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Trading with Zero Commission

-An event study on the impact of zero commission trading

Abstract

Online trading has created a less controlled environment where investors have to rely on their own capabilities. The new technology has lead to excessive trading, higher volatility and excessive risk taking decreasing investor returns. This paper seeks to study the effects of an online broker scheme offering certain shares to be traded with zero commission over a specific period of time. An event study is conducted in order to determine the effects of zero commissions on investor returns using the Cumulative Average Abnormal Return measure. The main findings are that even though 50% of the shares in the sample are subject to increased liquidity the study finds no significant abnormal returns in relation to zero commission trading.

Author:
Alexander Norberg, 18990

Supervisor:
Inaki Rodrigues

Definitions

Event	A specific share is traded on zero commission for 20 days
Day	Each day mentioned in this thesis refers to a day when the Stockholm Stock Exchange is open for trading
Week	One week is defined as five days during a normal trading week
AR	Abnormal Returns
CAR	Cumulative Abnormal Returns
CAAR	Cumulative Average Abnormal Return
Portfolio	A portfolio of stocks, subject to the zero commission during a period of one month, held over the event period

1. Introduction

”We know that zero commission trading increase liquidity”

-Klas Danielsson, CEO Nordnet

The Internet has significantly changed the way investors receive information and their ability to act on that information. Online trading is one of many innovative services that have arisen from the rise of information technology. Online trading has decreased average trading costs and has given investors access to more investment alternatives, and captured a majority market share in retail securities trading. However, the internet does not only bring good things to the retail investment community. The focus of online trading has been mostly on cutting costs, also leading to a decrease in the service provided to retail investors. The increased accessibility has drawn inexperienced investors to the market and created a much less controlled environment where investors have to rely on their own capabilities.

Online trading of stocks has been suggested as a cause for excessive trading, higher volatility and excessive risk taking. Furthermore, the increased amount of information available has led to an overconfidence that has decreased yearly average investor returns by up to 5 percent.[1] This study seeks to analyse how an online scheme of zero commission trading periods set up by online brokers affect investor returns. The aim of this study is to provide useful information to investors in understanding the effects of zero commission trading in the Swedish stock market.

The paper is divided into seven sections. The next, section two, will explain the methodology approach for this study. Section three will present the theoretical framework. The results are presented in section four followed by an analysis and a summary in sections five and six. A reference list and appendixes are included in section seven and eight.

1 Barber, Brad M., and Terrance Odean (2000)

1.1 Background

Trading financial securities incur transaction costs.[2] The impact of such costs on asset prices has been subject to numerous empirical[3] and theoretical studies.[4] In this paper the terms commission and transaction costs will be used interchangeably referring to the actual fixed or floating fee that brokers charge the investor on every trade.

In Sweden, the "share of the month" scheme was set up by Nordnet Securities Bank in 2003 and Avanza, two Swedish online brokerage firms, with the intention to increase liquidity in certain shares.[5] Nordnet is the largest retail securities broker in the Nordic region and Avanza is the sixth largest, calculated by number of trades executed.[6]

Every month different shares are offered, to the members who hold an account with Nordnet or Avanza, to be traded at zero commission. This implies that the trading cost is zero whether you buy or sell at any amount within the course of this period. The terms *share of the month scheme*, *zero commission trading periods* and *the event* will be used interchangeably to describe the same phenomenon.

One might ask what the purpose for offering zero commission is. According to information director at Nordnet Jessica Gertun it is the underlying company that pays for the campaign with the intention to reduce the amount of minor[7] shareholders in order to increase liquidity. Accordingly they believe that minor shareholders will either sell their uneven lots of shares or start buying from other minor shareholders to reach an even lot. From the companies perspective there is great incentive to engage in liquidity increasing activities since research has shown that it is linked to significant stock price gains.[8]

2 A partial list of such costs includes bid-ask spread, market-impact costs, delay and search costs, and direct transactions fees (including brokerage commissions, exchange fees, and transactions taxes)
3 Y. Amihud, H. Mendelson, (1986)
4 A. Admati, P. Pfleiderer, (1985)
5 Jessica Gertun, Nordnet
6 Dagens Industri 2005-10-13
7 Defined as shareholder holding less than one full trading lot of shares
8 Amihud an Mendelson (1986)

The general intention of the scheme is thus to increase liquidity in specific stocks by creating a market which trades in larger lots of shares. The increased long term liquidity can either be explained by the fact that trading costs per share decrease when one deals with larger amounts and that it is easier to find a party who is willing to buy or sell the exact same amount of shares (i.e. easier matching and faster execution).

I have not found any prior studies supporting the theory that this kind of scheme actually increases liquidity or shareholder wealth. Nordnet has reported increases in liquidity of 600% (Tele2), 745% (TeliaSonera), 630% (H&M) and 1400% (Nordea) respectively for certain stocks that have been subject to the zero commission scheme.[9] This is interesting from a pricing perspective since it could imply that stock prices also increase during this period. The link between liquidity and asset prices will be explained further in section three.

1.2 Problem Discussion

Prior research papers confirm the hypothesis that investors are net buyers of attention grabbing stocks such as stocks in the news or stocks experiencing high "abnormal" trading volumes.[10] Since Nordnet and Avanza inform all their clients of the upcoming shares that will be traded at zero commission there is a heightened attention and an increased amount of information surrounding this stock at that specific time period. Additional research on why investors would act or behave differently when subject to the zero commission scheme is presented in section three; Theoretical Framework. It would therefore be interesting to see if these net buyers are negatively or positively affected in terms of stock returns during the mentioned periods. In other words can we detect any abnormal returns (AR) during the zero commission periods?

[9] Nordnet Press Release, 2003-09-10
[10] Barber and Odean (2005)

There is an extensive range of academic research confirming that liquidity can be priced[11] and that a liquidity decline is associated with a significant loss of shareholder wealth.[12] The liquidity premium would according to theory go down if liquidity goes up during the zero commission periods, in return creating an upward move in the stock price. If this could be statistically verified one could set up a trading strategy to only buy stocks that are traded at zero commission and earn excess returns.

1.3 Objective

Using the Cumulative Average Abnormal Returns (CAAR) and a portfolio of shares subject to the zero commission scheme the objective of this paper is to analyse how the share a month scheme affect investor returns. In other words I will test if it is a good idea to hold these shares over different time intervals during a period of zero commission.

1.4 Delimitation

All companies included in this study where hand picked and all subject to the share a month scheme via either the Nordnet or Avanza trading platform. Nordnet and Avanza would not disclose a full list of all companies for the purpose of this study, which has limited the amount of shares in the sample to 33. Data for the identified companies has been collected for the time period January 2003 to December 2005. This is because the zero commission trading was introduced as recently as 2003 and the shares in the sample where subject to the scheme from January 2003 and onwards.

The implication of not receiving a full list of names from the brokers has limited my study to one investment portfolio. An alternative approach would have been to use two or more portfolios constructed by criterions such as market capitalisation or risk.

The paper will limit itself by solely covering stocks during the defined periods and disregard other types of financial instruments such as options or convertibles. This approach, in line with empirical findings of Jeng et al (2003), will indicate a more significant signal to the financial markets.

