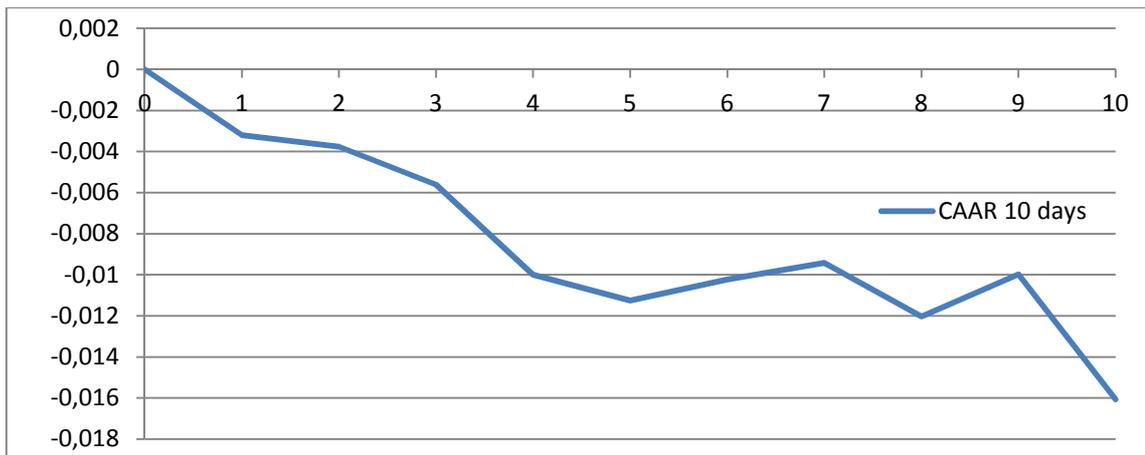
Figure 8.4.3. CAAR for 30 days.

Figure 8.4.4. CAAR for 90 days.
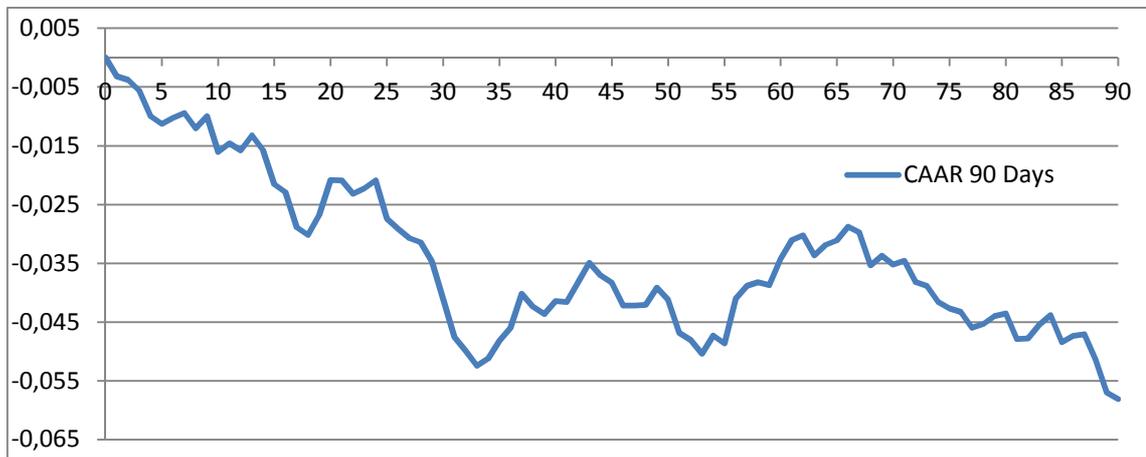
Figure 8.4.5. CAAR for approximately 1 year.

8.5   Table of CAAR large volume purchases, Small Cap

Event Period	CAAR	Standard deviation	T-Value
Day 0 → 5	0.433%	0.0120	0.3613
Day 0 → 10	-0.153%	0.0162	-0.0946
Day 0 → 30	-1.343%	0.0272	-0.4933
Day 0 → 90	-4.215%	0.0467	-0.9035

8.6   Large volume purchases Small Cap graphs

Figure 8.6.1. CAAR for 5 days.

