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The Accruals Based Trading Strategy on the Swedish Stock Market

Does the benchmark when classifying extreme accrual firms have an impact on the trading strategy's effectiveness?

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Abstract

Title:	The Accruals Based Trading Strategy on the Swedish Stock Market
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Key words:	Accruals anomaly, trading strategy, market efficiency, earnings fixation
Purpose:	To investigate if it is possible to earn abnormal returns from the accruals based trading strategy in Sweden. The aim is also to examine if the benchmark used when classifying firms into accruals portfolios has an impact on the abnormal returns from the trading strategy.
Methodology:	The study investigates the abnormal returns from the trading strategy that aims to exploit the accruals anomaly. Firms are divided into portfolios and using previously established methods of risk-adjustment, the abnormal returns from the trading strategy are estimated and tested for each of the 11 portfolio years.
Theoretical perspectives:	The theory in the paper is based on previous research on the accruals anomaly. The theories have been applied when investigating other markets to describe and analyse the accruals anomaly.
Empirical foundation:	The study examines firms listed on NASDAQ OMX Stockholm main market. Portfolios are formed each year between 2002 and 2012. The majority of the data has been collected using Thomson Reuters Datastream.
Conclusions:	The results show that while the benchmarks classify firms differently, the difference does not spill over to the abnormal returns earned by the investor. Overall, the results for all risk-adjustment methods show that investor may not earn positive abnormal returns from the trading strategy in Sweden.

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1. INTRODUCTION

The first chapter provides a background and discussion on the subject of this paper before presenting the chosen research questions. The purpose of the study is defined as well as any delimitations.

1.1 Background

In 1996, Richard Sloan (1996) presented a paper that suggested that there is a possibility to earn abnormal returns on the US market by following a trading strategy based on the components of a firm's reported earnings. The reasoning behind this was that firms' earnings can be divided into a cash flow component and an accruals component. The cash flow component represents an actual cash transaction, while the accruals component adjusts for a mismatch between cash transactions and the actual delivery of goods or services[1]. When Sloan published the results from his study, he showed that accruals are less persistent in future earnings than cash flows, but that investors fail to recognize this. Instead, investors tended to overweight the value of current accruals and underweight the value of current cash flows when they forecasted future earnings. This has become known as the accruals anomaly and represents a systematic mispricing on the market that allows for the possibility to earn abnormal returns on stock investments. Sloan (1996) constructed a trading strategy designed to take advantage of the situation, where firms were sorted into portfolios based on the relative size of their accruals. The reasoning behind the strategy was that when accruals were reversed in the future periods, investors were surprised by the reported earnings, which was reflected in the stock price. Hence, firms that had reported high accruals experienced a falling stock price as earnings did not meet expectations due to the reversal of accruals. Thus, by taking a long position in firms with low accruals and a short position in firms with high accruals, Sloan (1996) found that the trading strategy was able to attain double-digit abnormal returns on the US market. The findings received widespread recognition in academic literature (Green *et al.*, 2011). In fact, they were taken beyond the scope of the academic world and used by professionals in investment decisions, as Business Week reported in its cover story on 4 October, 2004:

[1] Examples of accruals are accounts payable or accounts receivable, which may impact a firm's earnings, but do not correspond to a similar change in cash flows.

"*Now, Goldman Sachs Asset Management, Barclays Global Investors, and Susquehanna Financial Group, among others, are employing versions of the Sloan-Richardson Models to guide their investments.*" (Henry, 2004, p. 79-88)

Furthermore, the findings challenge one of most widely accepted theories on capital markets; the efficient market hypothesis (Hafzalla *et al.,* 2007). The efficient market hypothesis was introduced in 1970 by Eugene Fama, who was recently awarded Sveriges Riksbanks Prize in Economic Sciences in Memory of Alfred Nobel for his contributions on the matter. (Nobel Foundation, 2013) The efficient market hypothesis suggests that all information available on a firm should be reflected in its stock price. As reported earnings and its components are publicly available information, the market should incorporate the information into the stock price accordingly. (Fama, 1970) However, the magnitude and duration of abnormal returns found in Sloan (1996) is an indication that the market efficiency fails to hold and has become a highly debated issue in finance and accounting literature (Hafzalla *et al.,* 2007).

1.2 Problem discussion

While a majority of the studies on the US stock market have been fairly unanimous regarding the existence of the accruals anomaly (see for example Sloan, 1996, Collins & Hribar 2000; Bradshaw *et al.,* 2001; Xie, 2001; Zach, 2003; LaFond, 2005; Hafzalla *et al*., 2007; Pincus *et al.*, 2007), there are researchers that have found otherwise. For example, Kraft *et al.* (2006) point out that results in previous research are rarely robustness checked by controlling for outliers and look-ahead bias (discussed in detail in chapter 3), and argue that when these biases are accounted for, the anomaly is no longer present. This suggests that the results found in previous studies are due to a few, extreme observations, and should not be generalized to a greater population. Furthermore, Khan (2008) and Wu *et al.* (2009) argue that the accruals anomaly is largely attributable to misspecified risk adjustments, suggesting that the findings are sensitive to the chosen asset pricing model used to specify expected returns. Finally, Green *et al.* (2011) and Johnson & Schwartz (2001) found evidence that the anomaly has declined over the years. Green *et al.* (2011) argue that the increased research on the subject has inclined investors to exploit the anomaly, leading to the abnormal returns from the trading strategy being arbitraged away. This argument has also been backed by practitioners, for

example Ron Kahn, Global Head of Equity Research at Barclay's Global Investors, who was quoted in Financial Times:

> *"Buying companies with high quality earnings and shorting those most dependent on accruals proved a good strategy, until the market figured it out."* (Skypala, 2009, p.4)

In spite of the great amount of attention the subject has received, the majority of research to date has been conducted on the US market while few studies have been done on the Swedish market. In addition, the research that has been conducted, has reached ambiguous results regarding the existence of the accruals anomaly in Sweden. For example, LaFond (2005) found that the accruals based trading strategy in Sweden does yield positive abnormal returns, but only at a 10% significance level. Pincus *et al. (*2007) on the other hand, found no statistical support for this. Furthermore, one recent master thesis (Giaever & Gabrielsson, 2007) supports existence of the accruals anomaly in Sweden, while another (Ivanov & Maximova, 2011) fails to find such evidence. The ambiguity in results on the Swedish market suggests the need for further research in order to determine if the anomaly is present in Sweden, in which case investors may exploit it and earn abnormal returns on their investment portfolio.

One factor that all studies on the Swedish market have in common is that they benchmark the accruals by total assets when classifying firms into accrual portfolios in the trading strategy. By setting the size of accruals in relation to the size of the firm, the researchers enable for comparison between firms, which is necessary when comparing portfolio returns (Sloan, 1996). However, Hafzalla *et al.* (2007) suggest a new benchmark for classifying the extreme accrual firms, namely by earnings. Their results suggest that by modifying the classification measure in this way, the significance of statistical results improve, thus making the trading strategy more effective. In an attempt to contribute to the limited research and ambiguous results on this topic in Sweden, this paper will apply Hafzalla *et al.*'s (2007) classification method, as well as Sloan's (1996). The aim is to investigate if the new benchmark will detect higher statistically significant results of the accruals based trading strategy on the Swedish market than the classification using total assets.

Finally, due to the criticism by Khan (2008) and Wu *et al.* (2009) against previous literature's methodology, this study will employ several measures of risk-adjustments. This is further motivated by the difference in results across studies on the Swedish market, which suggests that there may be a misspecification in estimating abnormal returns. This study therefore includes the Capital Asset Pricing Model, Fama-French 3 factor model and buy-and-hold abnormal returns using size-matched reference portfolios. A distinction will also be made between earlier and later years in order to investigate if the accruals anomaly has been arbitraged away in recent years, as is argued by Green *et al.* (2011) and Johnsson & Schwartz (2001).

1.3 Purpose

As the benchmark used to identify extreme accrual firms changes, the effectiveness of the accruals based trading strategy has been found to improve accordingly (Hafzalla *et al*., 2007). The aim of this study is to investigate if the recently introduced earnings benchmark by Hafzalla *et al*. (2007) can improve previous researchers' low significance of an accruals based trading strategy on the Swedish stock market. If the accruals anomaly is present on the Swedish market, investors may use this information in order to benefit from abnormal returns.

1.4 Research question

There are two main questions that this paper will research:

1. When attempting to create an accruals based trading strategy, to what extent is the measure that classifies accruals by earnings more effective than the measure that classifies accruals by total assets?
2. To what extent is it possible to earn abnormal returns from the accruals based trading strategy in Sweden?