[11] Amihud and Mendelson (1986)
[12] Angel et al (2004)

2. Methodology

This chapter will describe the methodological approach applied. The chapter also discusses the reliability and validity of the research method and the source data.

2.1 General Approach

There are two different approaches for observing reality when conducting empirical research.[13] One is the *inductive method* which implies that the researcher observes the reality and then tries to build up a perception of the case in question. From this perception the researcher studies the case in order to attain scientific evidence for the theories.

The second approach, *the deductive method*, implies that the researcher finds an existing theory and uses this as a base for further analysis. The theory is tested and subsequently either verified or developed further.

In this case the share a month scheme is first observed and then analysed from a theoretical perspective. The theory that increased liquidity and its link to share prices is developed into a perception that share prices should be affected during this specific period. In this sense, the thesis is based on both the *inductive and deductive method* since the findings are linked to existing theories.

2.2 Choice of Method

A method can either be *quantitative* or *qualitative*. The *quantitative* method is more structured and formal and uses numerical observations to describe a certain phenomenon and is more structured in its approach. The *qualitative* approach is focused on a verbal description and seeks a more general understanding of the same issue.

[13] Holme and Solvang (1997)

This thesis requires the collection of a set of data to be analysed and the preferred method for this is the *quantitative method*.[14] To study the impact of certain events on the stock market it is useful to apply the quantitative event study methodology.[15] Using daily stock data we can analyse how the stock market reacts to a certain event such as the introduction of zero commission on a specific set of stocks. Accordingly, and in line with the efficient market hypothesis, the event should have an immediate impact on the stock price.[16] A further discussion on the efficient market hypothesis is provided in section 2.5. The event can be seen as providing the market with new information which should be discounted into the share price whether it is positive or negative. With this background an event study seems like an appropriate approach for this particular study.

2.3 Literature and data sources

This study uses secondary data and information collected from sources such as databases, working papers, articles and search engines on the Internet. The data on stock prices, daily closing prices, and stock turnover was collected from Datastream. The working papers where mainly looked up over the internet or found via academic research databases such as JSTOR.

2.4 Data selection criteria

To study the impact of the share a month scheme on the stock market I have selected a number of shares that have been subject to this scheme. The dates for when a share was subject to zero commission trading was collected from Nordnet, Avanza, the companies own records, and through official press releases found on the companies' web sites. The total number of zero commission trading periods included in this study is 33.

[14] Holme and Solvang (1997)
[15] MacKinley (1997)
[16] Fama (1969)

Since smaller firm's stocks are more costly and difficult to trade than larger firm's stock, they should offer higher returns than larger stocks do. In a stable market the *size effect theory* states that a portfolio of small stocks will outperform a portfolio of large stocks with equal intermediate term risk. Since it is well known that small stocks are less liquid than larger stocks the *size effect* can be explained by the *liquidity premium*.[17] One could therefore argue that the share a month scheme could have a more profound impact on the small cap stocks.

Grammatikos and Papaioannou examined 88 non financial companies wanting to increase the liquidity of their stock by changing their listing from NASDAQ to NYSE. Through conducting an event study they found that only previously illiquid NASDAQ stocks experienced liquidity gains whereas the more liquid stocks did not experience a significant change in liquidity.[18]

2.4.1 Non Synchronous Trading

Since some shares that are subject to this study are to be considered thinly traded the issue of non-synchronous trading arises. Especially when analysing daily market data we can observe extreme jumps and falls or no movements at all for a period of time. Previous research has shown that non-trading-adjusted beta estimates for thinly traded securities are approximately 10-20 percent larger than unadjusted estimates.[19]

Prem Jain (1986) considered the influence of thin trading on the distribution of the AR. However, by comparing the distribution of the AR when using the Scholes-William approach for estimating betas in the market model and the distribution of AR using the usual OLS betas he found that the differences where minimal. This indicates that in general adjustments for thin trading are not imperative. I am therefore including a number of stocks that can be considered thinly traded to create a larger sample.

[17] Fernholz and Karatzas (2005)
[18] Grammatikos, T. and Papaioannou, G.J. (1986)
[19] Myron Scholes and Williams (1977)

2.5 Event study

The event study has been a frequently used tool for research within the field of finance since the 1970s. Early event study publications were conducted by Ball and Brown (1968) along with Fama, Fisher, Jensen and Roll (1969). The purpose of the methodology is to study how financial markets or a separate company's stock is reacting to a specific event. Advantages of an event study originate in the presumption that as soon as an event occurs, it will immediately be reflected in the stock price.[20] One underlying assumption is that the market is efficient and immediately reacts to new information. This was explained by Fama in 1970 in his paper "Efficient Capital Markets" where he presented the efficient market hypothesis. The Efficient Market Hypothesis (EMH) states that no single buyer or seller can affect prices, investors are rational, seek to maximise their profits and that all investors receive information simultaneously.

The news that a share is to be traded on a zero commission basis can be seen as such an information flow and could therefore have an impact on the stock.

The following seven steps are the foundations of a correctly specified event study:[21]

1. *Event definition*

   It is important to define an event that is of major importance. Also, a suitable length of the event window should be defined as it is the period for which the company stock price is analysed. The event window can span a combination of the period before, on or after an event date.

[20] MacKinley (1997)
[21] MacKinley (1997)

2. *Selection criteria*

The second step is to decide which companies to include in the study. The selection can be made according to industry, market capitalisation, geographical area or any other criterion. This study will focus on Swedish shares registered on the Stockholm Stock Exchange that have been selected for inclusion in the zero commission schemes.

3. *Normal and Abnormal returns*

To measure the effect of the event on the stock price one should calculate the difference between the normal return and the observed return to obtain the abnormal return. The normal return is defined as the expected return given that there is no event.

4. *Estimation procedure*

Abnormal returns are calculated using the expected returns which can be calculated in several different ways. The most widely used approach is the market model and this study will use the simplified adjusted market model. The choice of the model is motivated below.

5. *Testing procedure*

It is imperative to test for statistical significance in order to validate the results and their probabilities. The hypothesis used for this will be presented below.

6. *Empirical results*

The empirical results will be presented graphically and in tables to give the reader further insight into the study and its results.

7. *Interpretations and conclusions*

   The interpretation of the empirical finding is analysed and conclusions are drawn. In this part it is also important to infer if there is actually an economical significance behind the finding. Economical significance refers to the ability to exploit the findings successfully through different investment strategies.[22] We also discuss the rationality behind the results by referring to other financial theories in the theoretical framework part.

2.5.1 Event and Event window Definition

The event studied is the period for which a company's shares are included in the share a month scheme which allows investors to trade at zero commissions. This event qualifies as having a major impact on the stock for reasons explained in previous sections where its link with liquidity and its effect on prices is explained.

The event date is defined as T_0 which is the day the share starts trading at zero commission. The months before and after T_0 will be termed – T_1, T_1 & T_2 and the beginning of the estimation window is – T_2. Only the five trading days per week are counted and the duration of the estimation window is -T_2 to – T_1 or 140 trading days as illustrated in Figure 1.

