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Swedish Post Earnings Announcement Drift: Implications of Past Earnings on Market Anticipation

A Study Conducted of the Swedish Market

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Abstract

This thesis investigates how the Swedish market realizes the full implications of past earnings for future earnings. This builds on previous studies on Post Earnings Announcement drift and sets out to expand on previous findings on the Swedish market. The aim of this thesis is to establish whether previous earnings releases can in fact enhance the earnings momentum. Apart from confirming the presence of the Post Earnings Announcement Drift, we find that the market reacts with less hesitation to unexpected earnings with the same sign as the previous quarter. Portfolios formed by subsequent high and low earnings surprises do not seem to drift significantly, contrary to the reference portfolios. These findings are surprising as they contradict previous results by Bernard and Thomas (1989) and Liu et al. (2003). However, we find that stocks with past positive earnings surprises tend to continue to perform better than expected, which could explain why these authors have found an oddly centered drift around the upcoming quarter. With these findings, we conclude that the Swedish market is more efficient than anticipated.

Keywords: Post Earnings Announcement Drift, Market Anticipation, Market Efficiency, Momentum

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1 Introduction & Motivation

In a paper from 1968, Ball and Brown were the first authors to reveal the Post Earnings Announcement Drift (PEAD) anomaly. The authors concluded that the stock price of firms releasing good earnings news tended to drift upwards while the stock price of firms releasing negative earnings news would drift downwards for several months after the actual release date. Since then, a multitude of studies have been carried out on the topic with a variety of results and conclusions. In 1989, Bernard and Thomas conducted a widely recognized study on the topic, confirming the drift on the U.S market. A remarkable finding in the same study was that a substantial part of the drift was centered prior to the upcoming earnings release date. With this in mind, the authors suggested that the market in general failed to realize the full extent of information that was released. In 1996, Ball and Bartov concluded that the market in fact underestimated the magnitude of seasonal correlation between quarterly earnings by up to 50%. Finally, in 2007, Setterberg was the first one to conduct a thorough study that could confirm the existence of the earnings drift in the Swedish market, after several previous research papers had failed to find any evidence of earnings momentum or the more common return momentum.

This paper seeks to take the findings of previous research and apply it on the Swedish market in order to expand on Setterbergs initial discoveries. We intend to investigate if the market can fully process the full implications of current quarterly earnings for future earnings. On the U.K. market, Liu, Strong and Xu (2003) found that companies with previous high earnings surprises tend to drift in the same sign as the earning surprise in anticipation of the upcoming earnings release and conclude that this is due to the fact that the market fails to realize the implication of current earnings for future earnings.

To conduct this research is interesting since it tries to shed some new light upon an already well known phenomenon. We do so on a market where this has not been tested before and that has proven to be different from other developed markets before.

The results found are on one hand expected and on the other unexpected. We confirm the previous findings that there is indeed a post earnings announcement drift in the Swedish market. However, there seems to be no deviating drift in stocks that have had one or two consecutive earnings surprises of the same sign. With this result we conclude that the market does not seem to react in the way theorized by Liu, Strong and Xu, prior to the upcoming quarter.

There are a multitude of plausible explanations to our findings. One possibility is that the

Swedish market is more efficient than we first thought. This could be a result of well informed investors that can process, exploit and understand the implications of earnings information immediately. Another potential explanation to as why our findings deviate from what has been found by Liu et al. could be that part of the market is following some prediction of mean reversion theory. These investors would expect companies to perform as expected by the market over time. In theory, these investors would expect negative quarters to follow good quarters and vice versa. This effect would work in an opposite direction to the effect of a PEAD. These mentioned effects could co-exist, resulting in a net zero abnormal return prior to the earnings release date that was found.

The remainder of this study is structured according to the following: The research question and hypothesis are described in part 1.1 and 1.2, the background and previous relevant literature are presented in part 2. The methodology used is described in part 3, followed by data description in part 4 and the result section in part 5. Implications and concluding remarks are made in section 6, references are attached in section 7 followed by appendices in section 8.

1.1 Research Question

The post earnings announcement drift-anomaly is a widely studied phenomenon with its first evidence dating as far back as 1968. A lot of the studies stem from the U.S. market, and evidence for the PEAD on the Swedish market has been both accepted and rejected.

The first part of this study will be to examine whether or not we find evidence of the PEAD anomaly in the Swedish market, in line with a thorough study by Setterberg (2007). However, the aim of this study is not to settle the difference in conclusions, whether the market anomaly holds in a Swedish setting or not. The results we find for the eventual evidence of the PEAD is instead used as a reference for our research question.

The purpose of this study is to explore the association between previous quarterly reports with the market reaction of coming quarterly earnings releases, in line with the findings of Liu, Strong and Xu (2003). What this study concluded was that the PEAD occurred disproportionately around the next earnings announcement. This is to say that that the market is anticipating good news following previously good news and this is being reflected in the stock price prior to coming earnings releases. The aim is to test if the outcome of previous earnings releases can in fact enhance this earnings drift, or if the PEAD may in fact be part of the normal pre earning announcement drift for the upcoming quarter. Previous studies on the Swedish market has not used this point of view when trying to explain the PEAD. These studied have instead assumed that abnormal returns between two quarterly releases are caused by news from the previous earnings release.

1.2 Hypothesis

Our hypothesis is influenced by the previous studies on the PEAD by Bernard and Thomas (1989) and Liu, Strong and Xu (2003). These studies conclude that a lot of the drift is oddly centred prior to the upcoming earnings release date. Bernard and Thomas (1989) hypothesised that the reason to this behaviour was that market participants naively assumed company earnings followed a seasonal random walk. Ball and Bartov (1996) however did not go as far as call market participants naive, instead they found that investors understand that earnings are seasonally correlated, but underestimate the magnitude of correlation by up to 50%.

These mentioned findings by Bernard and Thomas (1989) and Liu, Strong and Xu (2003) has lead us to believe the same findings can be found in a Swedish setting.

Our main testable explanatory hypothesis for this study is therefore:

Quarterly earnings releases contain information that have more implications for future quarterly performance than is anticipated by the market.

In order to find evidence of this hypothesis, we have to reject a hypothesis suggesting that no abnormal returns can on average be made from trading the stock after earnings releases. We therefore have the fundamental attitude that the market is in fact efficient.

The prediction is that if we construct two portfolios, one containing winners from the previous- and the present quarter, and another portfolio containing losers correspondingly, the winners should experience a greater stock performance prior to the second and coming third quarter release.

We will classify winners as companies beating earnings expectations, and losers as companies failing to reach market expectations. How we measure market expectations and how we grade the actual performance compared to the predicted performance is explained in more detail in the methodology section, section four below.

Market anticipation is measured as abnormal stock returns prior to the release date, suggesting that high expectations will lead to positive abnormal returns and low expectations would lead to negative abnormal returns. For our hypothesis to hold, we want to find a significant positive drift prior to the release date for winners and a significant negative drift prior to the release date for losers. The drift is measured as the cumulative average abnormal return, more on this can also be found in the methodology section.

An alternative hypothesis to our main hypothesis is that earnings surprises follow a mean reversion pattern. That is to say that the mean earnings surprise of a company is close to zero over time, which in practice would imply that the market would expect the next earnings surprise to be in the opposite sign of the previous quarterly releases. This alternative hypothesis would cause a drift in the opposite direction suggested by our main hypothesis. The portfolio with past winners should be underperforming in anticipation of the upcoming announcement and vice versa for the portfolios containing losers.

2 Background and Previous Literature

2.1 Post- Earnings Announcement Drift (PEAD)

The PEAD is one of the more astounding and enduring market anomalies. The PEAD phenomenon is by now well documented and was first academically discovered by Ball and Brown in 1968. Although this momentum effect is well known, it can still be proven to exist, contrary to the efficient market hypothesis would suggest. Fama (1998) went as far as to label the reaction to earnings up to a year after the announcement, the PEAD, *"The Granddaddy of underreacting events"* and as *"the only established anomaly above suspicion"*.

In short, the PEAD implies that good news stock, i.e. stocks with higher than predicted earnings, will tend to generate cumulative abnormal returns for a period of time after the actual earnings announcement. This drift has been documented for up to a year time after the announcement. Although not as frequently found, bad news firms, i.e. firms performing worse than predicted, will continue to generate a negative cumulative abnormal return after the earnings release date.

2.2 Relevant Empirical Work & Previous Findings

The first two famous studies on PEAD were conducted by Ball and Brown (1968) and Jones and Litzenberger (1970). Ball and Brown (1968) initially wanted to test the usefulness of the annual net income numbers and consequently the market's reaction to accounting numbers. What they found was the now famous PEAD anomaly. The good news firms tended to generate abnormal returns even after the announcement date and bad news firms continued to generate negative abnormal returns. Jones and Litzenberg (1970) modified their study a bit and used quarterly earnings instead of annual. The results found were similar to the results found by Ball and Brown (1968). Their results supported Ball and Browns hypothesis of imperfect capital markets, contrary to what the EMH and random walk theorists would suggest.

A large number of studies have been conducted in order to re-evaluate the presence of the PEAD, including a commonly cited study by Bernard and Thomas (1989). Studies have even tested the presence of the PEAD anomaly on other markets than the previously proven inefficient U.S. market. Hew et al (1996) tested the PEAD on the U.K. market and found that the drift only could be found for small firms, but not for large and medium sized firms. However in 2003 Liu, Strong and Xu found evidence in accordance with what Bernard and Thomas (1989;1990) found on the U.K. market for large companies as well. Liu et al (2003) also made an interesting finding, on which we will hinge our research paper. What the authors found was that investors fail to realize and process the full implications of current earnings for future earnings, and even that the drift mainly is concentrated around the next earnings announcement.