1.5 Delimitations

The scope of this study is limited to only include non-financial firms listed on NASDAQ OMX Stockholm main market. This is due to the special nature of the financial statements of financial firms and to increase comparability with previous research that frequently excludes such firms.

1.6 Outline

Chapter 2 starts with highlighting theories and previous research that is relevant to the chosen research questions. Chapter 3 describes the methodology when classifying firms into portfolios and estimating abnormal returns of the trading strategy. Chapter 4 presents the results and analysis with regards to theory. Chapter 5 presents conclusions and proposes topics for future research.

2. THEORETICAL FRAMEWORK

The second chapter introduces the reader to theories related to the accruals anomaly and relevant research. The chapter is split into three main sections. The first is the debate on market efficiency and the existence of anomalies. The second discusses earnings components, and their relation to future performance. Finally, the third section presents arguments on why the accruals anomaly may or may not exist.

2.1 Theories on market efficiency

2.1.1 The efficient market hypothesis

The efficient market hypothesis, presented by Eugene Fama in 1970, predicts efficient financial markets where all information available on a firm is reflected in the stock price. Thus, it is not possible for investors to exploit mispriced stocks and make arbitrage profits since the stock price already accurately incorporates all information about the firm. According to Fama (1970) there are three levels of market efficiency. A market that has *weak efficiency* only reflects historical information in stock prices, making it difficult to make arbitrage profits through a technical analysis. A *semi-strong* market is extended to include current public information, and it is therefore not possible to arbitrage from fundamental analysis. The third form, *strong efficiency*, fulfils both criteria above but in addition assumes that all insider information is also available to the public. This state is generally not considered to be realistic and instead the semi-strong state is the most accepted. (Fama, 1970)

2.1.2 Market inefficiencies

Market anomalies are circumstances of market inefficiency where stock prices are systematically mispriced and do not reflect all public information available. (Shefrin, 2007) There are two views on market anomalies. The first is the traditionalists' view, which claims that market anomalies are small and temporary. The second is the behaviourists' view, which argues that anomalies can be large and more permanent. Thus, according to both views, it may be possible to exploit anomalies in order to earn abnormal returns; however they differ with regards to the time frame and magnitude. (Shefrin, 2007) Still, Shefrin (2007) is clear to point out, that neither view is in support of the possibility of permanent market inefficiency. With respect to the accruals anomaly, this view opposes that proposed in previous literature (such as Hafzalla *et al*., 2007) which often argues that the existence of the accruals anomaly is evidence against market efficiency.

While certain anomalies are linked to time effects or structural factors, Shefrin (2007) attributes investors' failure to price stocks according to a firm's fundamental value to behavioural phenomena. As investors may view risk and return differently depending on the circumstances and market conditions, they are not always rational when pricing stocks which can lead to systematic mispricing. (Shefrin, 2007)

2.1.3 The accruals anomaly

Sloan (1996) found that investors fail to price stocks correctly with respect to firms' reported accruals, i.e. the part of earnings that is not attributed to cash flows from operating activities. By investigating the components of firms' earnings and go long in firms with high accruals and short low accrual firms, Sloan concluded that investors were able to earn abnormal returns of 10.4%. (Sloan, 1996) This occurrence of a systematic mispricing is referred as the accruals anomaly and further research on the subject will be presented in the section 2.3.

2.2 Theories on earnings and its importance to investors

Ball and Brown (1968) suggested that there is a positive relationship between earnings and stock returns. This is due to the fact that earnings are considered to summarize value relevant information about a firm. By breaking down current earnings into its components, one may investigate a firm's future earnings power, defined as "*the level of earnings an enterprise can be expected to sustain over the next five to ten years*." (Graham, *et al.* 1962, referred to by Sloan, 1996, p. 290) The argument is that certain components of earnings are more persistent when forecasting earnings and are thus more reliable when assessing the firm's future earnings power. (Graham, *et al.* 1962, referred to by Sloan, 1996) In particular, several authors (Sloan, 1996; Collins & Hribar, 2000; Bradshaw *et al.*, 2001; Xie, 2001; Zach, 2003; LaFond, 2005) have found that operating accruals are less persistent in future earnings than operating cash flows. Forecasts should therefore be adjusted for the accruals, in order to avoid a future earnings surprise. (Graham, *et al.* 1962, referred to by Sloan, 1996) Furthermore, Bernstein (1993) pointed out that cash flows from operations are less exposed to subjective valuations than other components of earnings, such as accruals. Therefore, a higher ratio between cash flows from operations and net income suggests a higher earnings quality. In the meantime, the opposite may suggest that the firm's management is involved in earnings management activities such as using doubtful accrual criteria. (Bernstein, 1993) In spite of

this, several researchers have found that investors fail to evaluate the different components of earnings when forecasting future performance. (Ou & Penman, 1989; Bernard & Thomas, 1990; Hand, 1990; Maines & Hand, 1996; Sloan, 1996; Dechow *et al.*, 2005) As a result, the positive relationship between earnings and stock returns is likely due to investors' fixation on earnings when pricing a stock, rather than earnings ability to summarize information on firm value.

The relevance of market efficiency and earnings to this study

Since financial markets today are assumed to be semi-strong and accounting data are available to the public, investors should not be able to earn abnormal returns by trading on this kind of information. In other words, in order for the market efficiency to hold, one should not be able to earn abnormal returns on an accruals based trading strategy. If the results in this study show that is possible, it suggests that the Swedish market fails to recognize the information available on accruals when assessing the quality of a firm's current earnings and its future earnings power.

2.3 Theories on the accruals anomaly

2.3.1 Earnings fixation hypothesis

When Sloan (1996) studied US firms between 1962 and 1991, he found that cash flows are more persistent than accruals in earnings, but that the market fails to anticipate this when forecasting future earnings. Due to this earnings fixation, investors are surprised when accruals are reversed in subsequent periods, and returns alter to reflect the stock price changes caused by the earnings surprise. (Sloan, 1996) For example, firms that recorded high earnings due to high accruals may initially have generated positive returns but experienced a falling stock price once the accruals were found to be overstated or reversed. Sloan found that this systematic mispricing may be exploited and developed a trading strategy accordingly. He sorted firms into portfolios based on the size of their accruals, benchmarked by total assets. The abnormal return in the lowest accrual portfolio was 4.9% and –5.5% in the highest accrual portfolio. He then created a hedge portfolio where he took a long position in firms that reported low accruals and a short position in firms with high accruals. By doing this, Sloan found that an investor could earn abnormal returns of 10.4%. (Sloan, 1996) Since then, a number of studies have confirmed Sloan's work and the existence of the accruals anomaly,

both in the US as well as in other markets. (Collins & Hribar, 2000; Bradshaw *et al.*, 2001; Xie 2001; Zach, 2003; LaFond, 2005; Pincus *et al.*, 2007)

A decade after Sloan published his paper, Hafzalla *et al.* (2007) investigated the accruals anomaly on US market between 1988 and 2004. In contrast to most previous research, they applied a new benchmark for identifying extreme accrual firms, namely by classifying accruals in relation to earnings. This differed from Sloan (1996) and the majority of earlier research who applied total assets as a benchmark to allow for comparison between firms. Hafzalla *et al.* (2007) found that by modifying the classification measure to instead scale by earnings, the significance of their statistical results for the trading strategy improved, thus making it more effective. Using the total assets benchmark, they found an abnormal return of -6.3% for highest accrual portfolio and 2.6% for lowest accrual portfolio. The latter was however, not statistically significant. The abnormal return for the entire hedge portfolio was 9% but statistically insignificant. When using the earnings benchmark, the abnormal return was -6.9% for highest accrual portfolio, 5.4% for lowest accrual portfolio and 12.3% for the entire hedge portfolio. All results were significant at the 1% level. In addition to the statistical improvement, Hafzalla *et al.* (2007) argued that by dividing accruals by earnings instead of total assets, the interpretation became more intuitive when relating to Sloan's (1996) earnings fixation hypothesis. This was due to the fact that the classification became a matter of accruals as a proportion of earnings, rather than accruals representing a growth of total assets. (Hafzalla *et al.*, 2007)

2.3.2 The agency theory of overvalued equity

Kothari *et al.* (2006) suggest an alternative explanation to the accruals anomaly. The authors found that companies in the highest accrual portfolio experienced large abnormal returns prior to the event year (the year where they were defined to have high accruals) which was then followed by stock underperformance in the subsequent year. However, the relationship was asymmetric, as high accrual firms' returns were found to be -7.6% and statistically significant but low accruals firms' returns were insignificant, (-1.92%). The authors argued that this asymmetry cannot be explained by the earnings fixation hypothesis, and supported the agency theory of overvalued equity argument (Jensen, 2005) instead. The agency theory of overvalued equity predicts that managers of overvalued firms are more likely to manipulate their earnings and adjust accruals upwards in an attempt to prolong the overvaluation.