[22] Pesaran Timmermann (1995)

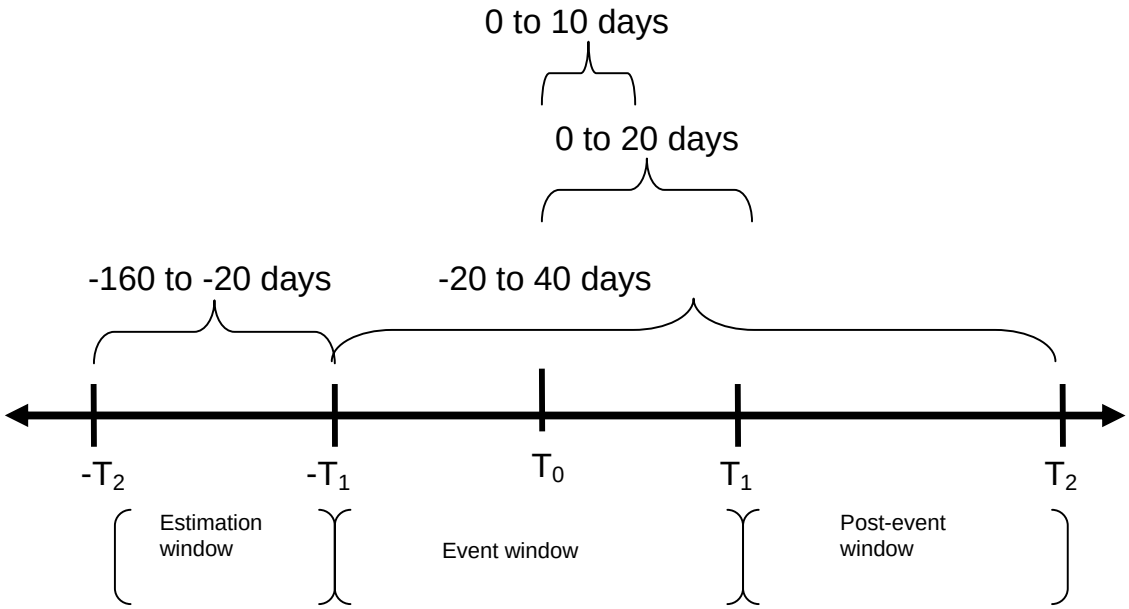


Figure 1 Event and Estimation Window

The reason for having a longer event window is to capture any abnormal returns prior to the period caused by traders foreseeing a potential increase in the stock prices. Also note that three different event windows are used apart from the actual day of the event. The reason for using a one day event window is in line with the theories that new information should have an immediate impact on stock prices (EMH). The longer one ($-T_1$ to T_2) is to capture any increases in the stock prices before and after the zero commission periods. The medium length window (T_0 to T_1) will capture abnormal returns during the zero commission trading period only and the short 10 day (T_0 to T_0 +10 days) window will capture if there is an initial abnormal effect during the event that is not capture by the longer windows. Daily data is used since it permits a more precise measurement of abnormal returns and a more informative study of the events effect on returns.[23]

[23] Khotari and Warner (2005)

2.5.2 Calculation of returns

Calculation of normal and expected returns is defined in Formula 2.1 where P_t is the closing price day t and P_{t-1} the closing price the day before.

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

Formula 2.1 Stock return and AFGX return formula

2.5.3 Abnormal returns

The most widely used model in relation to event studies is the *adjusted market model* which will also be used in this study.[24] The method is similar to the more advanced *OLS Market Model* which adjusts for risk and is defined in Formula 2.2. There is no risk adjustment in the adjusted market model and α_i and β_i are as a consequence set to 0 and 1 respectively. I therefore assume that the return of the observed portfolio should be somewhat equal to the market return which in this case constitutes of the value weighted Affarsvarlden generalindex[25] (AFGX). AFGX is as broad index covering the average return on the Stockholm Stock Exchange and is used as reference by many professionals in the financial sector.[26]

[24] Brown and Warner (1980) (Even though this source might seem outdated I have not found any more recent papers contradicting their findings.)
[25] www.afv.se
[26] Fredrik Hellstrom

This study seeks to detect potential abnormal returns from an investor's perspective. Investors in the Swedish stock market tend to evaluate performance of their trading strategies compared to the AFGX index.[27] Therefore, the choice of a value weighted index, such as the AFGX, as to an equally weighted index is preferred. The AFGX index covers mining, industrial, consumer goods, healthcare, financial, IT, telecom, media and entertainment, and service companies which is a similar to the composition of the portfolio in this study. A further reason for choosing AFGX instead of the OMX index is that AFGX also includes small cap companies like the ones included in this study. The abnormal return will be calculated as the difference between a certain stock's $R_{i,t}$ return, day *t*, and the market return (AFGX return) $R_{m,t}$, day *t* as illustrated in Formula 2.3.

$$AR_{i,t} = R_{i,t} - \left(\alpha + \beta \times R_{m,t}\right)$$

Formula 2.2 OLS Market Model

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

Formula 2.3 Simplified Adjusted Market Model

The choice of using the more simplified adjusted market model is based on earlier studies showing that it identifies abnormal returns as accurately as the OLS market model.[28] According to the same source it is important to identify the day of occurrence for the event as this will have a more profound impact on the discovery of abnormal returns than the choice of the model. In this case there is not much uncertainty surrounding the date of the event which yields for a more correctly specified model.

[27] Ibid
[28] Brown and Warner (1980)

All stocks will be placed in a certain group according to market capitalisation and the abnormal returns will be calculated for every day t for the two different event windows.

The next step is to calculate the cumulative abnormal return (CAR_i) for each stock subject to an event at time t.

$$CAR_i(T_0, T_1) = \sum_{t=T_0}^{T_1} AR_{i,t}$$

Formula 2.4 Calculation of CAR

The CAR as calculated in Formula 2.4 aggregates each security's AR over time. The cumulative abnormal return measured is thus the same as the returns from a trading rule which buys the securities at the beginning of the period and holds it through the end of the period. In other words, CAR and buy and hold abnormal returns correspond to the security holder's wealth change around the event for each security, given a certain window of time. As an example Formula 2.4 calculates the medium term window's CAR..

2.5.4 Cumulative average abnormal return (CAAR)

CAAR is calculated with the intention to capture the abnormal return effect of zero commission trading for a certain portfolio of stocks. This is calculated by aggregating the CARs for each stock and dividing them with the number of stocks in each portfolio. The CAAR will thus capture the total average effect of zero commission trading periods for a number of stocks in a specific portfolio and is defined in Formula 2.5, where *n* is the number of stocks.

$$CAAR_t = \frac{1}{n} \sum_{i=1}^{n} CAR_i(t,t)$$

Formula 2.5 Calculation of CAAR

Why use portfolio returns? A portfolio of stocks accounts for any cross sectional dependence since the variability of the portfolio returns over time incorporates whatever cross dependence that exist among the returns on individual events. However, with the drawback that there might be greater return variability and the use of historical time-series variability might understate the true variability of the event-period abnormal performance.[29]

The portfolio used in this study is equally weighted and includes all available[30] stocks that have been subject to zero commission trading through Avanza and Nordnet. The reason for including all names in one portfolio is to provide results that are statistically significant in accordance with the Central Limit Theorem (see section 2.6.1). A list of the stocks included is provided in Appendix 7.1.

2.6 Statistical analysis

In order to test if the abnormal returns are statistically significant a significance test will be conducted. There are *parametric* and *non-parametric* tests which are the most frequently used tests for this kind of quantitative research.