Figure 8.6.2. CAAR for 10 days.
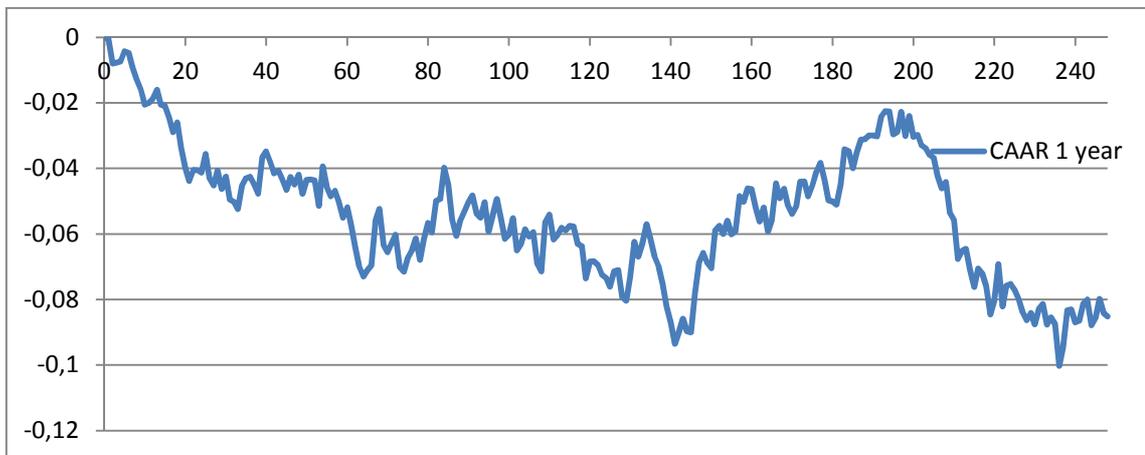
Figure 8.6.3. CAAR for 30 days.
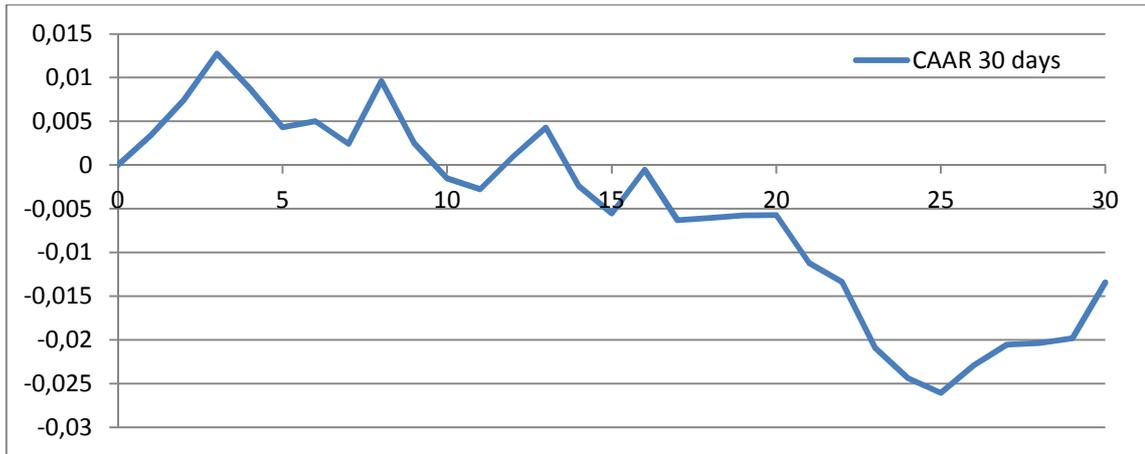
Figure 8.6.4. CAAR for 90 days.
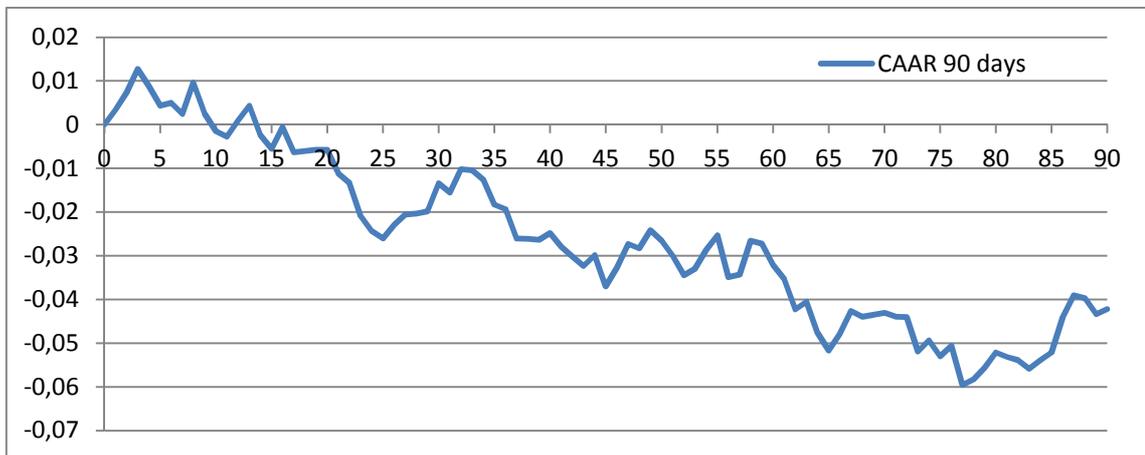
Figure 8.6.5. CAAR for approximately 1 year.