Undervalued firms on the other hand, do not have the same incentive to manipulate earnings downwards. This resulted in overvalued firms frequently appearing in the high accrual portfolio, but undervalued firms being more spread out, and not concentrated to the low accrual portfolio. (Kothari *et al*., 2006)

The relevance of the earnings fixation hypothesis and agency theory of overvalued equity to this study

Based on Hafzalla *et al.'s* (2007) findings is interesting to investigate whether the classification based on accruals scaled by average total assets (Sloan, 1996) or scaled by earnings (Hafzalla *et al*., 2007) generates the most profitable hedge portfolio. If this study finds that it is possible to earn abnormal returns from the accruals based trading strategy in Sweden, the results will be compared to previous research to see which theory the results support. A significant negative relationship between Swedish firms' reported accruals and stock returns, suggest that the results are consistent with the earnings fixation hypothesis. However, if the study finds statistical significance only for high accrual firms, and they experience negative returns, the earnings fixation hypothesis is not applicable on the Swedish market. In that case, the results instead support the agency theory of overvalued equity. The findings may be interpreted as evidence that the accruals anomaly on the Swedish market is a result of managers' attempts to prolong firms' overvaluation. Thus, the overvalued equity argument differs from the earnings fixation hypothesis as it assumes that the accruals anomaly is a consequence of mispricing rather than the cause itself.

2.3.3 Alternative findings on the accruals anomaly

Kraft *et al.* (2006) researched the existence of the accruals anomaly on NYSE /AMEX firms between 1987 and 1999. Their results indicated an inverted U-shape in the relationship between abnormal returns and firm accruals, in other words, they found significantly negative abnormal returns for both the extreme accrual portfolios. They employed a trimming procedure of 1% that eliminated a small number of outlying observations in order to robustness test their findings. Kraft *et al.* (2006) argued that the inverted U-shape in abnormal returns could not be explained by Sloan's (1996) earnings fixation hypothesis as earnings fixation does not predict the significantly negative returns in the low accrual portfolio. A main argument proposed in the paper was that of the lack of robustness tests in previous research when assessing market mispricing. The authors argued that when disregarding the importance

of robustness testing, findings may easily be misleading as outliers cause misspecified test statistics.

2.3.4 Accounting and institutional setting as contributors to the accruals anomaly

In contrast to many previous studies that have only focused on the US market, Pincus *et al.* (2007) investigated the international presence of the accruals anomaly. They specifically investigated how accounting and institutional factors added to the anomaly's existence, and found that legal tradition, allowance for accruals accounting, ownership concentration and limits to insider-trading all have significant impact. Firstly, Pincus *et al.* (2007) found that the anomaly is more likely to occur in common law countries. Their findings were unexpected as countries with a common law tradition are generally associated with stronger investor rights and greater access to firm specific information (LaPorta *et al.,* 1998). Furthermore, previous research by Hung (2001) found that financial markets in common law countries are assumed to have a greater degree of efficiency, suggesting that accrual mispricing would be less likely. In spite of this, the results of Pincus *et al.* (2007) indicated that even though investors were assumed to have greater access to information, this was the legal setting where the accruals anomaly was mostly likely to appear. Pincus *et al.* (2007) explained the anomaly's occurrence by claiming that investors in common law countries seem to disregard their access to information and focused more on total earnings rather than its underlying components. The authors also pointed out that extensive use of accrual accounting in certain countries could add to the anomaly's existence. As accruals are not always explicitly reported in financial statements, Pincus *et al.* (2007) argued that there is an information gap which increases the incentives for managers to adjust the earnings in a certain matter. Finally, Pincus *et al.* (2007) concluded that restrictions on insider trading could affect the duration of the anomaly's existence. In countries that had a more strict attitude towards insider-trading, insiders could not trade based on their knowledge of the persistence of the firm's accruals. As a result, the accruals mispricing on the market was not arbitraged away as quickly.

The relevance of accounting and institutional setting to this study

As Sweden is considered a civil law country (La Porta *et al.,* 1998), the findings of Pincus *et al.* (2007) would suggest that the accruals anomaly will likely not appear here. However, as will be discussed in the section 2.3.6 below, LaFond (2005) found significant abnormal returns from the accruals based trading strategy in Sweden. This suggests that if the results of

this study show that abnormal returns may be achieved from the trading strategy, Sweden may be an exception to the findings of Pincus *et al.* (2007)

2.3.5 Theories contradicting the existence of the accruals anomaly

If it is well known that it is possible to earn abnormal returns by looking at the accruals component in firms' earnings, should not the market exploit this and, after a while, the mispricing be arbitraged away? When Green *et al.* (2011) investigated the accruals anomaly on the US market between 1989 and 2008, they found that after 2004, the positive raw and risk-adjusted returns based on Sloan's (1996) trading strategy seemed to have declined. As this was compelling evidence against many earlier studies, they evaluated their results carefully with several specification and robustness tests. They also tested the implication of using different accruals definitions and measurement techniques. The findings were robust and they concluded that abnormal returns due to an accruals based trading strategy were no longer positive, indicating that the market had recognized the mispricing and arbitraged it away. The authors explained the disappearance of the accruals anomaly to be partly due to that many hedge funds have hired accounting scholars and invested a lot of capital in extreme accrual firms. By doing this, Green *et al.* (2011) argued that accounting researchers may have identified a mispricing on financial markets but that they also helped practitioners exploit them to the point they no longer existed.

As mentioned in the introductory chapter, there are other researchers that also have found evidence that the accruals anomaly may not be the phenomenon that some researchers claim. Khan (2008) and Wu *et al.* (2009) for example argue that the accruals anomaly is largely attributable to a misspecified risk adjustment, suggesting that the findings are sensitive to the chosen asset pricing model used to specify expected return. This is will discussed further in chapter 3, but motivates the use of different methods of risk adjustment in order for the results to be considered reliable.

The relevance of theories contradicting the existence of the accruals anomaly to this study

If the results of this study show that the abnormal returns on the accruals based trading strategy are not significantly different from zero, it would suggest that the accruals anomaly does not exist in Sweden. By dividing the sample into two time periods, the study may investigate if the anomaly has existed but been arbitraged away in later years. Furthermore, by

applying several methods of risk-adjustment, this study avoids being misleading with regards to misspecified asset pricing models.

2.3.6 The accruals anomaly in Sweden

The research on the accruals anomaly on the Swedish market has reached ambiguous results. When LaFond (2005) studied accruals' implication on stock returns in 17 countries between 1989 and 2009, he found that the monthly returns of hedge portfolios where investors go long in low accruals firms and short in high accruals firms generated significant abnormal returns in Sweden. Using the calendar time monthly abnormal returns, he found that the hedge portfolio had an alpha value of 0.69, significant at the 10% level. Even though the anomaly was present in all but two countries studied, LaFond concluded that it is uncorrelated across markets and therefore it is difficult to point out a common global source. (LaFond, 2005)

In contrast to LaFond's significant results, Pincus *et al.* (2007), who studied 20 countries between 1994 and 2002, did not find any support for the previous finding that Swedish investors may earn abnormal returns by using an accruals based trading strategy. However, there are some differences between the two studies worth pointing out. Firstly, LaFond (2005) investigated a longer time period than the latter study. This results in a greater amount of observations which may have improved the statistical tests. Secondly, when calculating abnormal returns, LaFond (2005) used the more traditional Fama-French 3 factor approach while Pincus *et al*. (2007) used a variation that accounts for earnings-to-price, size and book-to-market. It is possible that the choice of model may have influenced the estimated abnormal returns.

The authors of this paper have also found two master theses (Giaever & Gabrielsson, 2007; Ivanov & Maximova, 2011) that investigate the returns from an accruals based trading strategy on the Swedish stock market. The first thesis (Giaever & Gabrielsson, 2007) supports the existence of the accruals anomaly in Sweden while the second one (Ivanov & Maximova, 2011) fails to find such evidence. However, it seems that the former study did not statistically test their hedge portfolio returns. The ambiguous results on the Swedish market motivate for introducing the new earnings benchmark in order to expand the knowledge in the area.