Generally, non-parametric tests require less stringent assumptions but use less of the information embedded in the data. Non parametric tests can therefore be less powerful than parametric tests when the assumptions for the parametric tests are met.[31] This study will implement the parametric two sample t-test. The two sample t-test is a hypothesis test for answering questions about the mean, in this case the CAAR, where the data is collected from two random samples of independent observations and is discussed further in section 2.8.

[29] Khotari and Warner (2005)
[30] These are the names, with exact dates for inclusion in the zero commission scheme, I could find.
[31] Gujarati (2003)

2.6.1 The Central Limit Theorem

The central limit theorem states that the distribution of the sample mean tends to a normal distribution regardless of the distribution of the population from which the random sample is drawn. However, the sample should contain no less than 30 stocks for the central limit theorem and thus the normal distribution assumption to hold. The portfolio in this study includes 33 stocks.

2.7 Hypothesis

The purpose of this paper is to test if periods of zero commission costs affect stock returns. The zero and null hypothesis will be tested in order to statistically verify if the effect is a random phenomenon or not.

H_O: CAAR = 0 (there is no significant abnormal return in relation to zero commission trading periods)

H_1: CAAR ≠ 0 (there is significant abnormal returns in relation to zero commission trading periods)

Also:

H3: Is a significant CAAR generated depending on the length of the event window?

Four different window lengths are used; The event date (T=0), $-T_1$ to T_2, T_0 to T_1 and T_0 to T_0+10 days.

2.8 Student's t-test

A paired sampled t-test identifies differences in mean values when data has been collected through random and independent selection and the returns can be assumed to be approximately normally distributed. Since the requirement of normal distribution is approximately fulfilled I will use the t-test to verify the significance of each CAAR by

rejecting or accepting the Null Hypothesis. The test will be conducted with the following steps:

1. Calculate t-value according to Formula 2.6.

$$t_t = \frac{CAAR_t - H_0}{\left(\sigma_t^{\,2} \Big/ \sqrt{N} \right)}$$

Formula 2.6 Student's t-test

Where:

$CAAR_t$ = *CAAR for each day t in the estimation window*

N = *Number of stocks in each portfolio*

H_0 = *0 (as we assume zero abnormal returns by default)*

$\mathbf{S_t}$ is the approximation of the standard deviation in the sample according to Formula 2.7.

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

Formula 2.7 Calculation of standard deviation

CAR_t = *CAR for each stock N and day t in the estimation window*

2. Compare t-value with critical t-value, based on chosen significance level, from distribution table according to the following rule:

   Reject H_0 if t-value > critical t-value *(if rejected abnormal returns in relation to zero commission trading periods are non zero)*

   The significance level used will be **95%**[32] and the degrees of freedom are **N-1**.

3. Interpreting the p-value, the probability for accepted hypothesis to be wrong, will be conducted according to the following guidelines[33]:

   - $p < 0.01$ → result is very significant
   - $0.01 < p < 0.05$ → result is significant
   - $0.05 < p < 0.10$ → result is marginally significant
   - $0.10 < p$ → result is not significant

Hence, a p-value close to zero signals that the null hypothesis is false. Since the null hypothesis tests if there is zero CAAR a low p-value would indicate that CAAR is different from zero.

2.9 Reliability and validity

It is important to collect data that is representative of the sample. Furthermore it is imperative that the researcher is measuring the actual effect of the event. One important part of this validation process is the determination of the size of the event window which in this case is between 1 and up to 40 trading days. It is generally preferred to use shorter timeframes since this leads to less spurious results, because of the fact that less noise will affect the future returns, and thus lead to higher significance.[34]

[32] Recommended by Khotari and Warner (2005)
[33] Gujarati (2003)
[34] Khotari and Warner 2005

Another factor that could undermine the validity and reliability, and thus the results, is errors incurred when processing large amounts of data. By controlling the data input and the results meticulously the greatest of effort has been made to avoid these human errors. An error could also occur if the actual dates provided from the broker are not actually the dates when the share started trading on zero commission. This would however be captured through the model specification since one event window starts 20 days before the event. Since the shares start trading at zero commission from and to a specific date there is no doubt about when the actual event occurs which can otherwise be a problem with event studies.

2.10 Criticism of sources and methodology

The data collected for this research can be considered highly reliable and valid. All data has been provided from official sources and has not been handed over by less reliable third parties.

Event studies are considered the preferred choice of method when analysing the impact of an event on the stock markets.[35] However, the method could capture impacts on the AR of the stock caused by other external events such as positive or negative news e.g. such as acquisitions, financial reports or other macroeconomic factors previously defined as noise. The study might therefore not capture the effect of the event it is intended to capture. This potential issue is limited by the inclusion of a large amount of events and also the inclusion of the shorter 1 day and10 day event windows.

[35] MacKinlay (1997)

3. Theoretical Framework

This chapter forms the basis for further analysis and conclusions of the results. All theories are related to the formulated framework and are meant to further clarify the problem discussion and its consequences.

3.1 How does zero commission trading affect investor behaviour?

One might ask why the zero commission periods would have an impact on investor behaviour or why investors would start trading stocks for the sole reason of zero commissions? To analyse this question I turn to a behavioural finance approach.

Behavioural finance is the research on human and social cognitive and emotional biases focused on studies surrounding economic decisions and how they affect market prices, asset returns and the allocation of resources. The field is primarily concerned with the rationality, or lack thereof, of investors.

3.1.1 When do investors trade?

An investor who is flush with cash or has to pay a bill might buy or sell for liquidity reasons. If one investment appreciates considerably he or she might want to sell parts of that investment and buy another share to restore the desired portfolio diversification. Investors also trade when they want to capture a tax loss or simply trade to speculate in an effort to improve performance.

The *holding period preference* is the term for which an investor wants to hold an investment.[36] The *liquidity premium* depends on this preference since it determines the period over which the transaction costs get amortized. The average holding period in the US stock market (retail) is about 2 years.[37]

[36] Bodie, Kane and Marcus (2003)
[37] Ming Huang (2002)

Is it possible, with respect to the above stated, that the introduction of zero commission would alter an investor's *holding period preference* to the extent that the assets would be liquidated earlier or later than expected? This could imply that brokers can affect trading patterns in markets. However, this is an unexplored issue that requires more research.

3.1.2 Information-based overconfidence

The purpose of this paper is not to analyse investor behaviour or whether or not investors are rational when deciding to trade the shares that are on offer to trade on a zero commission basis. Nevertheless, it is an interesting topic to consider since many influential financial theories assume that investors are rational and analyse all available information before making an investment. However, as has been thoroughly shown in research, information gathering is expensive and the amount of information gathered by investors is therefore limited. Also, the bounded rationality of human beings prevents investors to make fully rational decisions. The existence of plentiful information leads to an *information-based overconfidence,* which make investors too willing to act when they have access to more information, even though the information does not provide new insight that makes valuation of the security more accurate.[38] Several studies confirm the existence of *information-based overconfidence* which indicates that confidence in decisions increase with more information whereas accuracy does not.[39]

Through marketing campaigns online brokers actively encourage investors to trade the shares that are on offer every month. Hence, the amount of information provided to investors about these shares increase. Whether this increase in information is enough to trigger a general overconfidence and desire to trade in these shares is beyond the scope of this paper. However, when trying to explain a plausible reason for the observed increase in liquidity the following theories might be reasonable to consider.