8.7　Table of CAAR large volume purchases, Mid Cap

Event Period	CAAR	Standard deviation	T-Value
Day 0 → 5	-0.413%	0.0101	-0.4128
Day 0 → 10	-2.062%	0.0137	-1.5020
Day 0 → 30	-4.245%	0.0231	-1.8433*
Day 0 → 90	-5.021%	0.0395	-1.2710

8.8　Large volume purchases Mid Cap graphs

Figure 8.8.1. CAAR for 5 days.
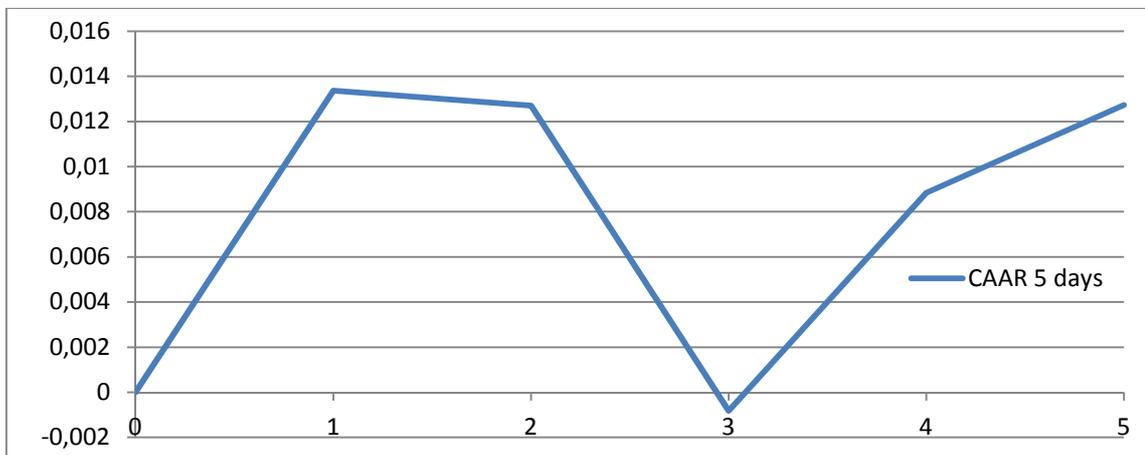

Figure 8.8.2. CAAR for 10 days.
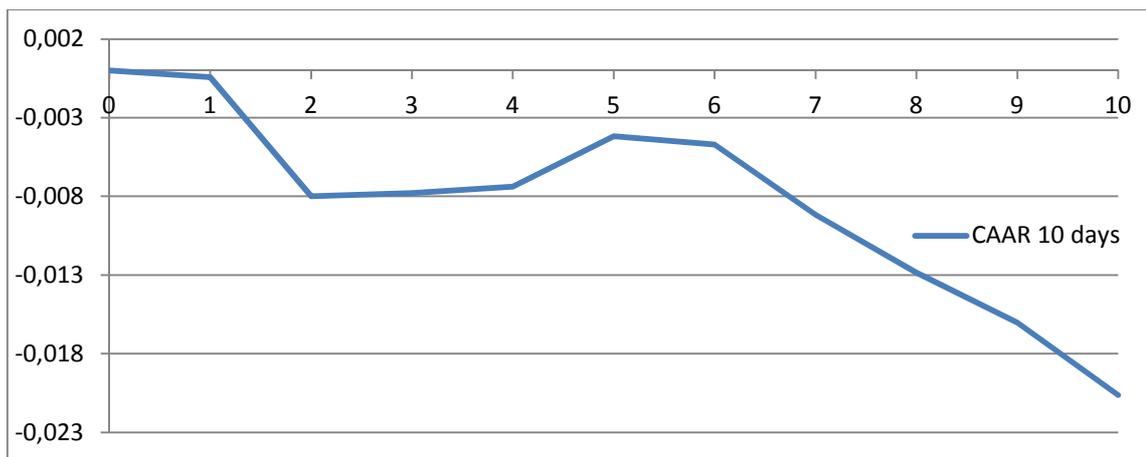
Figure 8.8.3. CAAR for 30 days.
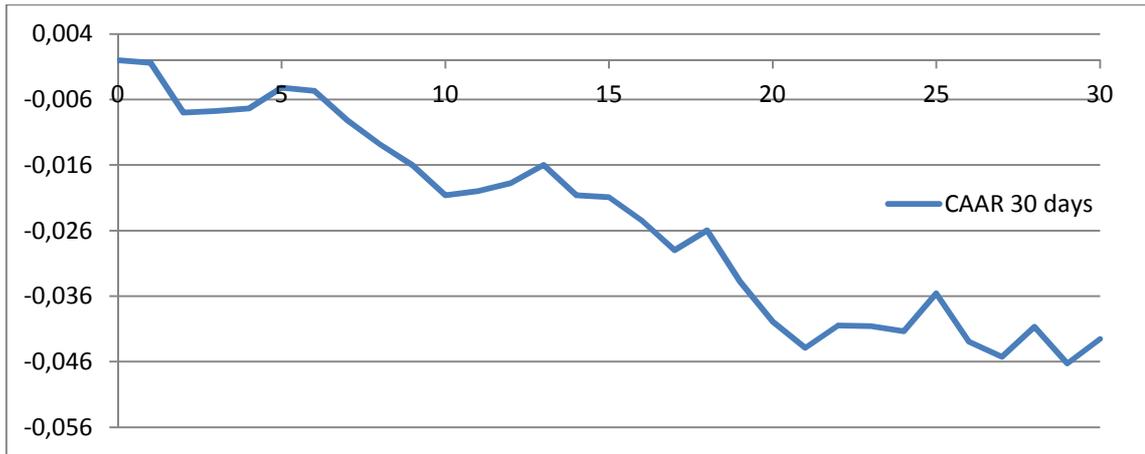
Figure 8.8.4. CAAR for 90 days.
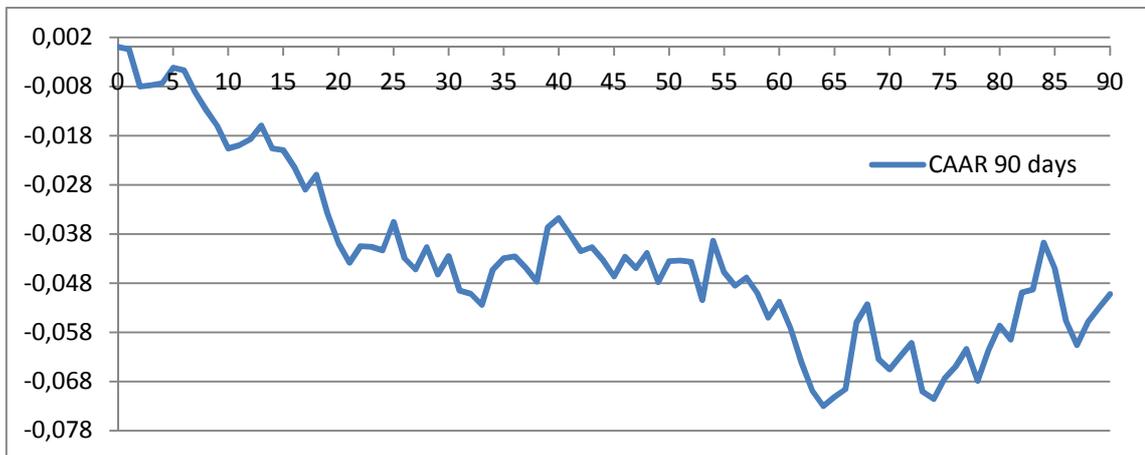
Figure 8.8.5. CAAR for approximately 1 year.