The relevance of previous research on the accruals anomaly in Sweden to this study

In case the results show that one can earn abnormal returns by trading on Swedish firms' accruals, the findings would support LaFond (2005) and Giaever & Gabrielsson (2007). Insignificant results would instead be in line with Pincus *et al.* (2007) and Ivanov & Maximova (2011).

3. METHODOLOGY

The third chapter addresses the data collection process and methodology of the study. The variables needed for the hedging portfolio will be defined as well as calculations of returns and statistical tests. The chapter ends with a critical discussion of the methodology.

3.1 Data and sample selection

The primary source of raw data is Thomson Reuters Datastream. The study includes firms listed on NASDAQ OMX Stockholm main market (Large cap, Mid cap and Small cap). Financial firms such as banks, investment firms and insurance companies have, in line with previous research, been excluded from the sample due to the special nature of their financial statements. They are identified by using Thomson Reuters Datastream's list of "Financial Services" firms and double checked using the Global Industry Classification Standards benchmark.

In order to reflect the information available to investors at the time of the portfolio formation, portfolios are formed based on the prior year's financial statement data. Portfolios are formed in June as it is assumed that all firms will have completed their financial statements by then and made them publicly available. For example, for the portfolio reaching from June 2002 to June 2003, stock returns are recorded from June 2002 to June 2003 and the classification variables are collected from the year-end financial statement data from 2001. Thus, firms must have had financial statement data during any of the years between 2000 and 2011 and historical stock price data for the subsequent year. However, firms need not have been listed during the entire investigation period, but must have data available for at least one portfolio formation. This selection is done to avoid the look-ahead bias determined in previous research (Hafzalla *et al.*, 2007; Kraft *et al.*, 2006) and will be discussed in detail in section 3.1.1. By forming the portfolios in this way, the trading strategy becomes realistically implementable, adding to the practical applicability of the results.

As all data has been collected from Thomson Reuters Datastream, the study is vulnerable to any faults in the database. However, as Datastream is widely used in research and in practice, it may be assumed that the amount of incorrect data is likely low. Furthermore, all calculations, apart from the Calendar time regressions, have been performed manually in this study. Thus, there is room for human error in the data. However, the authors have been

careful to double-check all calculations and portfolio formations in order to minimize the risks for mistakes.

3.1.1 Biases in accrual research

Kraft *et al. (2*006) identify a number of common biases that show up in several previous studies on the accruals anomaly. One of the most common ones is the look-ahead bias. This refers to the recurring requirement in research papers that sample firms must have reported earnings in the year *t+1* (i.e. the year after portfolio formation) and is present in studies performed by Sloan (1996), Collins & Hribar (2000), Xie (2001) among others. The reason for this sample selection is often that the researchers also investigate the persistence and pricing of accruals, which requires that next year's earnings are available. However, when only investigating the trading strategy, the selection is difficult to motivate intuitively as it is impossible for investors to predict which firms will be delisted during the year and which will remain on the market. The issue with the criteria is that it creates an upward bias in the measure of abnormal returns, as firms included in the research are only the firms that have survived during the event year. (Kraft *et al.*, 2006) In fact, the bias seems to distort results significantly as Hafzalla (2007) and Kraft *et al*. (2006) no longer get abnormal returns that are significantly different from zero for the low accrual firms, when the look-ahead bias is removed.

In order to account for the look-ahead bias, the authors of this study have gathered information on which stocks have had financial statement data available during the data collection period, but have been delisted during the research period 2002-2013. The financial information and stock prices have then been collected from Thomson Reuters Datastream. The delisted firms have been included in a portfolio if they have had stock returns for at least the first month from the portfolio formation. Once they are delisted, the proceeds are invested in the market index and not included in next year's hedge portfolio.

3.2 Variables

This section discusses and defines the variables chosen to classify firms when forming portfolios for the accruals based trading strategy. While there are a number of ways to calculate each variable, the definitions in this paper will be similar to those in Hafzalla *et al.* (2007). This is done in order to increase comparability.

3.2.1 Accruals

There are two methods commonly used in previous literature when estimating accruals; the balance sheet approach and the cash flow approach. The balance sheet approach estimates accruals based on changes in balance sheet line items and is calculated as follows:

(1)

$$Accruals_{BS,y} = (\Delta CA_y - \Delta Cash_y) - (\Delta CL_y - \Delta STD_y - \Delta TP_y) - Dep_y$$

Where:

ΔCA	= change in current assets year y
ΔCash	= change in cash /cash equivalents year y
ΔCL	= change in current liabilities year y
ΔSTD	= change in debt included in current liabilities year y
ΔTP	= change in income taxes payable year y
Dep	= depreciation and amortization expense year y

While this method is found in several studies conducted on the accruals anomaly (Sloan 1996; Zach, 2003; LaFond, 2005; Kothari *et al.*, 2006; Kraft *et al.*, 2006; Green *et al*, 2011), Hribar & Collins (2002) identify a misspecification and bias when using the balance sheet approach to estimate accruals. The balance sheet approach relies on an assumed relationship between the capital accounts on the balance sheet, and the accrual element of revenues and expenses on the income statement. However, Hribar & Collins (2002) argue that when firms engage in acquisitions, divestitures, accounting reclassifications etc., the non-operating events are incorporated into the balance sheet accounts, but do not ”flow through” to the income statement. If accruals are measured by the balance sheet approach, the balance sheet account changes due to such events would incorrectly be considered a change in the accruals component of earnings, leading to errors in measurement when using this approach. (Hribar & Collins, 2002)

The alternative method of estimating accruals is by means of the cash flow approach. This approach begins by determining the operating cash flow portion of earnings from the statement of cash flows. The operating cash flows are then deducted from earnings to give an accruals estimate:

(2)

$$Accruals_{CF,y} = Earnings_y - Operating\ cash\ flows_y$$

Where:

Earnings = the firms earnings (can be defined in different ways, discussed in section 3.2.2)

Operating Cash flows = cash flows from firms operations (discussed in section 3.2.3)

Previous research has varied slightly on which measure is applied. Sloan (1996) uses the balance sheet approach, primarily motivated by the fact that the disclosure requirements of SFAS no. 95 (which requires the statement of cash flows to report the information necessary to compute the accrual portion of earnings from the reconciliation of net income with operating cash flows) had only been in place for 4 of the 30 years he was examining. Accordingly, using the cash flow approach for those years would create an inconsistency in the calculation across firms. However, several researchers (see for example Zach, 2003; LaFond, 2005; Kraft *et al.*, 2006; Hafzalla *et al*. 2007) have employed the cash flow method when estimating accruals. Based on Hribar & Collins (2002) findings of the weakness of the balance sheet approach, and to ensure comparability with Hafzalla *et al.* (2007), this paper applies the cash flow approach, using the formula (2) above.

3.2.2 Earnings

Previous studies have defined earnings in various ways, the most common are net income before extraordinary items and net income (for example Kraft *et al*., 2006; Hafzalla *et al.*, 2007,). When Hribar & Collins (2002) tested different measures and definitions of accruals, they found that by defining total accruals as net income before extraordinary items minus operating cash flow, the researcher is provided with the most comprehensive measure of a firm's accruals. The measure includes accruals related to deferred taxes, restructuring charges and special items, but excludes accruals related to extraordinary items and discontinued operations. Hribar & Collins (2002) argue that this measure is least likely to give incorrect accruals estimations. This study will therefore use net income before extraordinary items as the measure for earnings[2].

3.2.3 Cash flows from operations

In line with previous research, the data for operating cash flows is taken directly from the statement of cash flows from Thomson Reuters Datastream. The variable includes net cash

[2] The data is collected from Thomas Reuters Datastream and is measured after taxes.

receipts and payments resulting from the operations of the firm, including funds from and for working capital.