[38] Barber and Odean (2002)
[39] Hoge (1970) and Slovic (1973)

3.1.3 Stocks in the news

Prior research papers confirm the hypothesis that investors are net buyers of attention grabbing stocks such as stocks in the news or stocks experiencing high "abnormal" trading volumes.[40] Since Nordnet and Avanza inform all their clients of which shares that are to be traded at zero commission there is a heightened attention and an increased amount of information surrounding these stocks at that time. We must also consider a possibility that the eventual increased liquidity, due to the increased interest in the stocks, in it self spur further interest. The aforementioned paper[41] also suggests that stocks bought by investors on high attention days underperform compared to relevant benchmarks suggesting that the share a month stock scheme could actually hurt investor returns.

3.1.4 Supply and Demand

In general, when the price of a product declines, quantity demanded increases.[42] Since the lower trading costs indirectly discounts the shares that are traded on zero commission it would be reasonable to assume that the demand should increase in this market as well. However, the reasons for buying stocks differ from the reasons for buying consumer products. What makes asset trading more interesting is its capacity to affect asset prices and, ultimately, the allocation of capital.

3.1.5 Liquidity[43]

Liquidity is the ease or speed at which an asset can be sold at a fair price. Therefore the relationship between the time it takes to dispose of an asset and the price received will be determinant to measuring liquidity in any market. For the equity markets this means the ability to trade any amount of stock at prevailing prices without suffering delays or unexecuted orders.[44]

[40] Barber and Odean (2005)
[41] Barber and Odean (2002)
[42] Perloff (2003)
[43] Eiteman et al (1998)
[44] Ibid

Another measure of liquidity is the discount from the fair market price when immediate sale is unavoidable. The most liquid assets are Treasury bills and commercial paper where the bid-asked spread is less than 1 basis point (bp) whereas Real Estate is one of the least liquid markets where liquidity discounts can top 30%. Investors should therefore always consider the market liquidity before making any investment.[45] In line with these arguments it is therefore possible that the liquidity increase during the event period affects trading behaviour.

3.1.6 Stylized Facts of Online traders

Online investors tend to tilt their investments towards small growth stocks with higher market risk.[46] Since it is predominantly these kinds of shares that are on offer every month there could be a selection bias leading to an even greater interest in these shares.

Online trades tend to be smaller, both in value and as a fraction of the investors portfolio, than trades made through other channels. Additionally, online traders tend to have smaller portfolios than other traders.[47] Hence, commissions, when not calculated as percentage of the size of the trades, could be of some importance in the stock selection process.

Previous research in the US has shown that speculative turnover nearly doubled when investors switched from phone based to online trading, up from 70 percent to 120 percent on average. The increase in speculative trading has been the main driver for this change.[48] It has further been shown that the average net return of investors who have started trading online is 0.036%.[49] Due to the large amount of trades and the increase in total commission costs this incurs it is reasonable to believe that a zero commission offer could spur interest in specific stocks.

[45] Bodie Kane Marcus (2002)
[46] Barber and Odean (2001)
[47] Choi, Laibson and Metrick (2001)
[48] Brad M. Barber and Terrance Odean, (2002)
[49] Ibid

The combination of the previous argumentation about *information-based overconfidence* and tilted investment preferences suggest that online traders behave less rational than the average investor implying that the surge in liquidity could be explained by the fact that they overemphasise the importance of zero commission news.

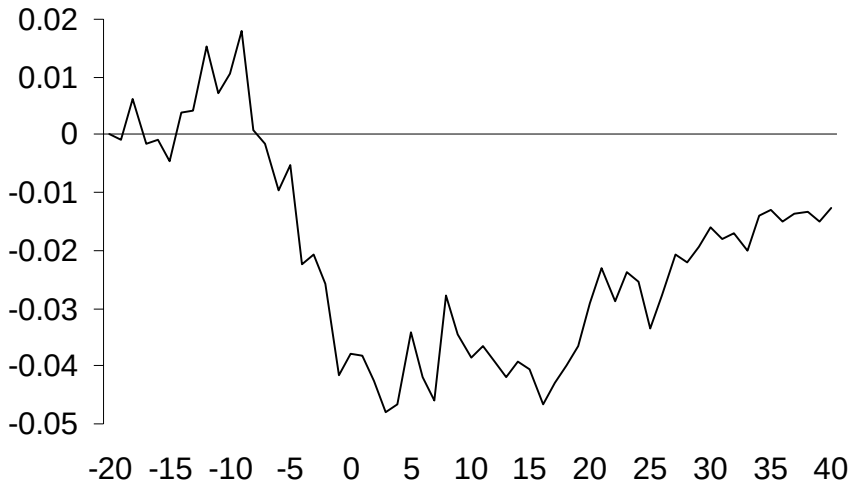
The potential explanations of the investors change in behaviour affected by the share a month scheme have now been set forth but the effects that the scheme has on the underlying shares and investors returns has yet to be examined.

4. Results

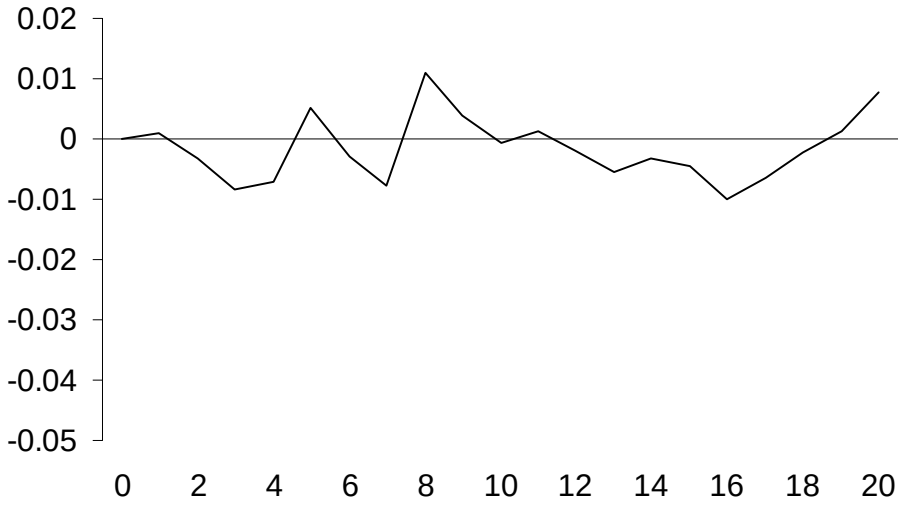
This section will present the results from the event study. The portfolio performances will be illustrated with graphs and a selection of the statistical results will be presented.