European focused studies have also found evidence of the PEAD. Forner et al (2009) studied the PEAD phenomenon on the Spanish market, but with the respect to model errors. The authors suggested that the PEAD was a result of model errors, where the Fama-French factors were not incorporated. In turn, this lead to an expected return that was lower than what was actually expected by the market, thus resulting in abnormally high returns. However Forner et al. (2009) concluded that these factors could not explain the drift. The authors also suggest, in line with what Liu et al. (2003) suggested, that investors fail to process and realize the full implications of information.

The Nordic region has been studied as well with mixed results. Kallunki et al. (1996) could not find any positive unexpected drifts for good news firms on the Finnish market. Further, Kallunki et al. (1996) argue that the delay in negative stock returns are caused by the short selling restriction in Finland. The authors also suggest that the existence of investors in the region who are well informed prior to the earnings releases can make more accurate estimates of future earnings. The informed investors can immediately take advantage of the good news in their investment decision, which will erase all of the potential future good news drift which will push the share price up to its intrinsic value.

The Swedish market has been an interesting market to conduct research on because the results have differed from what has been found in other developed economies. The Swedish market has been considered efficient from a return momentum point of view, as was described by Jegadeesh and Titman (1993). The link between this return momentum and the PEAD have been studied after the discovery by Jegadeesh and Titman (1993). Chan et.al. (1996) found that the PEAD was partially the reason behind the return momentum and later studies by Chordia and Shivkumar (2006) extended this research topic and concluded that return momentum is caused by the earnings momentum. Both suggest that return momentum is a "noisy proxy" for earnings momentum. Early studies on the Swedish market, e.g. Rouwenhorst (1998), found that Sweden was the only country within the study where momentum strategies did not generate abnormal returns significantly different from zero. Doukas and McKnight (2005) studied the same phenomenon but used more recent data than Rouwenhorst did in 1998. The data in this study involved observations from 1988 to 2001 but the results were similar, neither study found significant evidence of the effects of momentum strategies. The first thorough study on the Swedish market to prove the existence of the earnings drift, the PEAD, was presented by Setterberg in 2007. Setterberg found evidence of the PEAD and concluded that the PEAD was not significant for all years, but at least on average, and that the drift mainly was driven by the relatively small stocks on the Swedish A-list.

A number of studies have tried to explain the reason behind the PEAD, suggesting that the PEAD could still exist under the efficient market assumption. These studies involve suggestions about design flaws, (similar to what Foster et al. (1977) did), incomplete controls for risk and also transaction costs. Because of these failures to explain the underlying cause of PEAD, Rendleman, Jones and Latane (1987), Bernard and Thomas (1990) and Liu et al (2003), suggested that investors fail to grasp the implication of change in current earnings on the change in future earnings. The essential hypothesis of the study by Rendleman, Jones and Latane (1987) was that change in earnings relative to the previous period, would in fact signal changes in future earnings. This has just not been incorporated fully in the share price.[1]

[1] *Source: Advances in behavioural finance, Volume 1 Richard H Thaler*

2.2.1 Critique Against the Post Earnings Announcement Drift

As was mentioned earlier, not all studies have found evidence of the PEAD. The Swedish market was for example considered efficient from a momentum point of view up until 2007 when Setterberg found results in conflict to what was previously found by Rouwenhorst (1998), Doukas and McKnight (2005) etc. The reason to why the PEAD can and can not be found on the same market can be explained by the range and age of the data. Studies (Bernard and Thomas 1989:Setterberg 2007) have shown that the PEAD generate substantial abnormal returns some months, but can produce abnormal losses a following month.

Other common reasons, however mainly with the focus on why small firms generate a more substantial drift, is transaction costs which historically have been higher for small firms. What these studies suggest is that the PEAD is present, however no abnormal return can be earned for beta neutral portfolios when considering transaction costs. A study by Rusticus and Verdi (2008) found that transaction costs have a twofold impact on the PEAD. The authors conclude that transaction costs not only provide an explanation and persistence of the drift, but also cause the existence of the drift. What they found was that the magnitude of transaction costs were correlated to the drift. The drift would be reduced significantly when adjusting for these costs.

Other critiques against the PEAD are, as mentioned, design flaws and incomplete controls for risk. Bernard and Thomas (1989) found that one reason to why the PEAD could be found was because a shift in betas for the observed stocks, meaning that risk can be reduced with good news and vice versa for negative news. Ball, Kothari and Watts (1993) controlled for this shift in beta and found a lower drift than before, however the drift was still significant.

2.2.2 The Efficient Market Hypothesis (EMH)

Eugene Fama is known as the first proponent of the Efficient Market Hypothesis. In his famous study from 1965, he formulated the efficient market hypothesis as:

" A situation were successive price changes are independent is consistent with the existence of an 'efficient' market for securities, that is, a market where, given the available information, actual prices at every point in time represents very good estimates of intrinsic value." (p.90)

The definition has evolved over time and was defined by Fama in 1991 as: "*security prices fully reflect all available information*" (p.1575)

The research around the EMH has evolved through time and now three forms of market efficiency are defined: the weak form of efficient markets, the semi-strong form of efficient markets and the strong form of efficient markets. The initial study on the subject focused on the weak form, simply that the current security prices reflect information about historical prices and returns. This is in line with the Random Walk literature.

The semi-strong form of efficient markets suggests that security prices adjusts immediately when information about earnings are released. Security prices should therefore reflect all publicly available information. This is the form of efficient market that would conflict the PEAD anomaly, and henceforth the form of market efficiency we will study.

The last and strongest form of efficient market investigates any groups with monopolistic access to information, e.g. mutual funds and management. This means that for the efficient market hypothesis to hold at this stage, all public information as in the semi-strong form, and all private information should be reflected in stock prices.

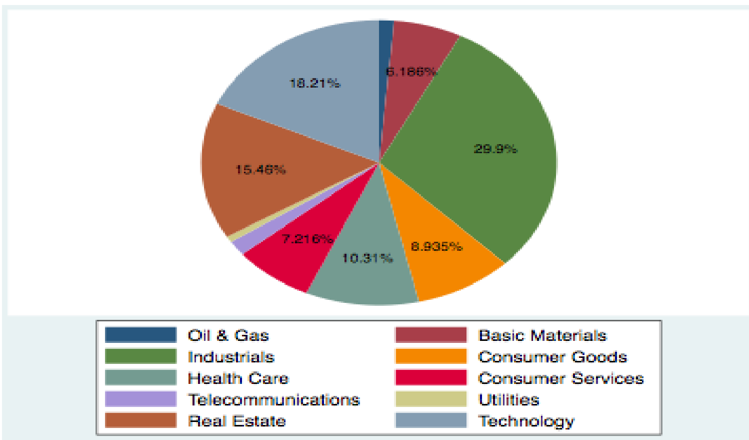
2.2.3 Market Anomalies According to the Efficient Market Hypothesis

Market anomalies are documented long term market inefficiencies that have proven to generate abnormal returns contrary to what should be possible according to the efficient market hypothesis. Schwert (2003) explained that market anomalies are empirical results that are inconsistent with maintained theories about security pricing behavior. The existence of historical anomalies have been accepted, however there is no guarantee of future presence, therefore investors have their reasons to be skeptical. The PEAD is only one of many market anomalies that has survived through the history, which is surprising and definitely violating the efficient market hypothesis.

3 Data Description

3.1 Data Selection and Collection

The dataset used in this study is constructed using 6128 quarterly observations from 299 companies within 10 different industries, listed on the Swedish stock markets. The companies in this dataset are in various sizes as can be seen in Table 1. The dataset includes all companies with the largest companies, at the time, listed on the A-list and the smallest companies listed on the Swedish list called "Aktietorget". The Swedish stock market changed structure in October 2006, but the A-list would contain the larger companies on the Swedish market according to today's structure. The dataset industry distribution is Graph 1, further description of the Swedish market is presented in Appendix 1.



Graph 1: *The sample by industry: The sample companies are represented by their industry.*

Quarterly earnings numbers used in the study are compiled using data from the first quarter of 1996 to the last quarter of 2006. However because of the time series models used in this study, the actual studied events are based on data from the first quarter 2001 to the last quarter of 2006.

Companies without eight subsequent quarters during any time between 1996 and the last quarter of 2006 have been removed from the dataset. The reason as to why they have been removed is because of the methods used to forecast expected earnings. The expected earnings and standardized unexpected earnings are constructed in a way that we use data from the previous eight quarters. Hence the minimum data required to conduct these predictions are eight quarters subsequent to the quarter being predicted.

Companies within the financial sector have been excluded by intent, this is because difference in accounting standards and presentation. Approximately 10 companies from different industries with fiscal year deviating from calendar year have been excluded as well. This because of simplicity. A handful of companies were removed due to missing or unreliable data. Examples of missing necessary data involves missing historical share prices or numerous missing quarterly report release dates. Unreliable data could be that the return index was rebalanced from one day to another or that the same stock had two prices for each day in Datastream during a longer period of time. Descriptive Statistic for the data sample is presented in Table 1.