3.3 Classifying firms according to their accruals using different benchmarks

Once the accruals have been determined as outlined above, portfolios of firms are created based on the size of accruals in order to test an accruals based trading strategy. As mentioned earlier, the majority of previous research scale accruals by some measure of firms size (often total assets) when classifying firms into portfolios. Sloan (1996) motivates the use of firm size with that it allows for comparison cross-sectionally and intertemporally. Hafzalla *et al.* (2007) however, introduce the benchmark of earnings as a repair to the accruals based trading strategy and argue that it significantly improves the strategy's abnormal return. The new benchmark is motivated with the argument that it focuses on the composition of earnings and the percent that is constituted by accruals and thereby, intuitively linked to the notion of earnings fixation. (Hafzalla *et al.,* 2007) In accordance with Hafzalla *et al*. (2007) this study uses both the benchmark of size and earnings to compare the returns of the strategy when applied to firms listed on NASDAQ OMX Stockholm main market. When applying the size benchmark, accruals in year *y* are scaled by average total assets in year *y* and *y-1*:

(3)

$$SizeAccruals_y = \frac{Accruals_y}{\frac{1}{2} \times \left(TotalAssets_{y-1} + TotalAssets_y\right)}$$

When applying the earnings benchmark on the other hand, accruals in year *y* are scaled by the absolute value of net income before extraordinary items in year *y*:

(4)

$$PercentAccruals_y = \frac{Accruals_y}{\left|Earnings_y\right|}$$

The absolute value is used when scaling by earnings to ensure that the sign of accruals is maintained when classifying firms into portfolios. The effect is that firms that generally are sorted into the lowest accrual portfolio have large positive cash flows, but accruals have lowered earnings so they are close to zero. In the meantime, firms generally sorted into the highest accrual portfolio generally have negative cash flows but accruals have increased their

earnings so they are close to zero. As earnings can be close to or equal to zero, using the absolute value of earnings gives rise to the possibility of having extremely positive and negative values of percent accruals. However, the value of percent accruals is merely used for classification purposes, and is not relevant when measuring the returns once the portfolios have been created. (Hafzalla *et al.*, 2007)

The size accruals and percent accruals values are calculated for each of the 11 years being investigated, for all firms that have the data required to be included in the portfolio. Datastream may not lack data from their latest annual report regarding earnings, operating cash flows or total assets, as this would hinder a proper classification. Once the size accruals and percent accruals values have been calculated, firms are ranked and sorted into portfolios. This sorting is done for each benchmark separately. While previous researchers (Sloan, 1996; Kraft *et al.*, 2006; Hafzalla *et al.*, 2007) sort firms into deciles, this study uses quartiles because the sample is smaller than in many other studies. This is done to ensure that the sample being investigated in the trading strategy, i.e. the highest and lowest quartiles, is not too small to ensure statistical reliability. As this study includes firms that are delisted during the investigation period, as well as firms that have been listed after 2002, the number of firms in the quartiles vary between the years[3]. In total, the study includes 2363 firm-year observations. There are between 50 to 60 firms in each quartile each year, resulting in approximately 581-598 firms in each quartile in the entire investigation period. Within each quartile, the stock returns of each firm are computed to estimate the portfolio return. The computation of returns and abnormal returns are discussed below.

3.4 Returns

3.4.1 Stock returns

Stock prices for each firm are recorded monthly from the end of June in the year that the portfolio is formed (six months after the fiscal year end from which the financial statement data has been collected). The stock price is defined as the adjusted stock price in Thomson Reuters Datastream as this accounts for dividends and stock splits, giving a more accurate

[3] Newly listed firms are only included in portfolios from the year when they fulfill the requirements regarding financial statement data and stock price information (see requirements explained in section 3.1)

reflection of the return earned by an investor than, for example, the unadjusted closing price. The monthly stock returns for each firm are computed as the relative change in stock price:

(5)

$$R_{it} = \frac{P_{it}}{P_{it-1}} - 1$$

Where

R_{it} = is the return of the security *i* in month *t*

P_{it} = is the price of the security *i* in month *t*

P_{it-1} = is the price of the security *i* in month *t-1*

3.4.2 Abnormal stock returns

When evaluating the return from an investment, it is important to recognize the relationship between risk and return, which indicates that a higher return may be associated with the investor having accepted a higher risk. This makes it inappropriate to assess the raw return and instead motivates the use of risk adjustment in order to estimate the abnormal return of an investment.

It is common to use a historical estimation period to estimate the normal returns, and then estimate abnormal returns as the difference between realised and historical normal returns. However, Sloan (1996) argues that this method is inappropriate when firms are classified according to characteristics that are unstable, such as accruals. This is because using a historical estimation period implicitly assumes that the relative risk of portfolios remain the same over time, which may be unlikely. By using a method that estimates normal returns at the same time as the actual returns, the risk is permitted to change over time, which is preferable. There are two commonly used ways of risk adjusting long-run stock returns in previous accruals literature that accomplish this. The first method calculates the buy-and-hold abnormal returns using carefully constructed and individually matched size reference portfolios. The second estimates calendar time abnormal returns for sample firms. As previous researchers have used different approaches, and in order to robustness check the results, this study employs both.

When estimating and risk-adjusting long run abnormal stock returns, Barber & Lyon (1997) argue that there are three common biases that may cause misspecified test statistics. These are:

1. The *new listing bias:* refers to a misspecification as the firm return is compared to an expected return proxy (for example a reference portfolio or market index), where the firm's stock price reflects a long history of events but the expected return portfolio includes new firms that begin trading subsequent to the event month.
2. The *rebalancing bias:* occurs when estimating the reference portfolio return. When the returns of all firms in the market or reference portfolio are compounded to find the return of the reference portfolio, it is often assumed that the weights of each firm are rebalanced monthly. In the meantime, no such rebalancing is done to the sample firm, causing a bias in the abnormal return estimation.
3. The *skewness bias:* refers to the empirical finding that long-run abnormal returns are positively skewed.

Generally, the bias related to the *rebalancing bias* and *skewness bias* is negative, while the bias related to *new listings* is positive (Barber *et al.*, 1999) This should be taken into account when estimating abnormal returns and will be discussed in relation to this study below.

3.4.3 Buy-and-hold abnormal returns using reference portfolios

Estimating the abnormal returns using the size-adjusted buy-and-hold return entails classifying all firms by their market capitalization[4] on the last day of the year ending before the year when the portfolio is formed. For example, for the portfolio formed in 2002, firms are ranked according to their market capitalization on the last of December in 2001. Based on their market capitalization, firms are sorted into 10 portfolios. Firms with relatively high market capitalization are sorted into portfolio 10, while firms with relatively low market capitalization are sorted into portfolio 1. While there is compelling evidence that market-to-book also systematically accounts for a portion of risk and return (Fama & French, 1993), Barber *et al*. (1999) find little difference when also accounting for market-to-book when assigning reference portfolios. As all portfolio creations, calculations and portfolio matching is done manually in this study, only the market capitalization is considered when creating reference portfolios.

[4] Market Capitalization is defined as market price at year end multiplied by the number of shares outstanding and represents the total market value of the firm. The variable is collected from Thomson Reuters Datastream.

The return calculation for each reference portfolio can be done by finding the average stock return of all firms in the portfolio for each month, and then compounding the monthly average return for the 12 month event window. However, when applying this calculation it is implicitly assumed that the reference portfolio is rebalanced monthly, giving rise to the *rebalancing bias* discussed above. It also leads to the *new listing bias* as firms listed after the portfolio formation are included in the reference portfolio. Instead, Barber *et al*. (1999) argue that the reference portfolio return should be calculated by compounding the monthly returns of each firm in each size portfolio for the 12 month window individually, and then averaging across all firms in the size portfolio:

(6)

$$R_p^{ref} = \sum_{i=1}^{n_p} \frac{\left[\prod_{t=s}^{s+\tau}\left(1 + R_{i\rho t}\right)\right] - 1}{n_p}$$

Where:

R_ρ^{ref} is the buy-and-hold return of the size reference portfolio p for time period τ

S is the first month of trading

τ is the total buy-and-hold period (in this case 12 months)

n_p is the no. of firms in the size portfolio p,

$R_{it\rho}$ is the return of the security i , that belongs to size portfolio p, in month t

By applying formula (6), Barber *et al.* (1999) argue that the return on the reference portfolio represents *"a passive equally weighted investment in all securities constituting the reference portfolio"* (Barber *et al*., 1999, p. 169) during the event window. As each security is given equal weights once the compounded returns are calculated, there is no monthly rebalancing in this method, effectively eliminating the *rebalancing bias.* Furthermore, as the investment in the securities is done at the beginning of the portfolio formation, firms listed after the formation are not included, effectively eliminating the *new listing* bias. The *skewness bias* is addressed in the test statistics by applying a skewness adjusted t-test when testing abnormal returns.