4.1 CAAR results

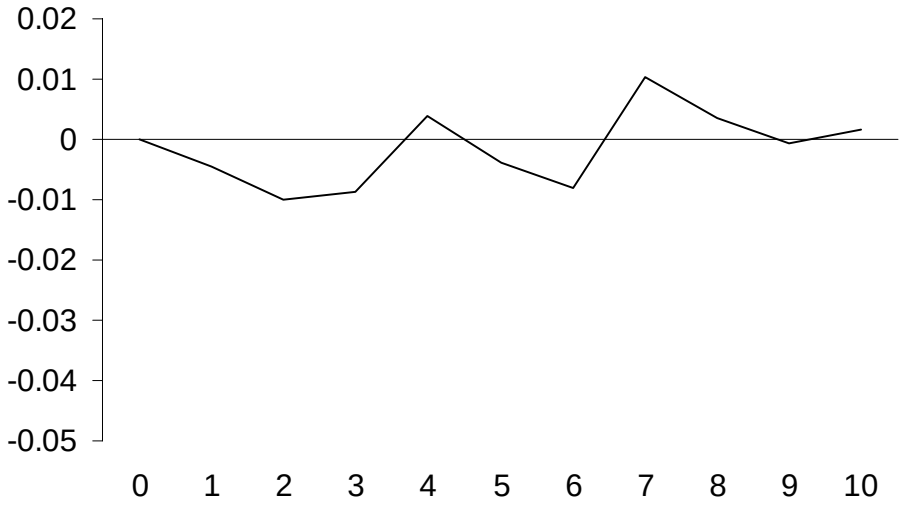
Graphs 4.1 to 4.3 illustrate CAAR for the portfolio over time for the three different event windows (the event day window is excluded from graphical illustration). The event windows presented are 60, 20 and 10 day windows. Graph 4.1 captures 20 days prior to the event, the event and 20 days post event. Graph 4.2 captures the whole event of 20 days and graph 4.3 captures the first 10 days of the event.



Graph 4.1 CAAR for 60 day Event Window



Graph 4.2 CAAR for 20 day Event Window



Graph 4.3 CAAR for 10 day Event Window

Contradicting the Efficient Market Hypothesis, according to which a market reaction should occur simultaneously with the information disclosure, Graph 4.1 show a divergence from zero during the 20 day pre event period.

The CAAR values for Graphs 4.2 and 4.3 do not show any particular divergence from zero (less than 1%). However, when looking at the CAAR for the event period in graph 4.1 there seems to be a general upward trend from day zero to day 40 with a CAAR increase of around 3%. However, this study's aim was to test if abnormal returns are to be found during the actual event. Any long term effects on returns and liquidity are therefore not taken into account.

4.2 Statistical Results

The following results will validate if observed CAAR values can be statistically verified in order to draw inferences about the hypothesis.

Table 4.4 presents the results from the formulated hypothesis. Each row represents one of the different time perspectives or event windows (Event day, short, medium and long term windows).

Event Window	Std Dev	CAAR	T-value	P-value
Event day	0.0317	-0.00465	-0.82964	0.4129
Short Term T0 to T0 +10 days	0.1145	0.001518	0.07498	0.9407
Medium Term T0 to T1	0.1528	0.007683	0.28433	0.7780
Long Term -T1 to T2 days	0.3457	-0.012740	-0.20842	0.8362

Table 4.1 Summary of Results for Portfolio

The table show the hypothesis of zero CAAR can not be rejected. The results indicate that zero commission trading periods does not affect the returns on the stocks for this portfolio. With respect to H3 *"Is a significant CAAR generated depending on the length of the event window?"* I have found no significant differences.

5. Analysis

This part will analyse the results within the framework of included theories and prior research.

5.1 Liquidity

Previously the theory that there is a positive link between liquidity and stock prices was presented. In the light of this I would therefore like to present how liquidity for the stocks included in the portfolio was affected by the event.

In order to see if there is indeed an increase in liquidity over the event period I have used a three month trading volume average[50] to compare with the event period's average trading volume for every stock in the portfolio. As illustrated in graph 5.1 17 (51%) out of the 33 companies in the portfolio experienced increased liquidity during the event period compared to the previous three months.

I have chosen to exclude DisplayIT from the liquidity calculation data set since its increase in trading volume (>6000%)[51] was more than two standard deviations above the portfolio average of 218%.[52] The average aggregated liquidity increase for the portfolio excluding DisplayIT was 11.1%. This increase in liquidity can be compared to the average yearly increase in liquidity for OMX of 12% over the period from 2003 to 2005.[53] In line with previously presented theories it was mainly the small cap companies that showed an increase in average liquidity.

Furthermore, I found that 11 of the companies experiencing an increase in liquidity where also subject to positive cumulative average abnormal returns over the long term period (60 day event window). These companies are presented in Table 5.1.

[50] Trading volume is the number of shares traded during a period of time. This is according to Eitman et al (1998) an appropriate definition of liquidity.
[51] See Appendix 7.3 for graphical illustration.
[52] Sunsite.univie.ac.at/textbooks/statistics/stbasic/html
[53] www.se.omxgroup.com

	CAAR	Liquidity Increase
Affarsstrategerna	17%	124%
Peab	38%	13%
Nordea	4%	25%
Volvo	8%	54%
Cherryforetagen	169%	42%
Display IT	144%	6214%
MSC Konsult	76%	38%
RaySearch	61%	15%
Formpipe Software	12%	175%
MTG	36%	11%
Average	56%	671%

Table 5.1 List of companies subject to positive CAAR and increased liquidity

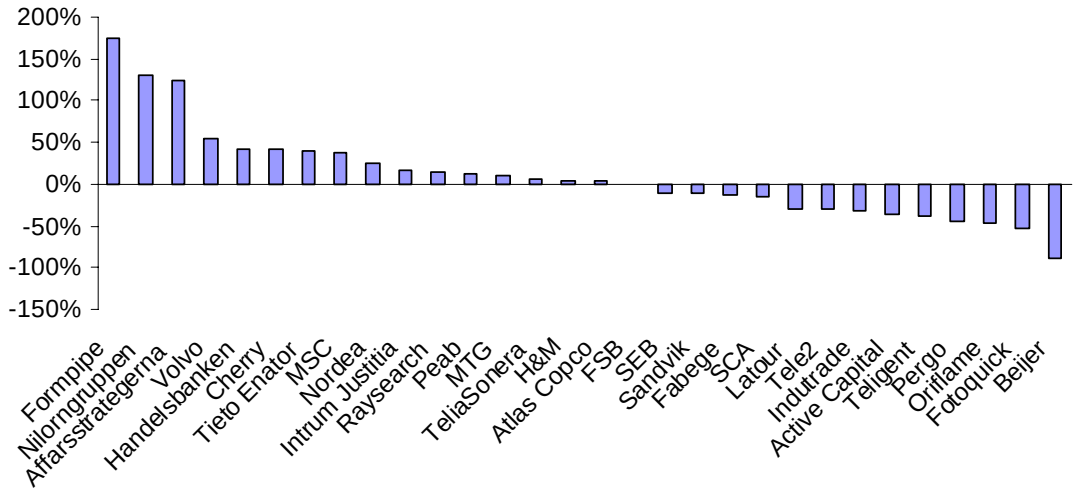


Chart 5.1 Portfolio Trade Volume54

[54] Excluding Doro, Formo Services, DisplayIT and Focal Point due to insufficient data.

A further interesting note with respect to the liquidity analysis is that even though only half of the shares in my study show an increase in liquidity Nordnet has marketed the share a month scheme as a success story in terms of increasing liquidity in the market place.