Variable	N. Obs	Mean	Median	SD	Skewness	Kurtosis
Assets	1713	9130,0	774,2	28379,3	5,7	41,5
Debt	1702	2390,1	83,4	7567,6	6,5	59,8
Equity (BV)	1713	3947,3	356,4	13767,0	6,7	55,4
Liabilities	1710	5073,8	353,1	16222,7	6,8	63,7
Market Cap	1658	8200,6	750,4	30135,0	8,7	101,9
M/B-ratio	1657	2,8	2,0	3,7	6,4	80,0
D/E(MV)	1647	0,4	0,1	0,8	4,4	29,4
D/E(BV)	1702	0,6	0,3	1,4	-2,0	106,1
D/A	1702	0,2	0,2	0,2	1,0	3,5
ROA	1401	1,8	7,3	24,2	-2,1	13,6
ROE	1665	-5,2	9,5	54,9	-5,0	56,3
ROIC	1654	-3,0	7,3	39,7	-5,2	57,7

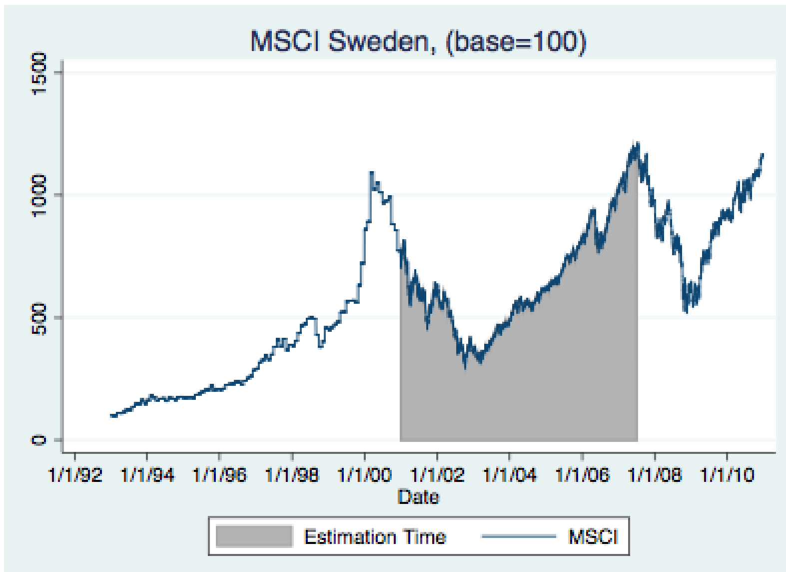
Table 1: *Descriptive statistics for the sample data: Descriptive statistics are presented for all 299 companies for the sample time. The numbers are based on end of year numbers. Number of observations are presented as well as the mean, median standard deviation, skewness and kurtosis of relevant accounting numbers. Some return metrics are included as well and are calculated based on outgoing numbers.*

The above presented table of descriptive statistics is composed using fourth quarter numbers for 299 Swedish companies between fiscal years 2001 and 2006. The, mean, median, standard deviation, skewness and kurtosis are presented for common accounting and investor metrics. All variables except the ROA are provided by the Datastream database. The ROA has been calculated using data from the mentioned database. As may be seen, the standard deviation of the metrics are substantial, therefore the median may be the superior metric to determine averages, at least for the return metrics. Return on Equity (ROE) and Return on Invested Capital (ROIC) are calculated using outgoing capital numbers for equity and invested capital. Unlike ROE and ROIC, Return on Assets (ROA) is calculated using the earnings before interest and taxes (EBIT) divided by the ingoing balance of assets.

The quarterly earnings, "income before extraordinary items", have been collected from the Compustat database and have been complemented and verified manually using the quarterly reports for missing or unreliable data points. The earnings release date for Swedish companies have been the main restriction within our data collection process. The SIX Trust database has provided us with the release dates from 1999 to 2006, however this database has not been exhaustive so some release dates have been collected manually. The lack of historical dates has been obvious and the database only provided reliable data between 1999 and 2006. Only semi-annual release dates were provided for a majority of companies before 2004, however this does not affect our event window.

The daily stock return measurements have been generated using The Datastream Return Index (RI), from Thomson Reuter Datastream. The RI is constructed in a way to follow the actual return of the underlying share under the assumption that dividends are reinvested. A more detailed explanation on this index is provided in Appendix 3. These return indices have been compared to the actual stock returns provided by the Finbas database. The data has also been reviewed for companies being listed on more than the Swedish stock exchange. This is because some companies listed on a foreign exchange as well had two stock prices each day but in two currencies. These foreign currency stock prices have been removed from the dataset.

The index used in this study to approximate market return is the value weighted, cum dividend, Morgan Stanley Capital International Sweden Index. According to the factsheet, MSCI Sweden index is designed to measure the performance of the large- and midcap segments of the Swedish markets, thus the index covers 85 % of the total performance in the Swedish equity universe. In Graph 2, the MSCI Sweden index is presented and shaded for out studied time, 2001 to 2007.



Graph 2: *The MSCI Index: This graph visualizes the MSCI index that is used in this study. The relevant time period has been highlighted.*

3.1.1 Data Separation

For our main hypothesis we have sorted all companies into one of three categories. We are interested in studying the market anticipation of quarterly releases depending on the outcome of previous earnings releases. The winners group get a dummy variable if the previous quarter was among the top 20% best in the market. The losers get a separate dummy variable if the previous quarter was among the bottom 20% in the market. The rest of the 60% are not studied and will not affect the conclusion for the quarter.

3.1.2 Selection Biases

There are some biases within the data that can affect our final results, however we find this unlikely:

- Age of the data – the age of the data can be considered old, however we do not expect any radical change in our results since the PEAD has been found from 1968 and onwards.
- Excluding companies with few quarterly observations – Some companies have been excluded from the data set because of having too few observations. One major reason we found for this was because a lot of companies had struggles and went bankrupt after the IT boom. This is a form of hindsight bias because in practice we cannot know which companies would go bankrupt before they actually do.
- Financial companies – Financial companies have been removed because of their divergent accounting. However we do not expect any bias from this decision.
- Excluded companies with fiscal year not consisted with calendar year - Companies with fiscal year deviating from calendar year have been excluded, however these companies were few and from various industries so we do not expect any substantial bias from excluding these companies.
- Confounding event, no adjustments have been done to confounding events, e.g. that other price affecting news are released at the same time as earnings releases. This is a form of omitted-variable bias.
- Transaction costs have not been accounted for. This means that some of the returns might not be possible to realize in reality since they would be mitigated by the transaction cost. The reason to as why no adjustment have been done is because the aim of this study is not to form a trading strategy, but instead study a phenomenon in isolation.

4 Methodology

The methodology of this paper follow most tests used by the more cited authors on the subject, e.g. Bernard and Thomas (1989:1990), Liu et al(2003) and Foster (1977). We are also influenced by the methodology used by Setterberg (2007), who to a great extent follows previous mentioned authors. This will facilitate comparability with eventual differences we might find, despite studying similar matters on the same national market.

To investigate whether there is a significant return to be realized after the earnings releases we will construct portfolios based on the quarterly performance of the observed companies. The aim of this paper is to study the stock return performance of companies with different earnings background. What we initially have to do is form a reference-scenario, this is the regular PEAD scenario. We will in this reference-scenario form portfolios based on the level of the underlying companies' earnings surprise. The decile of best performers are put in a portfolio labeled "Portfolio 10", the following decile of companies are labelled "Portfolio 9" and so on until the worst decile of performers are put into "Portfolio 1". We should be able to conclude whether earnings surprises have an impact of stock performance drifts, the PEAD, by looking at statistics and plotted graphs. We assume these portfolios are reconstructed every quarter when new quarterly performance data is released to the market.

The next step in the process is to arrive at an answer, whether post earnings announcement drifts are affected by previous quarter's performance. This is done by constructing new portfolios based on the first and second subsequent unexpected quarterly earnings releases of the same sign. When doing this we want to see how the stock price is adjusting to a "winner" being a winner, and vice versa for a "loser", prior to the coming quarters. We are studying how the market is reacting prior to the upcoming earnings release for companies that have been a "winner" or "loser" for one subsequent and two subsequent quarters in a row. The results will be presented using graphs, tables and statistics.

4.1 Event Studies

This research paper is designed as an event study. Event studies focus on a certain event happening at the event date or event window. The purpose of the event study is to investigate whether or not there is an adjustment to, in our case, the stock price during the event day and the days following the actual event.

Kothari and Warner (2006) make a statement similar to MacKinlay (1997). They state that the *"basic statistical format of event studies has not changed over time"*. The authors also make remarks regarding the purpose of event studies. The purpose has not changed since late 1960's, according to Kothari and Warner (2006), and it is still to measure mean and cumulative returns caused by the event. Researchers conducting these kinds of event studies hypothesize that the market is efficient, i.e. that the market reacts immediately once the information is publicly available. The researcher must therefore reject this hypothesis in order to prove market inefficiencies.

4.1.1 Long Horizon and Short Horizon Event Windows

Event studies can be classified either as long or short windowed. In this paper we use a relatively short event window compared to the study by Setterberg (2007). Setterberg (2007) is using a long window and has studied the drift effect up to 12 months after the event date. The significant effect of the PEAD has by Bernard and Thomas (1989) been proven to last up to at most 180 days after the actual announcement date for some years, however the effect is diminishing with time.