Once the total buy-and-hold return for each size reference portfolio has been estimated using the formula above, the abnormal returns for each security are estimated as follows:

(7)

$$BHAR_{i\tau\rho} = \prod_{t=s}^{\tau}\left[1 + R_{it\rho}\right] - R_\rho^{ref}$$

Where:

$BHAR_{i\,\tau\,p}$ is the buy-and-hold abnormal return for firm i, belonging to size portfolio p, for the period τ

$R_{i\,t\,p}$ is the return of the security i, that belongs to size portfolio p, in month t

R_{ρ}^{ref} is the buy-and-hold return of the size reference portfolio p for time period τ

Once the buy-and-hold abnormal returns for each security have been calculated using formula (7) the return of each accruals portfolio is estimated using the formula below. This is done for each quartile in both benchmarks.

(8)

$$BHAR_{q\tau} = \frac{1}{n_{q\tau}} \sum_{i=1}^{n_{q\tau}} BHAR_{i\tau}$$

Where:

$BHAR_{q\tau}$ is the buy-and-hold return of quartile q for the period τ

$BHAR_{i\tau}$ is the buy-and-hold abnormal return for firm i for the period τ

$n_{q\tau}$ is the no of firms in quartile q for the period τ

The hedge portfolio is constructed by taking a long position in the low accruals quartile and a short position in the high accruals quartile. Thus, the return from the hedge portfolio is calculated as follows:

(9)

$$BHAR_{Hs} = BHAR_{Ls} - BHAR_{Ss}$$

Where:

$BHAR_{Hs}$ is the buy-and-hold return of the hedge portfolio that begins in month s

$BHAR_{Ss}$ is the buy-and-hold return of the short position (quartile 4) taken in month s

$BHAR_{Ls}$ is the buy-and-hold return of the long position (quartile 1) taken in month s

Finally, the significance of the buy-and-hold abnormal return in each quartile as well as in the hedge portfolio is tested. While this study employs the conventional test statistic in order to ensure comparability with Sloan's (1996) results from the buy-and-hold abnormal returns, the skewness adjusted t-statistic introduced by Johnson (1978) is also applied. The reason for applying a skewness adjusted t-statistic is that Barber & Lyon (1997) identify a positive skewness in long-term buy-and-hold abnormal stock returns, which is reflected in a negatively biased t-statistic. This leads to the risk of p-values being lower than they should in

lower tailed tests, and p-values being higher than they should be in upper-tailed tests (Barber *et al.*, 1999). The skewness adjusted test statistic is calculated as follows[5]:

(10)

$$t_{sa} = \sqrt{n}\left(s + \frac{1}{3}\hat{\gamma}S^2 + \frac{1}{6n}\hat{\gamma}\right)$$

Where:

$$S = \frac{\overline{AR_\tau}}{\sigma(AR_\tau)} \text{ and } \hat{\gamma} = \frac{\sum_{i=1}^{n}(AR_{i\tau} - \overline{AR_\tau})^3}{n\sigma(AR_\tau)^3}$$

t_{sa} is the skewness adjusted t-statistic

$\overline{AR_\tau}$ is the mean buy-and-hold abnormal return for the sample

$\sigma(AR_\tau)$ is the cross sectional standard deviation

n is the no. of observations

As in the conventional test statistic, the null hypothesis is that the mean abnormal returns are not significantly different from zero. If the null hypothesis is rejected, the buy-and-hold abnormal returns are significantly different from zero. Calculations for the buy-and-hold test statistics are performed manually and summarized in Appendix 1: figure 1.

While Barber *et al.* (1999) make a convincing case for the use of the buy-and-hold abnormal return using size matched reference portfolios, there is still a wide amount of researchers who prefer the calendar time approach.

3.4.4 Calendar time approach

Fama (1998) and Mitchell & Stafford (2000), strongly advise using the calendar time approach when estimating abnormal returns. Mitchell & Stafford (2000) argue that the calendar time approach's strength lies in that it is robust to most statistical problems and find evidence against Loughran & Ritter's (2000) argument that the calendar time approach should suffer from low power in assessing the reliability of abnormal returns. This is in line with Barber *et al*. (1999) who argue that from a researcher's point of view, the calendar time approach offers the advantage of being able to assess if the abnormal returns are persistent and yield more robust test statistic in non-random samples than does the buy-and-hold approach[6]. Because the sample firms investigated in this study are characterized by extreme

[5] Barber *et al*. (1999) argue that the skewness adjusted t-statistic should also be bootstrapped; however, this is beyond the scope of this study.

[6] The test statistics may still be misspecified, but less so than in the buy-and-hold case. (Barber *et al.*, 1999)

accruals, the sample is by design non-random. This creates a strong argument for the use of the calendar time approach.

The disadvantage of the calendar time approach is that it does not precisely mimic the return earned by the investor during the entire one year event window, and is sensitive to the model of asset pricing. (Barber *et al.*, 1999) Barber *et al.* (1999) state that when testing if the abnormal returns are equal to zero, the researcher is actually doing a joint test that the abnormal returns are equal to zero, as well as, testing that the chosen asset pricing model is correct and valid. To account for this, this study employs two asset pricing models, both the Fama-French 3 factor model developed by Fama & French (1992), and the Sharpe-Lintner version of the Capital Asset Pricing Model (CAPM) (Sharpe, 1964; Lintner, 1965) when performing the calendar time regressions.

In this method, the portfolio return is defined as the average monthly returns of the stocks that constitute each portfolio. Thus, there will be one monthly portfolio return for each quartile in both benchmarks. Below is the formula for calculating the monthly portfolio return:

(11)

$$R_{qt} = \frac{1}{n_{qt}} \sum_{i=1}^{n_{qt}} R_{it}$$

Where:

$R_{q\tau}$ is the return of the accruals quartile *q* in month *t*

R_{it} is the return of the individual security *i* in month *t*

$n_{q\tau}$ is the number of firms in the accruals quartile *q* in month *t*

The return of the hedging strategy is the sum of the returns generated by taking a long position in firms in the lowest accruals quartile and a short position in firms in the highest accruals quartile:

(12)

$$R_{Ht} = R_{Lt} - R_{St}$$

Where:

R_{Ht} is the return of the hedge portfolio in month t

R_{St} is the return of the short position (quartile 4) in month t

R_{Lt} is the return of the long position (quartile 1) in month t

To estimate the monthly abnormal returns in this method, a calendar time regression is run to generate an alpha value. The alpha is the estimate of the monthly calendar time abnormal return. The calendar time regression based on CAPM is specified as follows:

(13)

$$(R_{pt} - R_{ft}) = \alpha_p + \beta_p \cdot (R_{mt} - R_{ft}) + \varepsilon_{pt}$$

Where:

α is the abnormal return of portfolio

R_{pt} is the return of the portfolio in month t (done for each individual quartile and entire hedge portfolio)

R_{ft} is the risk-free rate estimated as the Swedish Treasury bill 30-day rate in month t

R_{mt} is the return on the market in month t[7]

The calendar time regression based on Fama-French three factor model is specified as:

(14)

$$(R_{pt} - R_{ft}) = \alpha_p + \beta_{1p} \cdot (R_{mt} - R_{ft}) + \beta_{2p} \cdot SMB + \beta_{3p} \cdot HML + \varepsilon_{pt}$$

Where:

α is the abnormal return of portfolio

R_{pt} is the return of the portfolio in month t (done for each individual quartile and entire hedge portfolio

R_{ft} is the 1 month risk free rate estimated as the Swedish Treasury bill 30-day rate in month t

R_{mt} is the return on the market in month t

SMB is the return on a portfolio that assumes a long position in small market capitalization firms and a short position in firms with a larger market capitalization.

HML is a portfolio where firms are divided by the market-to-book value. The portfolio return is the return from the high MtB firms minus the return from the low MtB[8]

The monthly abnormal return using this method is the alpha value. Its significance is tested using a conventional t-test. However, as the estimation is specified as an Ordinary Least

[7] This study uses the return on the market index of Stockholm OMX collected from Thomson Reuters Datastream. The variable is chosen as it is comprised of all firms on NASDAQ OMX Stockholm, and can therefore be assumed to be representative of the trends on the general Swedish market.

[8] When performing studies on the US market, researchers are provided with Fama-French factors from Kenneth French's website. However, comparing returns to HML and SMB portfolios constructed using US firms is inappropriate when investigating Swedish firms. As estimating and constructing Fama-French factor portfolios can be time-consuming, this study has used values for the HML and SMB variable that are provided by Professsor Stefano Marmi on http://homepage.sns.it/marmi/Data_Library.html. The methodology for constructing portfolios is identical to the one in Fama & French (1993).