5.2 Observed data linked to theories

As discussed in section 3.1.2 the share a month scheme might alter investor behaviour in terms of the holding period preference. DisplayIT liquidity increased over 6000% during the zero commission trading period compared to its three month historical average. Analysing graph 5.2 we see an initial liquidity hike in the beginning of the zero commission period. Furthermore, towards the end of the period we see a declining liquidity. This supports my discussion about brokers affecting trading patterns in markets. This also indicates that stocks in the news are subject to a heightened initial attention by investors. However, the purpose of this paper is not to statistically verify this but is subject to further research.

Going back to the earlier presented theories about stocks in the news and their link to liquidity graphs 5.2 and 5.3 are also supportive of this theory. The graphs show that when the news about zero commission is released liquidity goes up and as the news becomes outdated liquidity declines for the selected stocks.

We can also analyse the changing liquidity from a supply and demand perspective. This time using Formpipe as an example, we also see an initial hike in demand which declines towards the end of the event period.

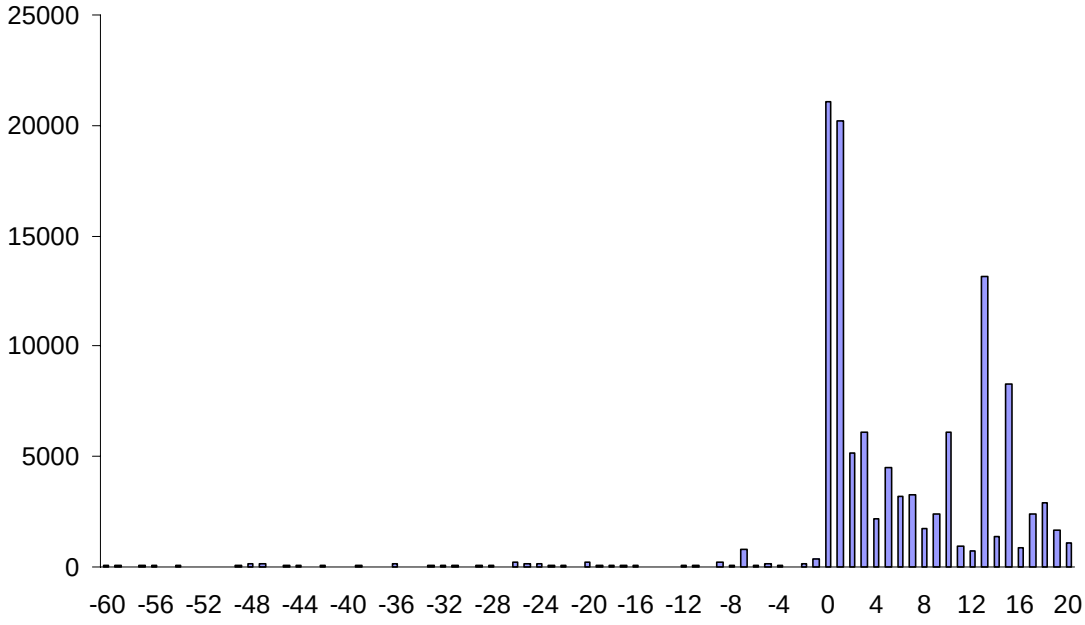


Chart 5.2 DisplayIT Trade Volume three Months pre Event and Event Month

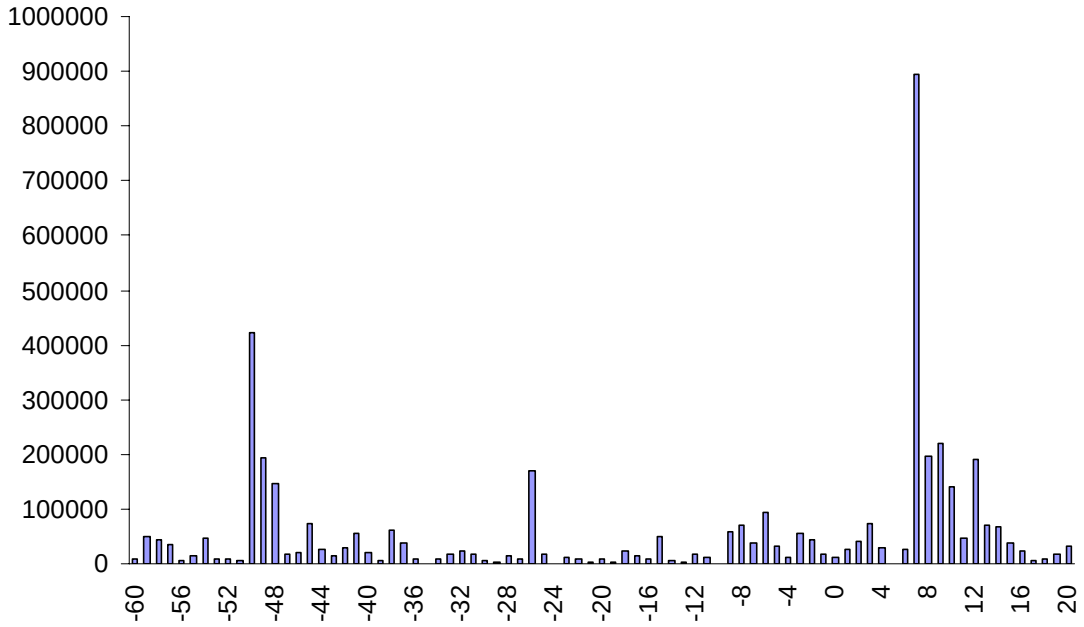


Chart 5.3 Formpipe Trade Volume three Months pre Event and Event Month

As illustrated in this section the theories about stocks in the news, supply and demand and information based overconfidence can all be linked to the liquidity patterns in graphs 5.2 and 5.3.

The CAAR values of -46,5 bp[55] 15 bp, 76 bp and -127 bp where shown to be statistically insignificant and in contrast with earlier presented theories about liquidity and its affect on share prices this study has not indicated that a potential increase in liquidity has lead to any abnormal returns for the chosen portfolio. However, further research is required with respect to the actual increase in liquidity and its statistical link with returns for this portfolio. The link between liquidity and market capitalisation was discussed earlier in this paper suggesting that the impact of zero commission trading might differ depending on the stocks pre event liquidity. There is a possibility that the shares in the portfolio experiencing an increase in liquidity were offset by the shares subject to a declining liquidity during the period. Due to the limitation in data I was unable to further analyse this aspect where one approach would have been by using two different portfolios sorted by market capitalisation.

[55] Basis points (100 bp=1%)

6. Summary

The aim of this study was to analyse Nordnet's and Avanza's zero commission trading scheme's affect on investor returns and if it's a good idea, from a trading perspective, to hold these shares over the course of this event. Theories about liquidity and its link with asset returns was presented and also how the event could affect investor behaviour. The methodology was based on an event study which aims at capturing abnormal returns over a specific period due to a specific event. Abnormal returns where calculated as Cumulative Average Abnormal Returns for a specific portfolio.

Using four different lengths on the event window, event date (T=0), -20 to 40, 0 to 20 and 0 to 10 days, this study has not detected any statistically significant abnormal returns caused by zero commission trading periods for a portfolio of 33 stocks registered on the Stockholm Stock Exchange. My results are therefore in line with the efficient market hypothesis which implies that no single investor can take advantage of additional information. There is thus, on the basis of these results, no reason for holding or not holding these shares during a period of zero commission.