The reason as to why we have chosen a shorter window is twofold. The main reason is because we study quarterly releases and the impact of previous releases on future releases. With this in mind, we would miss out on this effect by not considering earnings releases made during an event window of say 12 months. The second reason to why we use a shorter window, and why the shorter window is useful, is due to the fact that previous studies, e.g Bernard and Thomas (1989), have shown that a lot of the drift occurs within a few days and then wears off. Support for this reasoning is presented by Fama (1998) who points out the benefits in short windowed event studies. Two important benefits are that we should assume price responses to an event being short-lived and because daily expected returns are close to zero, meaning that the estimation of the expected return would be more significant during the short event window. This is in line with what was concluded by Brown and Warner (1985). Brown and Warner (1985) concluded that there were benefits of using short event windows and stated that the method used to approximate abnormal return is of little importance when using daily data instead of monthly data, this will also lead to a relatively low misestimating error.

4.1.2 Event Window of Choice

This study is conducted using a total of 2156 earnings releases event from quarterly reports between the years 2001 and 2006. Out of these events, 228 observations are used to sort into two portfolios, the long and the short portfolio. The long portfolio consists of 127 quarterly events and the short portfolio consists of 101 events.

The time of interest, the event window, in this study is 20 days before the event day, [-20], and reaching 40 days after the event date [40]. We have defined our event date as the earnings release date [0], but have also created an event time where we expect the market to adjust fully to newly released information. This event time is defined as the event day and the subsequent three trading days [0:3].

4.2 Models of Measuring Performance

4.2.1 Daily Return

Studies on the PEAD phenomenon either use monthly returns or daily returns. Because of our short window event study, daily returns are more suitable. The daily return used to evaluate stock price performance for the different portfolios is based on the equation:

$$R_{i,t} = \frac{P_{i,t} + DIV}{P_{i,t-1}} \qquad \text{(eq. 1)}$$

Where:

$R_{i,t}$ = the daily return day t for company i.

PI_t = end of day share price company i at time t.

DIV = dividend of share i at time t

4.2.2 Abnormal Return

As mentioned, daily returns are used in this study. The process of calculating abnormal return is influenced by Bernard et al (1997). The daily abnormal return is calculated as the daily return subtracted by the expected return. The index, here a value weighted index, is used as a proxy for expected daily return. Due to the arguments put forth by Brown and Warner (1985), who said that there is little difference regardless of method used to calculate daily abnormal return, and Fama (1998), who said that the daily expected return is close to zero in short event windows, we will use this relatively simple method. The calculation of the abnormal return is the following:

$$AR_{i,t} = R_{i,t} - Rm_t \qquad \text{(eq. 2)}$$

Where:

$R_{i,t}$ = the daily return day t for company i.

Rm_t = daily return of the MSCI Sweden Index at time t

4.2.3 Cumulative Abnormal Return

We need a cumulative measure in order to measure potential PEAD since we are not interested in a single abnormal return on the event date. There are two ways of measuring the cumulative return, the summed metric cumulative abnormal return (CAR) and the buy-and-hold abnormal return (BHAR). Both of these measures include a bias. According to Bernard and Thomas (1989), using the CAR metric will include a bias that assumes daily rebalancing of the portfolios. The BHAR metric on the other hand can give a false impression of a portfolio generating abnormal return even though no extra value was generated compared to the market portfolio for a given year (Setterberg 2007, Fama 1998). Bernard and Thomas (1989) however state that the difference between the two metrics is very small in reality. We will in this study follow Bernard and Thomas (1989) and Foster (1977) and use the summed metric of CAR. The formula for CAR is given as:

$$CAR_i = \sum_{t=1}^{T} AR_{i,t} \qquad \text{(eq. 3)}$$

When sorting into portfolios we will have one cumulative abnormal return for each company *i* at time *t*. What we do to get realistic expected return is that we weight each company in the specific portfolio equally and generate a cumulative average abnormal return (CAAR) for each event date. The CAAR for portfolio *p* at time t is given as:

$$CAAR_{p,t} = \frac{1}{N}\sum_{t=1}^{T} CAR_{i,t} \qquad \text{(eq. 4)}$$

4.3 Market Expectations

The PEAD phenomenon is based on the hypothesis that companies stock prices will drift in the same sign as the unexpected earnings. The unexpected earnings is the difference between actual earnings and the earnings predicted by the market. In order to state whether a company beats the earnings expected by the market, and later rank the deviations according to their magnitude, we will need a method to predict market expectations. There are two common ways to predict market expectations, time series predictions and consensus forecasts.

4.3.1 The Usage of Time Series to Predict Earnings

Time series predictions are calculated using firm-specific parameter estimates from an autoregressive model in quarterly seasonal differences estimated from historical data. This means that linearity is assumed between comparable quarters, the same quarter each year to adjust for seasonal differences. Stock prices appear to partially reflect a naïve earnings expectation, suggesting expectations reflect a view based on seasonal random walk, where earnings are expected to follow the earnings for the same quarter previous years. Freeman and Tse (1989) have suggested that the errors from such an expected earnings model are correlated through time. In contrast, if the market fully incorporated the information in earnings information, forecast errors should not be correlated[2].

Consensus forecasts have not been available on the Swedish market for our whole sample, consequently we will follow the time series model suggested by Foster (1977), Foster et al. (1984) and Bernard and Thomas (1989). Because of the seasonal impact on earnings, we use a 9 quarter rolling window. This means that the same quarter year one and two are used to predict the earnings for year 3. The time series parameters are because of this rolling estimation non static, meaning they are allowed to vary over time as the estimated sample changes. This leads to the following regression:

$$[Earnings_{i,t} - Earnings_{i,t-4}] = \alpha_i + \beta_i \times [Earnings_{i,t-4} - Earnings_{i,t-8}] + \varepsilon_i \qquad \text{(eq. 5)}$$

Where:

[2] *Source: Advances in behavioural finance, Volume 1 Richard H Thaler*

$Earnings_{i,t}$ = Income before extraordinary items for firm i time t.

α_i = the firm specific regression intercept

β_i = the firm specific autoregressive term

ε_i = the residual for firm i.

Once the firm specific variables have been estimated, we can generate expected earnings for each firm and quarter. The expected earnings are then compared to the actual earnings released by the companies in the sample.

With this forecast, we can calculate the unexpected earnings used as:

$$Earnings_{i,t} - E_{i,t-1}\,(earnings_{i,t}) \qquad \text{(eq. 6)}$$

These unexpected earnings numbers are not used directly to classify the magnitude of earnings performance compared to what was expected by the market. As can be seen in the below presented table of descriptive statistics, Table 2, there is a high standard deviation of unexpected earnings compared to the mean and median, numbers. Two conclusions put forward by Setterberg (2007) are that the standard deviation is high because of either the difference in company size within the data sample, or that the predicted earnings method is faulty. It can also be true that both of these reasons could co-exist. Due to the proportions of this standard deviation, we calculate a metric called the standardized unexpected earnings, SUE.

The standardized unexpected earnings (SUE) is equal to the deviation of actual earnings and predicted earnings, scaled with the standard deviation of the forecast error, i.e. the standard deviation of unexpected earnings. This is in line with previous studies by amongst others Bernard and Thomas (1989) and Liu et al (2003). The purpose of the scaling is to alleviate the problem of heteroscedasticity (Setterberg 2007). The Breusch-Pagan test has been executed to test for heteroscedasticity, with significant results supporting the theory of heteroskedastic data. Further details can be found in Appendix 2.

The comparison among companies can be done when having a scaled metric. That is to say that the real earnings surprise is the difference between the expected earnings and the reported earnings in relation to the error of the forecast model. This implies that we can compare companies with high and low SUE independent of size. The SUE will henceforth be our measurement of earnings surprise and is constructed as:

$$SUE = \frac{Earnings_{i,t} - E_{i,t-1}\,(earnings_{i,t})}{\sigma_{i,t}} \qquad \text{(eq. 7)}$$

Where:

$Earnings_{i,t} - E_{i,t-1}\,(earnings_{i,t})$= The unexpected earning for firm i at time t

$\sigma_{i,t}$= the standard deviation of forecast error for firm i at time t.

There are 2156 observations of reported earnings in the sample. This leads to the same number of unexpected earnings. In Table 2, summary statistics are provided for the earnings and SUE.

Variable	N. Obs	Mean	Median	SD	Skewness	Kurtosis
Predicted Earning	2156	456,15	21,79	2379,09	4,73	88,97
Unexpected Earnings	2156	17,7	-0,2	1226,59	3,52	144,29
SUE	2156	0,38	-0,03	15,24	43,57	1980,72

Table 2: *Predicted earnings, Unexpected earnings and SUE: In the table, the mean median, standard deviation, skewness and kurtosis are presented for the 2156 quarterly observations. Predicted earnings are generated using a seasonal time series regression. Unexpected earnings are the actual earnings subtracted by the predicted earnings. SUE is a scaled unexpected earning and is defined as the unexpected earnings divided by the standard deviation of the prediction error. A regression between the actual earnings and the predicted earnings is conducted and the intercept and R-Square is presented in the table.*

Variable	Income Before Extraordinary Items
Predicted Earnings	0.788***
	(0.0101)
Constant	114.5***
	(24.52)
Observations	2,156
R-squared	0.738

Table 3: *Regression: A regression between the actual earnings and the predicted earnings is conducted and the intercept and R-Square is presented in the table. Standard errors in parentheses. *** p<0,01, ** p<0,05, *p<0,1*

The median of unexpected earnings is -0,20 which is close to zero. This could be an indication that the model for predicted earnings is accurate. However, as previously mentioned the standard deviation of predicted earnings is large compared to the mean. The standard deviation of the SUE is also quite high compared to the mean. As mentioned, this could imply a faulty model. We also run a regression on the predicted earnings and the actual earnings for each observation. We can conclude that the explaining variable is 0,788 with an R-square of 0,738. This indicates that the model, although not working perfectly, is performing acceptably. See Table 3.