Squares (OLS) regression, the OLS assumptions are tested for each regression in order to ensure that correct inferences are drawn. The assumptions are:

1. The dependent variable is a linear function of the explanatory variables. This is essential in order to detect if the functional form is correct. It is tested using the RESET test in Eviews, where the rejection of the null hypothesis implies that the model is misspecified and/or contains non-linearity. (Brooks, 2008)
2. $E(u_t) = 0$: The average value of the error terms is zero. This is tested in Eviews by running the RESET test, however as there is a constant included in the regression, this condition is assumed to hold. (Brooks, 2008)
3. $var(u_t) = \sigma^2 < \infty$: The variance of the error terms is constant and finite. Even though the presence of heteroskedasticity may yield consistent and unbiased results, the regression model would be inefficient and the standard errors may be misleading, leading to incorrect inference. The assumption is tested by running White's heteroskedasticity test. If the null hypothesis is rejected, there is heteroskedasticity which may be corrected for using White's robust standard errors in Eviews. (Brooks, 2008)
4. $cov(u_i, u_j) = 0$: Residuals are uncorrelated with another over time. In order to investigate the assumption of positive autocorrelation the Durbin-Watson test is performed. If the null hypothesis is rejected there is positive autocorrelation between the residuals, which could cause the same consequences as the presence of heteroskedasity, namely incorrect inference. As this study investigates stock returns over time, the probability of autocorrelation is high. (Brooks, 2008)
5. $cov(u_t, x_t) = 0$: The independent variables are non-stochastic and not highly correlated with each other. However, as long as these independent variables are not correlated with the residuals, evidence shows that OLS will still be consistent and unbiased even if the x independent variables are stochastic. The assumption of no multicollinearity is tested using a correlation matrix, where the correlation between variables should not be above 0,8. (Brooks, 2008)
6. $u_t \sim N(0, \sigma^2)$: The error terms are normally distributed. This is investigated by running a Jarque-Bera test of normality as well as plotting histograms. (Brooks, 2008)

The corrections that are made to each regression are presented in Appendix 2: figure 2 & 3.

3.4.5 Winsorization

As Kothari et al. (2006) finds that the previous findings of the accruals anomaly are largely attributable to outliers, this study will investigate if the results are sensitive to extreme observations. Winsorization is a process that attempts to deal with extreme outliers in a research sample. It entails setting the values of extreme observations equal to the value of a chosen percentile cut off. For example, when winsorizing by 5%, the observations below the 5^{th} and above the 95^{th} percentile are assigned the value of the 5^{th} and 95^{th} percentile respectively. (Kothari *et al*., 2005) The effect is that outliers are brought closer to other observations that are assumed to represent the true distribution of a population. The argument for using such a data transforming method is to avoid the research results being incorrectly influenced by spurious outliers. It also offers a robustness check to see if results are attributable to extreme observations. (Kothari *et al*., 2005) Winsorization can be performed for various percentile cut offs, such as 0.1%, 1% or 5%. The disadvantage of using such a method is that it transforms the data to no longer reflect the actual observations, making the findings less generalizable. Kothari *et al*. (2005) argue that trimming (i.e. completely excluding extreme observations) or winsorizing may lead to biased inferences due to the non-random deletion from the sample.

While the trading strategy becomes less realistically implementable when winsorizing the returns, the findings of Kraft *et al.* (2006) motivate need for testing the results once outliers have been accounted for. This is considered a complement to the regressions on the raw data. The reason for choosing to winsorize the sample instead of trimming it, is because trimming completely eliminates the extreme values, which may be more misleading than when transforming them. The results of the abnormal returns using the winsorized data are presented in the next chapter.

4. RESULTS AND ANALYSIS

This chapter begins by comparing the characteristics of the firms when applying the total assets and earnings benchmarks. The results of the accruals based trading strategy are then presented and discussed in relation to previous research.

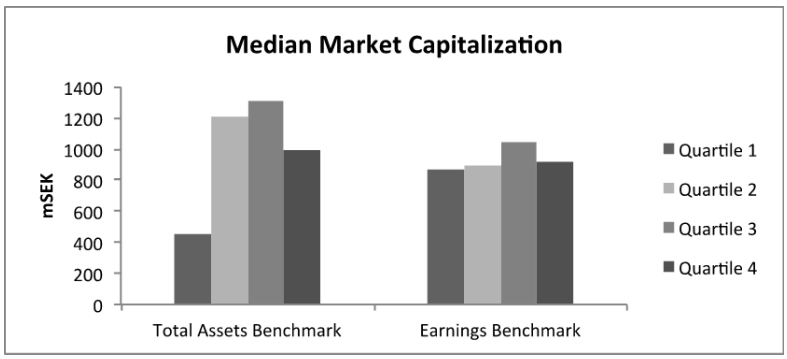
4.1 Comparing the benchmarks

To investigate if the benchmarks differ when classifying firms into extreme accrual portfolios, firm characteristics in each quartile are compared within each benchmark as well as between the benchmarks. Appendix 3 presents the average and median values for market capitalization, stock price, cash flows from operations, net income and total assets for the firms in each benchmark's quartiles. As the focus is to identify common characteristics of the majority of the firms within each quartile, the analysis will focus on the median value as the mean value may be influenced by a few extreme firms. Upon examination, it appears that the benchmarks often classify the same firms into quartile 4. Each year, only a few firms that are classified into quartile 4 using the total assets benchmark are not classified into the same quartile using the earnings benchmark. The firms sorted into the 1st quartile differ to a greater extent and are therefore in greater focus in this comparison.

4.1.2 Market capitalization

The median quartile market capitalization is illustrated in figure 4a below:

Figure 4a



When studying the quartiles within the total asset benchmark, quartile 1 is most noteworthy as the median market capitalization of these firms is substantially lower than in the other quartiles. Instead, the largest firms seem to have been classified into quartile 2 and 3. As size is negatively correlated with risk, and risk is positively correlated with returns (Fama & French, 1992), the potential returns in quartile 1 using the total assets benchmark (that

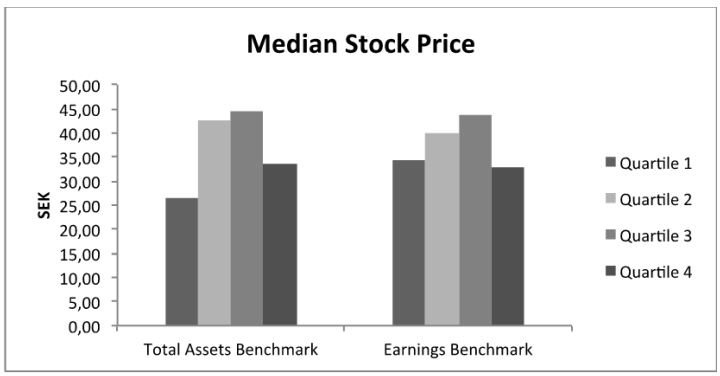
contained smaller firms) can be assumed to be higher than in the other quartiles. On the other hand, a higher portion of cash flows in earnings seem less risky as these are more persistent, causing earnings to be more persistent. When assessing the quartiles in the earnings benchmark, the market capitalization is more even across quartiles.

When comparing the two benchmarks it is obvious that firms in quartile 1 are larger when sorting by earnings than sorting by total assets. The median market capitalization in quartile 1 using the earnings benchmark is 864mSEK while the median using the total assets benchmark is 459mSEK. Thus, firms sorted into quartile 1 by the earnings benchmark are almost twice as big as firms sorted into quartile 1 by the total assets benchmark. The results are in line with Hafzalla *et al.* (2007). However they are not as extreme as Hafzalla *et al.* (2007) found that firms in quartile 1 sorted by the earnings benchmark are four times larger than the firms sorted by the total assets benchmark.

4.1.3 Stock price

The median quartile stock price is illustrated in figure 5a below:

Figure 5a



As may be intuitive after investigating market capitalization, firms in quartile 1 have the lowest stock price (26.74 SEK) when sorting by total assets benchmark. The highest stock price is found in quartile 3 (44.4 SEK.) The stock price in quartile 2 is 42.4 SEK and in quartile 4 is 33.69 SEK. As Kraft *et al.* (2006) state that relatively low stock prices suggest poor past performance, it seems counterproductive that the firms with the lowest stock prices are assigned to quartile 1. This is because the trading strategy consists of taking a long position in quartile 1 and a short position in quartile 4, making it preferable for bad performing firms to end up in the high accrual quartile where the investor profits from a

declining stock price. Using the earnings benchmark on the other hand, the median stock price is lowest in quartile 4 (32.94 SEK). As mentioned, poor performance is desirable when shorting firms and thus the earnings benchmark seems to sort firms into quartile 4 effectively with respect to their stock price. Meanwhile, the median stock price in quartile 1 is 34.17 SEK and 39.85 SEK in quartile 2. Again, firms in quartile 3 have the highest stock price: 43.67 SEK. The fact the middle quartiles contain firms with the highest median stock prices using both benchmarks suggests that the majority of well performing firms end up in these quartiles. In combination with significant positive abnormal returns found in table 1a and 2a using the Fama-French 3 Factor model, it suggests that it may be more likely to earn abnormal returns by taking a long position in these firms instead of focusing on firms with extreme accruals.