8.9 Table of CAAR for the third test (intensive criteria + large transactions)

Event Period	CAAR	Standard deviation	T-Value
Day 0 → 5	1.273%	0.0155	0.8202
Day 0 → 10	-0.704%	0.0206	-0.4787
Day 0 → 30	-2.601%	0.0350	-0.7430
Day 0 → 90	-6.125%	0.0603	-1.0203

8.10 Third test (intensive criteria + large transactions) graphs

Figure 8.10.1. CAAR for 5 days.

Figure 8.10.2. CAAR for 10 days.
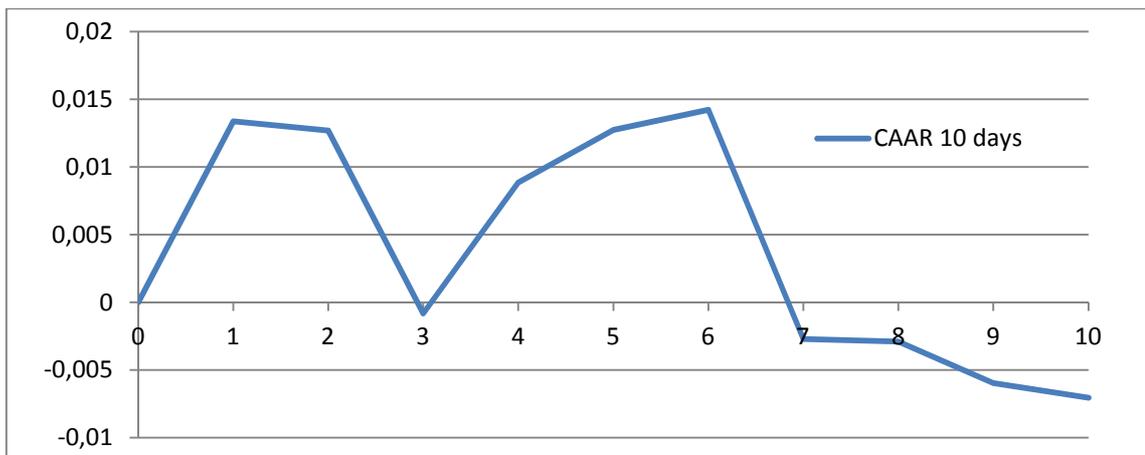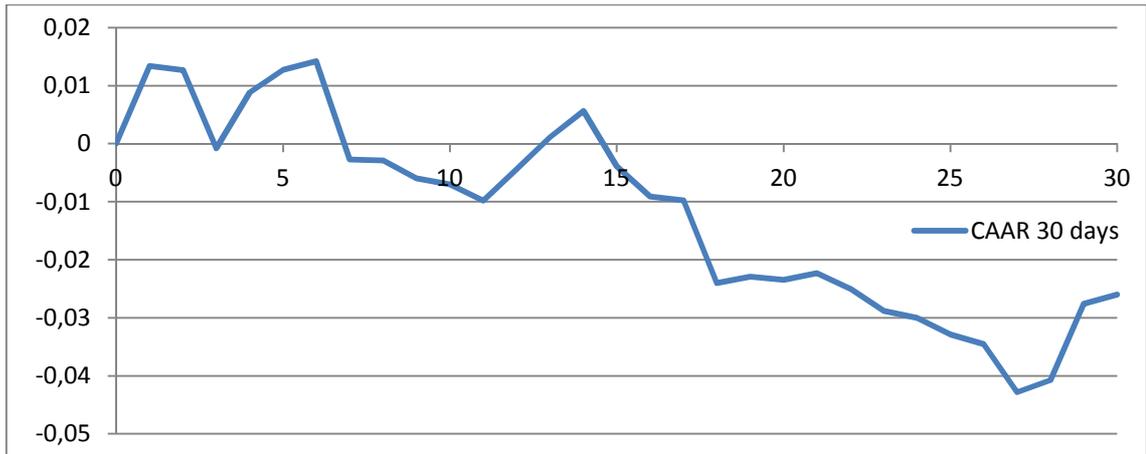
Figure 8.10.3. CAAR for 30 days.
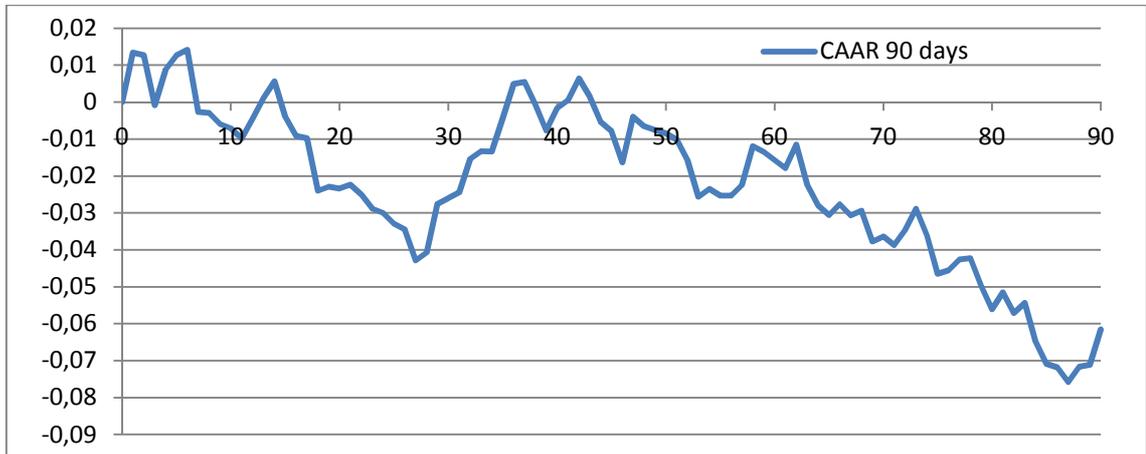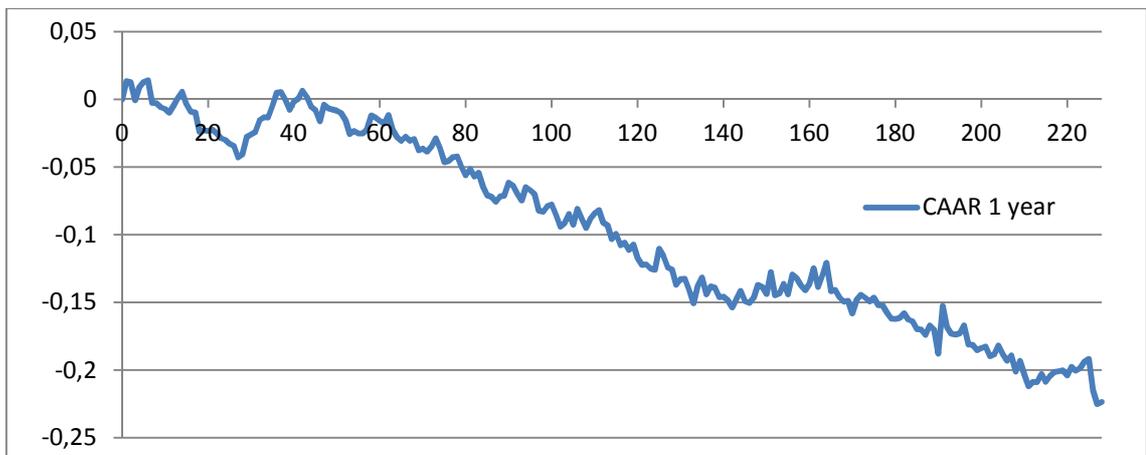

Figure 8.10.4. CAAR for 90 days.

Figure 8.10.5. CAAR for approximately 1 year.

8.11 Development of Indexes during the test period

Figure 7.11.1 Development of Small Cap 2007-2009.

Figure 7.11.2 Development of Mid Cap 2007-2009.