4.4 Test Statistics

Under our null hypothesis, H_0, we assume that we find no evidence of an earnings drift. To investigate whether the observed returns for the reference portfolios are results of the earnings announcements and simply not a compensation for risk, we will do two statistical tests following the methods of Setterberg (2007). One robust regression with a constant as the explaining variable and one model with market return as the explaining variable. These have been calculated on the CAR starting from day 3 to ensure that we only account for return that is part of the drift and not the initial market reaction.

5 Results

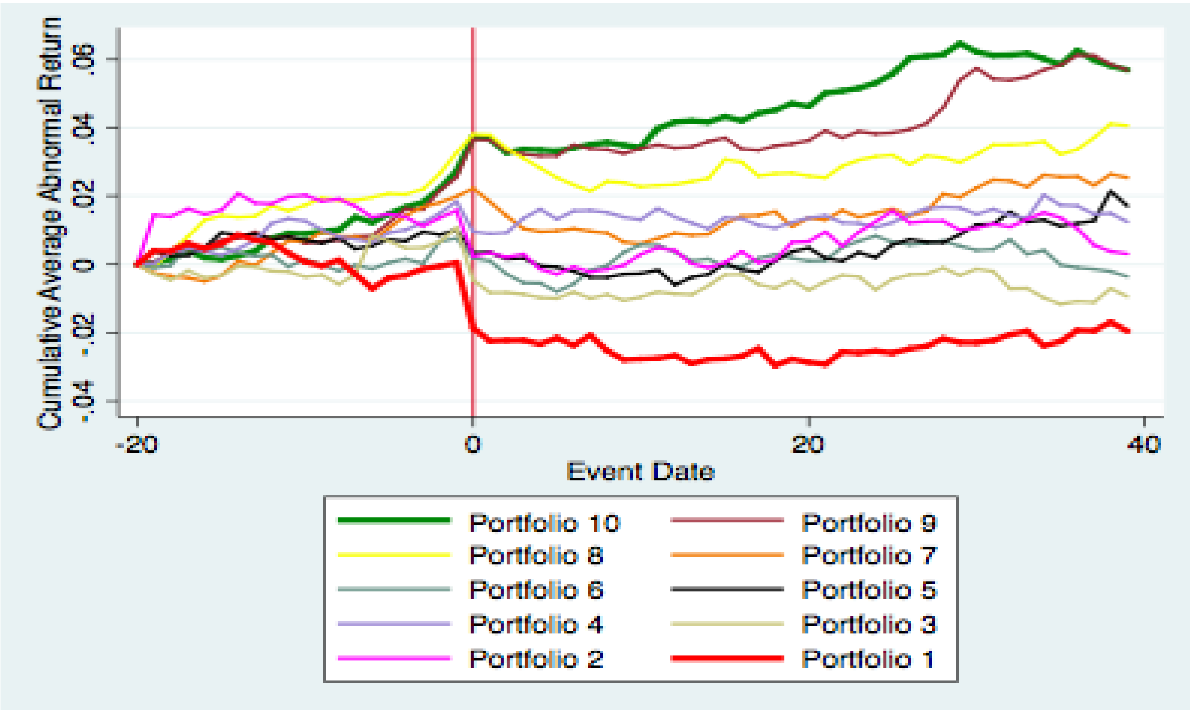
5.1 Performance of Reference Portfolios

In Table 4, the returns for each of the reference portfolios are presented. The table presents proof that portfolios with high SUEs generate the highest cumulative average abnormal returns and vice versa for the portfolios with low SUEs, with some exceptions. To illustrate the results better, returns are also plotted over the whole event time in Graph 3.

Portfolio	CAAR at +40	SUE	Market Cap
Portfolio10	5,688%	7,115936	7613707
Portfolio9	5,679%	1,31397	11636947
Portfolio8	4,057%	0,7530128	9480446
Portfolio7	2,544%	0,3713426	7605232,1
Portfolio6	-0,357%	0,086043	11835540
Portfolio5	1,706%	-0,1917042	7486423,6
Portfolio4	1,248%	-0,5470232	8550715
Portfolio3	-0,941%	-0,80084	8035817
Portfolio2	0,307%	-1,459239	9927302,7
Portfolio1	-1,957%	-4,139401	5437772,3

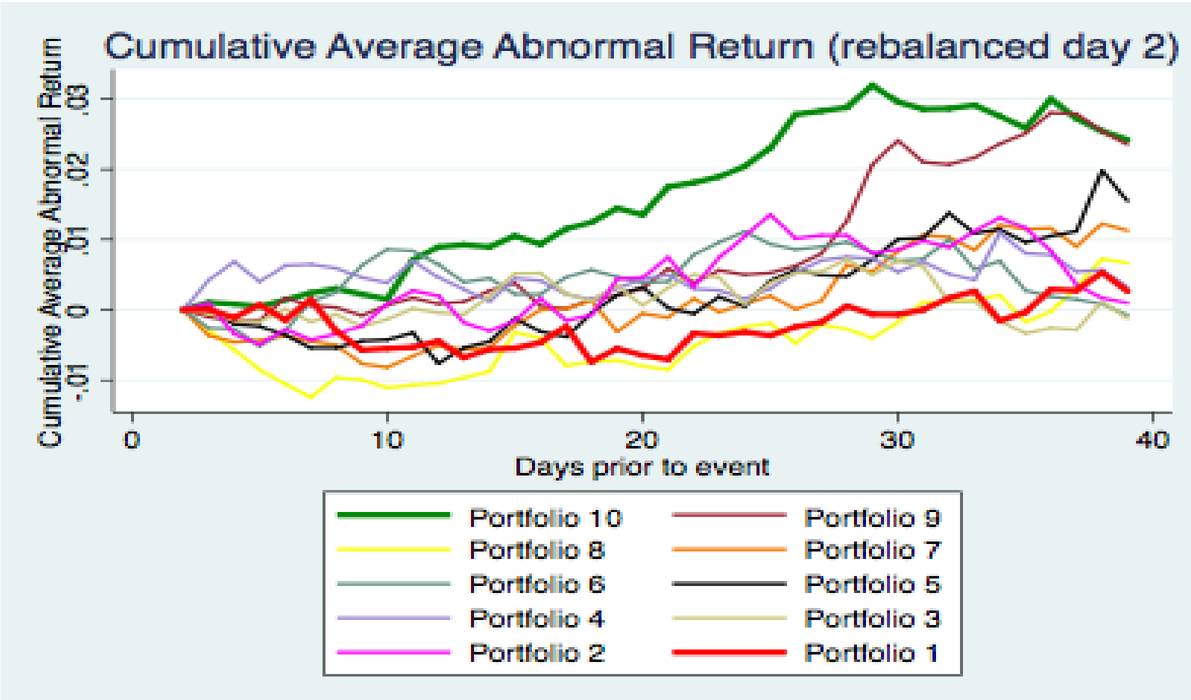
Table 4: *Return of the reference portfolios: The CAAR from day -20 to day 40 is reported for each of the portfolios formed by their respective SUE. Highest SUE is placed in portfolio 10 while lowest SUE is placed in portfolio 1. The average market cap for each portfolio is presented as well. In this table all numbers are presented as arithmetic averages.*

In Graph 3, the CAAR is plotted for the estimation window -20 days to 40 days. Confirming the results of Setterberg (2007), we can see that although the portfolios are not in the exact order, the drift is increasing with the magnitude of the given unexpected earnings. The highest SUE-decile portfolios generate a market adjusted return of about 3% over the 40 days after the announcement, compounded over a year this return corresponds to approximately 20% annually. We can also conclude that while the long portfolios seem to be generating abnormal earnings well above zero after the event day, the short portfolios generate close to 0% abnormal return. These results are in line with previous studies on both the Swedish market and other markets. It is also worth noticing that the drift seems to be present in the first 30-35 days, before leveling off. This seems to be a little faster compared to the results of Bernard and Thomas (1989), they find that the drift lasts for about 60 days. Setterberg (2007) chose to hold the portfolios for up to 12 months, making comparisons less relevant to our sample.