The results where potentially limited by lack of data. 33 companies subject to the share a month scheme where hand picked with correct dates for announcement and inclusion in the zero commission schemes. For unknown reasons the brokers Avanza and Nordnet would not disclose any additional stocks that where subject to zero commission for the sole purpose of this study. Further analysis on the impact of zero commission trading is therefore required.

6.1 Suggestions for further studies

Since this study was unable to detect any differences in the effect of the zero commission periods on large cap and small cap companies it would be interesting to analyse any systematic differences and its effect on abnormal returns.

Another interesting study would be to analyse how zero commission schemes have affected stock liquidity over a long term period both in terms of abnormal returns and trading volumes. It would also be interesting to study the main purpose of the share a month scheme and in order to infer if the scheme reduces the number of shareholders holding less than one even lot of shares.

Furthermore, if zero commission trading schemes are seen as a marketing campaign, it would be interesting to conduct both a quantitative and qualitative study measuring its effect on new account openings, investor returns or customer satisfaction for the Swedish market.

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7.3 Databases

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www.datastream.com

JSTOR
www.jstor.com

7.4 Verbal sources

Jessica Gertun, Information Director, Nordnet AB

Fredrik Hellstrom, Analyst, Ohman Fondkommission

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7.6 Internet Sources

Affarsvarlden
www.afv.se

Stockholm Stock Exchange
www.se.omxgroup.com

8 Appendix

8.1 Table of the 33 stocks included in the portfolio

Stocks in Portfolio
Active Capital
Affarsstrategerna
Atlas Copco
Beijer Electronics
Cherryforetagen
Display IT
DORO
Fabege
Formo Services
Formpipe Software
Fotoquick
FSB
H&M
Handelsbanken
Indutrade
Intrum Justitia
Latour
MSC Konsult
MTG
Nilorngruppen
Nordea
Oriflame
Peab
Pergo
RaySearch Laboratories
Sandvik
SCA
SEB
Tele2
Telia Sonera
Teligent
TietoEnator
Volvo

8.2 Table of Aggregated Statistics for the Portfolio

Time T	Std Dev	CAAR	T-value
-20	-	-	-
-19	0.036543727	-0.000737318	-0.114134579
-18	0.03189395	0.006171101	1.094534182
-17	0.042370767	-0.001688483	-0.225426667
-16	0.047507686	-0.001018591	-0.121286044
-15	0.081509237	-0.004510169	-0.313011968
-14	0.078831427	0.004008682	0.287658504
-13	0.076303918	0.004258548	0.315710971
-12	0.087754425	0.015299035	0.986211334
-11	0.095621281	0.007102617	0.420183353
-10	0.095897002	0.010594646	0.624966006
-9	0.092338628	0.017907294	1.097037631
-8	0.091586455	0.000684429	0.042273888
-7	0.076880072	-0.001673493	-0.123136011
-6	0.090600411	-0.00957986	-0.598141557
-5	0.110248745	-0.005279886	-0.270910514
-4	0.158050112	-0.022435627	-0.803005276
-3	0.153699456	-0.020725552	-0.762796644
-2	0.158018068	-0.025687423	-0.919578428
-1	0.210547736	-0.041556946	-1.116523927
0	0.198713127	-0.037945698	-1.080216925
1	0.199754204	-0.03828612	-1.084227493
2	0.199723764	-0.04259541	-1.206446455
3	0.210569595	-0.047955266	-1.288295917
4	0.233099741	-0.046766481	-1.134926899
5	0.243867037	-0.034215404	-0.793676574
6	0.23419007	-0.041875586	-1.011503549
7	0.232905207	-0.046083336	-1.119282465
8	0.245769957	-0.02772338	-0.638105324
9	0.252191576	-0.034545828	-0.774889939
10	0.265518321	-0.038444329	-0.819054466
11	0.24989079	-0.036427613	-0.824623018
12	0.25637774	-0.03911757	-0.863110777
13	0.258700819	-0.041983409	-0.918025794
14	0.276919191	-0.039086984	-0.798461717
15	0.28743729	-0.040422852	-0.795534166
16	0.284161544	-0.046729535	-0.930253138
17	0.276542778	-0.043063376	-0.880888107
18	0.275510565	-0.039825125	-0.817699774
19	0.269454155	-0.03650829	-0.766446066
20	0.285988026	-0.029148504	-0.576558549

Time T	Std Dev	CAAR	T-value
21	0.30018	-0.02303	-0.43403
22	0.315149	-0.02891	-0.519
23	0.336821	-0.02388	-0.40106
24	0.312127	-0.02548	-0.46172
25	0.324134	-0.0336	-0.5864
26	0.332363	-0.02786	-0.47415
27	0.337004	-0.02086	-0.35021
28	0.335482	-0.02219	-0.37423
29	0.341095	-0.01938	-0.32149
30	0.33817	-0.01613	-0.2698
31	0.337177	-0.01818	-0.30506
32	0.340559	-0.0169	-0.28064
33	0.35296	-0.02009	-0.32193
34	0.330184	-0.01383	-0.23688
35	0.327393	-0.01297	-0.22405
36	0.330622	-0.01512	-0.25878
37	0.330396	-0.01367	-0.23412
38	0.331512	-0.0132	-0.22526
39	0.346774	-0.01498	-0.24432
40	0.345774	-0.01274	-0.20843

Table 8.2.1 Aggregated Statistics for 60 day window

Time T	Std Dev	CAAR	T-value
0	-	-	-
1	0.024241774	0.000839935	0.196000015
2	0.032254432	-0.003085179	-0.541085542
3	0.039866292	-0.008349568	-1.184767588
4	0.052446139	-0.007174637	-0.773858185
5	0.091055042	0.005163147	0.320763921
6	0.078842977	-0.002757776	-0.197865893
7	0.069544871	-0.007692773	-0.625738383
8	0.10210782	0.010914333	0.604662714
9	0.10644928	0.0039634	0.210620269
10	0.11492517	-0.000495933	-0.024410825
11	0.114558203	0.001132553	0.055925184
12	0.116051563	-0.001929184	-0.094036769
13	0.123024464	-0.005562774	-0.255784909
14	0.132388444	-0.003074978	-0.131391396
15	0.142556409	-0.004404599	-0.174781151
16	0.136373581	-0.010160689	-0.421471183
17	0.13359483	-0.006527987	-0.27641691
18	0.138824438	-0.002299399	-0.093696491
19	0.134851949	0.001207999	0.050673895
20	0.152854444	0.007683076	0.284336124

Table 8.2.2 Aggregated Statistics for 20 day window

Time T	Std Dev	CAAR	T-value
0	-	-	-
1	0.031703988	-0.004649712	-0.829635208
2	0.03919113	-0.010009568	-1.444782714
3	0.052001771	-0.008820783	-0.959542005
4	0.090991999	0.003730294	0.231907513
5	0.078711043	-0.003929888	-0.282435639
6	0.069448398	-0.008137638	-0.662843671
7	0.102051695	0.010222318	0.566635999
8	0.106352432	0.00339987	0.180838064
9	0.114830982	-0.000498631	-0.02456379
10	0.114524557	0.001518085	0.074984663

Table 8.2.3 Aggregated Statistics for 10 day window