Graph 3: *CAAR for the reference portfolios: The portfolios have been assigned by the magnitude of their respective SUE. The stocks with the highest 10% SUE have been assigned to portfolio 10, the stocks with the highest 80%-90% have been assigned portfolio 9 and so on until portfolio 1 which consists of the stocks with the lowest SUE. The CAAR is calculated and plotted over the event time from day -20 to day 40 for all portfolios.*

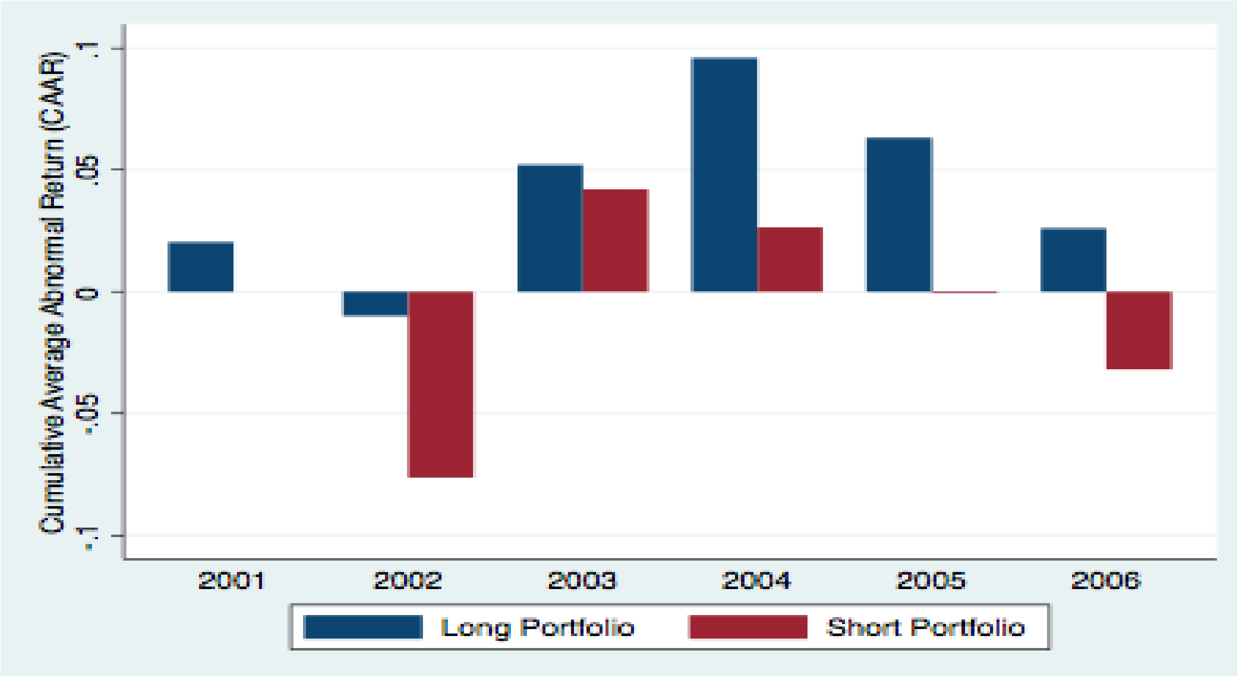
To further investigate the drift after the initial market reaction, the CAAR of the portfolios are plotted over a time window where the effect from the release date is removed. The graph is based on returns 3 days after the release date until 40 days after the release date. From looking at Graph 4, it is evident that the long portfolios are drifting to around 3% at the end of the window and that the short portfolios are not deviating from a 0% abnormal return.



Graph 4: *CAAR rebalanced at day 2: The SUE portfolios are rebalanced at day 2 to only account for PEAD and not initial market reaction. The long portfolios have positive return around 3% while the short portfolios have a return close to 0%.*

In Graph 5, the cumulative average abnormal return for the whole event window, [-20:40], is plotted for each year for a long portfolio and a short portfolio. The Long Portfolio consists of the 30 % best stocks according to their SUE, this is the same as an average of portfolios "10", "9" and "8". The Short Portfolio is constructed using the 30 % worst performing stocks according to their SUE, this is the same as an average of portfolios "1","2" and "3".

It can be noted that the cumulative average abnormal returns for the Long Portfolio is positive each year with one exception. The underlying stocks in the Short Portfolio are generating negative returns in three out of the six years, this would be equivalent to positive returns if taking a short position in the Short Portfolio. The above presented results confirm previously stated suspicions that the Swedish market seems to have a more significant drift upwards for good news compared to downwards for negative news.



Graph 5: *PEAD by year: In this bar chart the CAAR at day 40 are plotted for each year for one long portfolio and one short portfolio. The long portfolio consists of the stocks with the 30% highest SUE at each given quarter and the short portfolio consists of the stocks with the 30% lowest SUE at each given quarter. The long portfolios are returning positive for all years except 2002 while the stocks in the short portfolios only go down in two of the six years.*

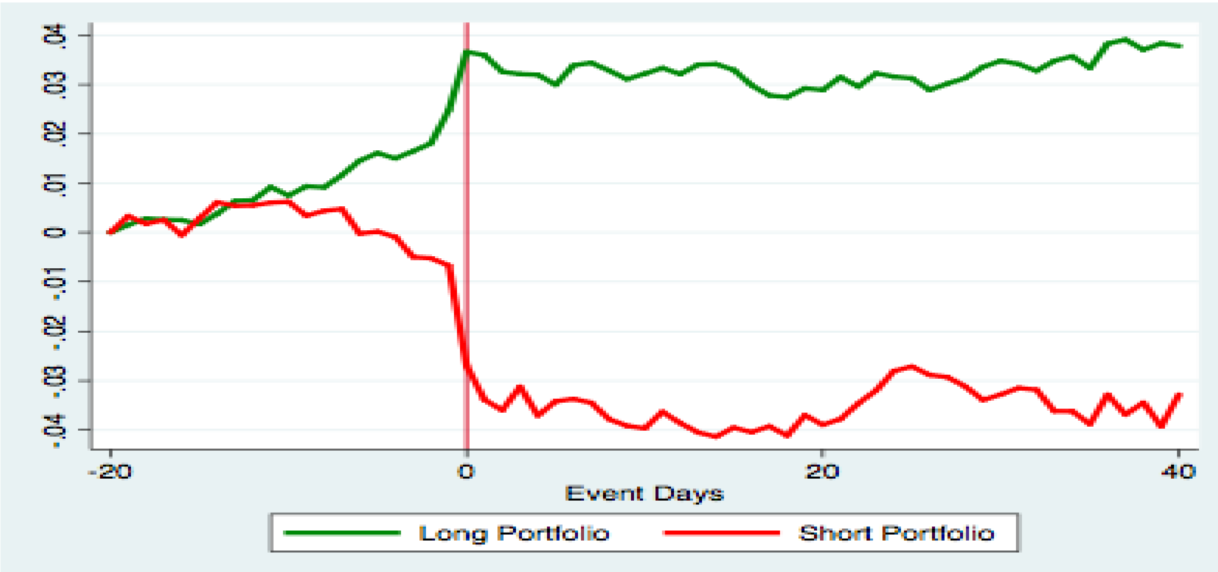
5.2 Relation of Drift to Previously Measured SUE

To test our main hypotheses we have constructed two portfolios with the Long Portfolio consisting of stocks that have been in the highest 20% SUE bracket for two subsequent quarters, and the Short Portfolio for the stocks that have been in the lowest 20% SUE bracket for two subsequent quarters. It is also worth pointing out that the Long Portfolio consists of 68 unique companies over the estimated period and that the average number of unique stocks per quarter is 18. The Short Portfolio consists of 64 unique number of different stocks during the estimated period. The Short Portfolio is constructed using on average 16 number of stocks per quarter. This should be a large enough number for the results to not be influenced by extreme returns of a few single stocks, and for the trades to be practically possible to execute in practice. Descriptive statistics for the portfolios are provided in Table 5. Note that the Long Portfolio seems to have an average ROE of 22,15% while the Short Portfolio has a ROE of -10,42%.

Variable	N Obs.	Mean	Median	SD
Long Portfolio				
Variable	**N Obs.**	**Mean**	**Median**	**SD**
Assets	121	9818,36	1799,54	15453,65
Debt	120	2209,61	288,4	3772,84
EquityBV	121	5226,8	931	10423,9
Liabilities	120	4466,94	1015,2	6748,01
MarketCap	121	10231,52	2351,63	15484,56
MB	121	3,11	2,64	2,45
DebtEquityMV	120	0,25	0,15	0,31
DebtEquityBV	120	0,51	0,35	0,71
DebtAssets	120	0,21	0,19	0,18
ROA	114	15,76	14,65	15,84
ROE	118	22,15	22,99	19,37
ROIC	116	15,65	13,91	19,9
	Short Portfolio			
Variable	**N Obs.**	**Mean**	**Median**	**SD**
Assets	100	5200,36	638	12404,18
Debt	100	1437,3	74,77	3865,82
EquityBV	100	2622,27	343,52	7559,34
Liabilities	100	2566,71	309,1	6048,82
MarketCap	99	5145,43	853,17	11460,35
MB	99	2,83	1,98	2,4
DebtEquityMV	99	0,22	0,13	0,28
DebtEquityBV	100	0,47	0,16	0,59
DebtAssets	100	0,17	0,12	0,16
ROA	99	-2,08	2,56	20,2
ROE	99	-10,42	5,78	47,99
ROIC	99	-4,43	5,19	28,53

Table 5: *Descriptive statistics for the long and short portfolios: Two portfolios are formed by stocks that have had two consecutive positive SUE and two consecutive negative SUE. Mean, median and standard deviation for the quarterly observations are provided for some standard accounting numbers as well as return metrics. The return metrics are calculated on outgoing numbers.*

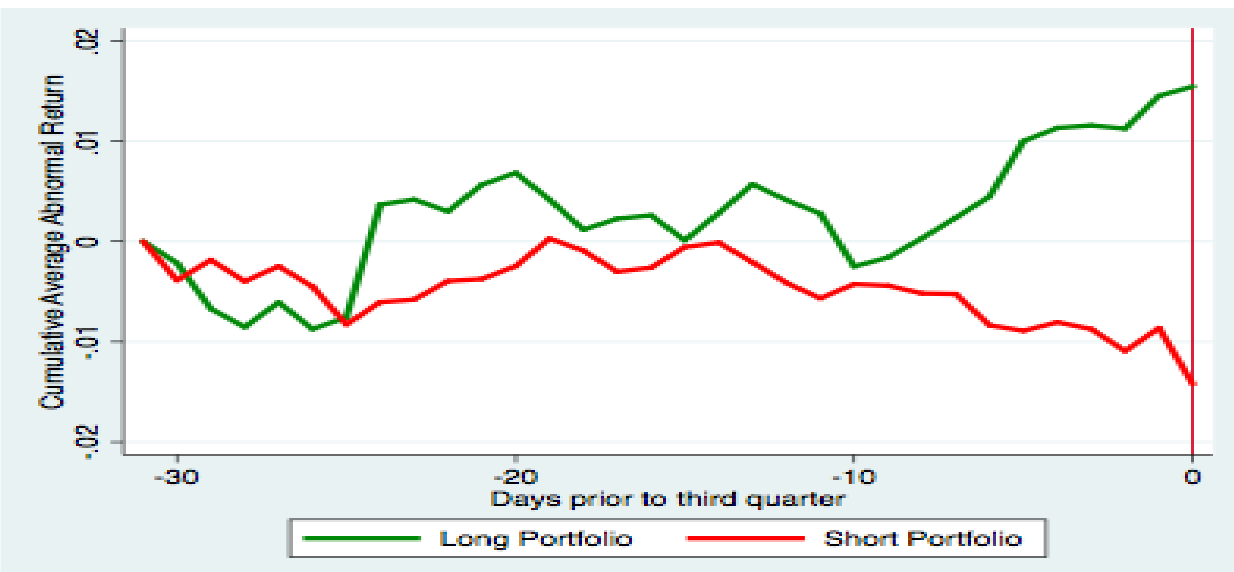
The CAAR of the long and short portfolios is then plotted in Graph 6 over the event time.



Graph 6: *The stocks that have had the highest 20% SUE two quarters in a row are in the long portfolio while the stocks that have had the lowest 20% SUE two years are in the short portfolio. The CAAR has then been plotted from day -20 to day 40. At around day -10 the portfolios start moving to correct for the earnings releases at day 0. From day 0 to day 40 there is hardly any movement.*

The results show that the market seems to react very quickly to the second consecutive high (low) SUE. Around the release date the Long Portfolio gains approximately 2% and the Short Portfolio 2,5%, this can be compared to the reference portfolio where the long portfolios reacted in a similar matter and with the same magnitude. Contrary to our initial prediction the portfolios show no signs of greater drift in any direction before the second positive (negative) release compared to the reference portfolio. We can therefore not make the conclusion that previous releases would enhance pre earnings release drift. The fact that the drift prior to the second earnings release is not deviating from what was found for our reference portfolios is surprising and not in line with what was suggested by Liu et al(2003) and Bernard and Thomas (1989). What is also worth noticing is that there seems to be no drift at all after the initial reactions. The results from the PEAD indicates that the market reacts with less hesitation when a company has showed two consecutive SUEs of the same sign, compared to the reference portfolio where the market takes several weeks to adjust. Furthermore, this indicates that since there seems to be no drift in anticipation of the third quarter, at least not in the first 40 days, the market is actually understanding the implications for future quarterly performance better than expected. The hypotheses that the market is working efficiently can thus not be rejected.

In Graph 7 we have plotted the same portfolios just before the next quarterly announcement date, the third consecutive quarter. This is to further investigate the movement of the stock before the third earnings announcement. We can see that up until day -10 the stocks are not moving in any certain direction. At day -10 the portfolios start to move just as in both previous graphs, but this could be due to information leaking out rather than pre-announcement anticipation considering that it is so close to the earnings announcement date. This further strengthens our previous observation that the market does in fact seem to be able to price the earnings information accurately. A suggested reason as to why previous studies on the subject found an oddly centered drift before the next quarter could be found in Graph 7. There the Long Portfolio and Short Portfolio continues to react in the same sign as they did in the two subsequent quarters with respect to the stock reaction at the release date in the third quarter.



Graph 7: *The portfolios with two subsequent high SUE and two subsequent low SUE are here plotted from day -30 to day 0 before the third earnings announcement. Both portfolios stay around 0% until day -10 where they start to move in anticipation of the upcoming earnings release.*

5.3 Mean Reversion Theory

One reason as to why we can not observe the initially predicted drift could be due to the fact that part of the market could consist of mean-reversionists. In our test we find that the median SUE is close to zero over time for both the stocks in the Short Portfolio and the Long Portfolio. This could lead to part of the market expecting the SUE to be negative for the Long Portfolio following a good quarter and positive for the Short Portfolio following a negative quarter. This could then mitigate part of the effects of the pre-announcement drift and explain part of our result. More details on this test can be found in Appendix 4.

5.4 Statistical Test and Robustness

Statistical tests and robustness tests on the reference portfolios are carried out to further investigate the significance of our observed results. The results are presented in Table 6 and Table7.

Variables	Portfolio1	Portfolio2	Portfolio3	Portfolio4	Portfolio5	Portfolio6	Portfolio7	Portfolio8	Portfolio9	Portfolio10
Constant	0.0170	-0.0122	0.000678	0.00755	0.0192*	3.01e-05	0.00832	0.0117	0.0175	0.00362
	(0.0118)	(0.00914)	(0.00911)	(0.0124)	(0.0107)	(0.0107)	(0.00914)	(0.0166)	(0.0165)	(0.00963)
t-stat	1.44	-1.34	0.07	0.61	1.79	0.00	0.91	0.71	1.06	0.38
Observations	67	70	68	63	72	69	63	73	62	78
R-squared	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 6: *Summary statistics for the robustness test with a constant as the explaining variable. The constant indicates the abnormal return over the event time. Standard errors are presented in the parentheses. *** p<0,01, ** p<0,05,* p<0,1 Additionally the t-stat of each portfolio is reported.*

Variables	Portfolio1	Portfolio2	Portfolio3	Portfolio4	Portfolio5	Portfolio6	Portfolio7	Portfolio8	Portfolio9	Portfolio10
mktrf	0.759**	1.566	0.640*	-0.190	0.414	0.405	1.562***	0.991**	1.003***	-0.387
	(0.350)	(1.314)	(0.352)	(1.261)	(0.360)	(0.247)	(0.465)	(0.390)	(0.328)	(0.573)
t-stat	2.17	1.19	1.82	-0.15	1.15	1.63	3.36	2.54	3.06	-0.68
Constant	0.000331	-0.00133	0.000347	0.000542	0.000799*	0.000680	-0.000657	-8.73e-05	0.00102**	0.00110**
	(0.000626)	(0.00199)	(0.000434)	(0.000643)	(0.000442)	(0.000450)	(0.000974)	(0.000666)	(0.000407)	(0.000504)
t-stat	0.53	-0.67	0.80	0.84	1.81	1.51	-0.67	-0.13	2.51	2.18
Observations	38	38	38	38	38	38	38	38	38	38
R-squared	0.065	0.063	0.080	0.001	0.025	0.037	0.115	0.074	0.177	0.013

Table 7*: Robustness test adjusted for market risk: In this table summary statistics are provided for each portfolio highlighting the results of the test where we adjust for market risk. The beta as well as the constant are reported with standard errors in parentheses. T-stat of each test is also presented for each portfolio as well as the R-squared. . *** p<0,01, ** p<0,05,* p<0,*

Table 6 presents summary statistics for the first test, for our so called reference test. This test is done for the whole event time. It is interesting to note that the constant is largely positive for the high SUE portfolios but not negative for most of the short portfolios. Portfolio 8 and 9 seem to be showing the highest intercepts at 0,0117 (1,17%) and 0,0175 (1,75%) respectively with t-stats of 0,71 and 1,06. This can be compared to Setterberg (2007) who found an intercept at 1,1% monthly for her long portfolio. Apart from Portfolio 1, the short portfolios all have an intercept close to zero but mostly on the positive side. This is well in line with the observed results of the returns, where the long portfolios had positive return while the short portfolios where close to 0. In general this test confirms the initial conclusion that the short portfolios drift marginally and have the major part of the reaction on the event date, while the long portfolios tend to drift more.

In Table 7 we use the market return to adjust for the market risk, according to the CAPM. The market return is therefore included as the explaining variable. Here the results are not quite as good as most portfolios have coefficients close to 0. This could be an indication that most of the returns gained are actually compensation for risk.

6 Implications & Conclusion

This paper studies the Post Earnings Announcement Drift (PEAD) on the Swedish market. In the first part of the study we confirm past findings and prove that there is indeed a PEAD in the same sign as the earnings surprise. Within 40 days after the quarterly announcement date we find that high decile SUE portfolios can return 2%-3% while low decile SUE portfolios return around 0%. These results are partially robust for some portfolios and tests.

We furthermore show that stocks with subsequent earnings surprises of the same sign seem to react more promptly than anticipated and suggested by previous studies conducted on other markets. In fact, there is no observable abnormal return to observe in neither the long nor the short portfolio after the event day.

The fact that we could confirm the previous findings of PEAD in the Swedish market was not a surprise. Even though not all studies have found evidence of the PEAD phenomenon on the Swedish market, Setterberg did it in 2007. Since we used largely overlapping data and similar methods, our results are similar throughout this research.

However, the finding that portfolios with subsequent high unexpected earnings and low unexpected earnings showed no sign of neither abnormal pre earnings announcement drift nor post earnings announcement drift was surprising. Bernard and Thomas (1989) and Liu et al.(2003) theorize that the most plausible explanation for PEAD in general, is the fact that the market can not completely grasp implications of the earnings information. Based on these theoretical suggestions and findings, the market should build some anticipation up to the following quarterly announcement. This would be reflected in the stock price as abnormal returns in the same sign as the anticipated outcome. However, if the market would not be able to grasp this immediately, we would see a drift leading up to the following announcement date and not an immediate reaction at the event date.

In our study this is not the case since the market seems to be reacting quicker than anticipated. These results are thus not in line with the conclusions of Bernard and Thomas (1989). A potential reason as to why our prediction was not fulfilled could be due to a mean reversion effect balancing out the effect of a PEAD.

A factor that was left out in this research was the impact of confounding events. The impact of other events such as large news articles and other media coverage could potentially impact the results in ways that we have not considered. How these events impact the drift could be a subject for future research.

To conclude, even though we hypothesized that the market would not act efficiently to subsequent earnings announcements, the Swedish market seems to be more efficient than was initially expected.

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8 Appendices

8.1 Appendix 1: The Swedish Market

The Swedish market is dominated by a few industries and our sample consists of 10 different ones. Out of a total of 291 companies from the sample, the industrial companies are dominating. 30 % of the number of companies are within the industrial sector, followed by the technology sector with 18% representation. It is worth noticing that this sample is constructed right after the IT boom, making the number of tech companies relative to the rest of the market very high. See details in Table 8.

Industry	Frequency	Percent
Oil & Gas	4	1,37%
Basic Materials	18	6,19%
Industrial	87	29,90%
Consumer Goods	26	8,93%
Health Care	30	10,31%
Consumer Services	21	7,22%
Telecommunications	5	1,72%
Utilities	2	0,69%
Real Estate	45	15,46%
Technology	53	18,21%
Total	291	100,00%

Table 8: *The Swedish market by industry: The table presents an overview of the industries that represent the Swedish market. The frequency as well as he percent of the whole market is presented for each industry. Source: Datastream ICB codes.*

8.2 Appendix 2: The Breusch-Pagan / Cook-Weisberg test for heteroscedasticity

The Breusch-Pagan / Cook-Weisberg test (BPT) for heteroscedasticity is one of the more common tests for heteroscedasticity in data sets. Heteroscedasticity occurs when the error term differs across observations and is often present when the regression is missing out on an independent variable, this is called the omitted variable bias. [3]

The Breusch-Pagan test tests if the error variances are equal (suggesting homoscedasticity), versus the alternative hypothesis that the error terms are a function of one or more variables, i.e. heteroscedasticity.

When testing for heteroscedasticity in the regression between predicted quarterly earnings and the actual quarterly earnings, we arrived at a Chi-2 test statistic of 3122,96. With this result we reject the null hypothesis of homoscedasticity. The implication of heteroscedasticity is that the regression will give faulty coefficients, making the robustness hard to perform.

What can be done, and what we have done, to at least subdue the effects of the heteroscedasticity is to use robust regressions instead of performing the standard Ordinary Least Square (OLS) regression. The robust regression is good because it is relatively less sensitive to outliers and still give us a linear relationship between outcome and the predictors. Robust regressions are consistently used throughout this study.

[3] Source: Williams, University of Notre Dame, 2015

8.3 Appendix 3: The Thomson Reuter Datastream Return Index

The Thomson Reuters Datastrem Return Index (RI) is used to measure the "fair" return on the underlying asset. The return index shows a theoretical growth in value of a share where dividends immediately are re-invested to purchase more equity units. The index is calculated as follow:

$$RI_t = RI_{t-1} * \frac{PI_t}{PI_{t-1}} * \left(1 + \frac{DY_t}{100} * \frac{1}{N}\right) \quad \text{(eq. 8)}$$

Where:

RI_t = Return Index at time t

RI_{t-1}= Return Index at the previous day

PI_t = Price Index at time t

PI_{t-1} = Price Index at previous day

DY_t = Dividend Yield % on day t

N = number of working days in a year, assumed 260.

In order to get the daily return Rt using the return index, we use the formula:

$$R_{i,t} = \frac{RI_{i,t}}{RI_{i,t-1}} \quad \text{(eq. 9)}$$

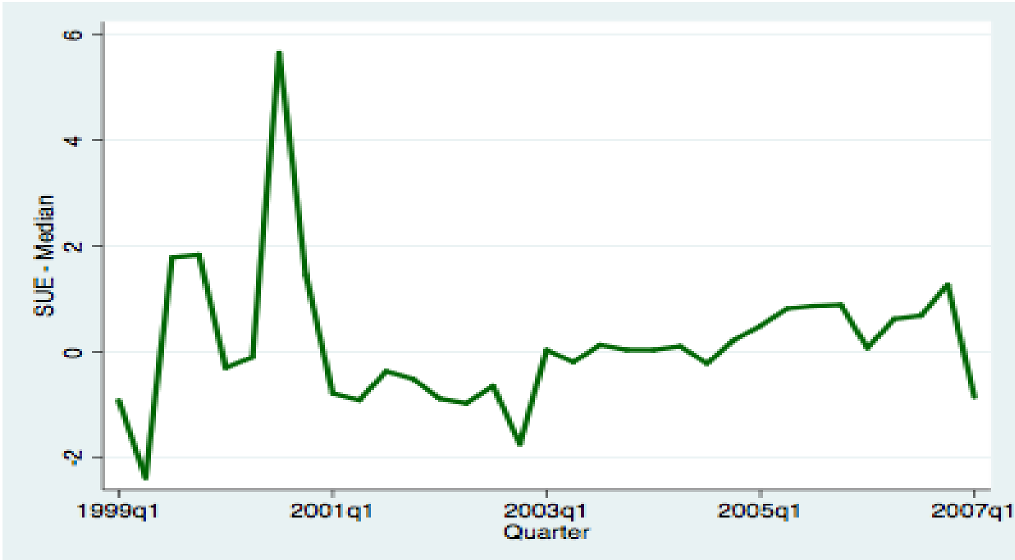
The implication of using the return index is that we arrive at the same return formula as was presented above in the methodology section.

8.4 Appendix 4: The Effect of Mean Reversion on the Observed Results

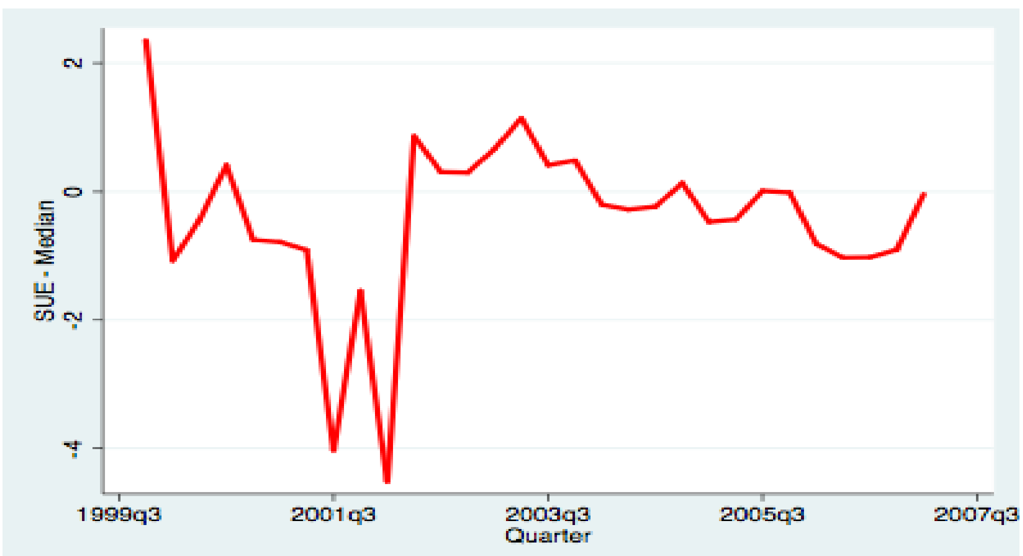
Mean reversion is the theory where prices and returns are expected to follow a long term mean or average. This could in practice mean that if a share generates abnormal return relative to what is supported by the historical average returns, then the "mean reversionists" will expect negative abnormal returns to follow. We have anticipated this theory and suggested that, as an alternative hypothesis, the average SUE of each individual company should on average, over time, be close to zero. This does not mean that SUE can not deviate from zero for individual quarters, just that companies cannot constantly beat market expectations.

When generating descriptive statistics for our complete data set we found that the median SUE was close to zero. A median SUE of zero is what should be expected, suggesting that the market on average manage to predict company earnings. Even when dividing our data set and sorting it into the companies that at any time are put into the long respectively short portfolio, we found that the median for both the long and short portfolios are over time close to zero with no definite sign over the sample time. What is interesting to note is that positive jumps are later compensated with negative SUE quarters and vice versa. This is illustrated in Graph 8 and Graph 9.

Since the median SUE seems to be around zero, a part of the market could argue that when a company has had several positive SUEs in a row, it should be followed by a negative one. This would then lead to part of the market having low anticipation, leading to negative returns prior to the third earnings announcement and thus canceling out a potential upwards drift. The same logic applies for the short portfolios. This could potentially bias our results.



Graph 8: *Median SUE for the long portfolio: The median sue for the stocks that at some point are included in the* ***long*** *portfolio is plotted over the sample period. Although moving up and down, the main observation is that the median is still close to 0.*



Graph 9: *Median SUE for the long portfolio: The median sue for the stocks that at some point are included in the* ***short*** *portfolio is plotted over the sample period. Although moving up and down, the main observation is that the median is still close to 0.*