The relative transaction costs decrease with higher stock prices (Hafzalla *et al*. 2007). Thus the cost of taking a long position in low accrual firms would seem to be lower when firms are sorted by earnings rather than total assets. As the stock prices in quartile 4 are relatively similar, there is likely little difference in transaction costs arising from taking a short position in high accrual firms. All in all, with respect to transactions costs, the earnings benchmark appears to be superior to the total assets benchmark.

4.1.4 Net income and Cash flows from operations

The median quartile net income and cash flows from operations are illustrated in figure 6a & 7a below:

Figure 6a

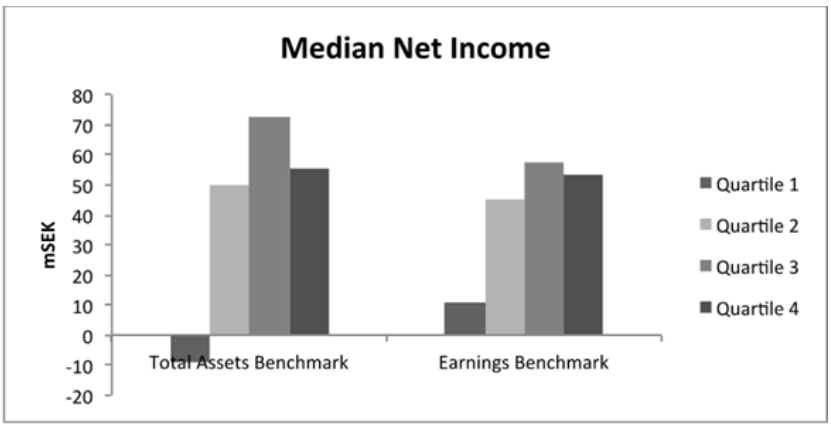
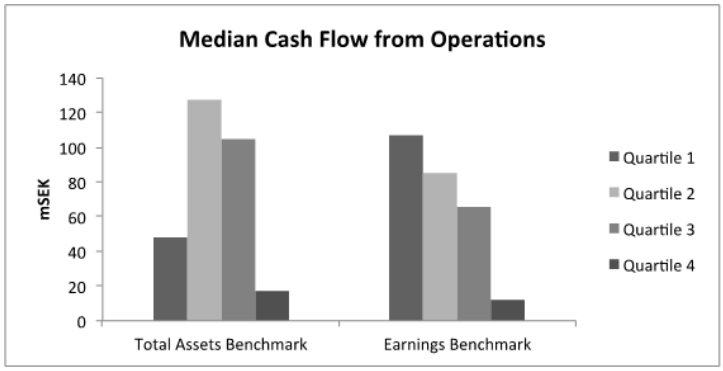


Figure 7a



The median net income as well as cash flows from operations are presented in figure 6a and 7a respectively. The quartile characteristics of net income and cash flow from operations are in line with Hafzalla *et al.* (2007). For the total assets benchmark the median net income in quartile 1 is -9mSEK while the median cash flows are 48mSEK. For quartile 4, the opposite is found as cash flows are low but net income is high. For the earnings benchmark, the median net income is 11mSEK, and the median cash flows from operations amount to 106mSEK. Again, the opposite is found for firms in quartile 4. Intuitively, this is expected as high and low accruals respectively, are the primary characteristics used to classify firms into portfolios. The median net income is relatively low in the lowest accrual portfolio for both benchmarks. The median cash flows are substantially higher in quartile 1 using the earnings benchmark, suggesting that the earnings benchmark is better at sorting firms with both higher net income and, more importantly, cash flows, into quartile 1. From an investor perspective this may be important as larger cash flow components are assumed to be associated with a higher earnings quality (Bernstein, 1993). Thus, the high cash flows coupled with the low stock prices in this quartile that were discussed above, may be an indication that the firms in quartile 1 are undervalued.

4.2. Results from testing the existence of the accruals anomaly in Sweden

In order to investigate if the accruals based trading strategy generates abnormal returns on the Swedish stock market, the abnormal returns for portfolios based on the total assets and earnings benchmark are estimated. As discussed in chapter 3, when estimating the abnormal returns, this study employs the calendar time approach using the CAPM and Fama-French 3 factor model as well as the size-adjusted buy-and-hold approach.

4.2.1 Total assets benchmark

To begin with, the total assets benchmark is investigated. Table 1a below shows the results using the calendar time approaches.

Table 1a. Calendar Time Approach to Total Assets Benchmark

Abnormal returns using the calendar time approach for the total assets benchmark. The top value represents the time series means of abnormal return (alpha) and the number below is the p-value corresponding to the t-test.

Quartile	Return CAPM	Return Fama-French 3 factor
Quartile 1	0.003	0.005
	0.46	*0.08**
Quartile 2	0.002	0.004
	0.48	0.07*
Quartile 3	0.001	0.003
	0.58	0.12
Quartile 4	0.002	0.004
	0.41	*0.06**
Hedge portfolio (Q1- Q4)	-0.007	-0.006
	0.21	*0.29*

** significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level*

As can be seen from Table 1a, the monthly abnormal returns from the hedge portfolio are not significantly different from zero for either of the risk adjustment measures. Thus, the results do not support the findings of LaFond (2005) and Giaever & Gabrielsson (2007) that an accruals based trading strategy may lead to abnormal returns in Sweden. The findings instead seem to support the results found by Ivanov & Maximova (2011) and Pincus *et al*. (2007). When looking at the individual quartiles in table 1a, the monthly abnormal returns estimated by CAPM yield no significant results. On the other hand, when applying the Fama-French 3 factor model to the calendar time approach, quartiles 1, 2 and 4 yield positive abnormal returns at the 10% level. However, the 10% significance level should be considered with caution and is not preferable when assessing the statistical reliability (Brooks, 2008). To further investigate the results of the total assets benchmark, the size-adjusted buy-and-hold abnormal returns are presented in table 1b below:

Table 1b. Buy-and-Hold Approach to Total Assets Benchmark

Abnormal returns using Buy-and-Hold size matched reference portfolios for the total assets benchmark.

Quartile	Mean return	Conventional t-statistic	Skewness adjusted t-statistic
Quartile 1	-0.006	-0.413	-0.395
Quartile 2	*0.000*	*-0.058*	-0.038
Quartile 3	0.004	0.238	0.247
Quartile 4	0.001	0.039	-0.014
Hedge portfolio (Q1-Q4)	-0.007	-0.246	-0.200

The critical t-value using the standard t-distribution is 2.228 at the 5% significance level and 1,812 at the 10% level.

Table 1b above shows the mean buy-and hold returns as well as the t-statistics for the conventional t-test and skewness adjusted t-test. When comparing the t-statistics it is clear that the skewness adjusted t-statistic is slightly higher. This suggests that the skewness adjusted t-statistic has corrected for the positive skewness in long-term buy-and-hold abnormal stock returns, that results in a negatively biased t-statistic (see chapter 3). However, neither t-statistic is higher than the critical t-value, indicating that the mean buy-and-hold abnormal returns cannot be concluded to be significantly different from zero.

All in all, the results from all three risk adjustment measures indicate that implementing an accruals based trading strategy using the total assets benchmark, does not yield consistent abnormal returns in Sweden.

4.2.2 Earnings benchmark

The investigation continues by evaluating the earnings benchmark proposed by Hafzalla *et al*. (2007). The results from the calendar time approach using the CAPM and Fama-French 3 factor model are presented in Table 2a.

Table 2a. Calendar Time Approach to Earnings Benchmark

Abnormal returns using the calendar time approach for the earnings benchmark. The top value represents the time series means of abnormal return (alpha) and the number below is the p-value corresponding to the t-test.

Quartile	Return CAPM	Return Fama-French 3 factor
Quartile 1	0.002	0.004
	0.43	*0.10**
Quartile 2	0.002	0.004
	0.46	*0.05***
Quartile 3	0.002	0.004
	0.41	*0.05***
Quartile 4	0.002	0.004
	0.54	*0.09**
Hedge portfolio (Q1- Q4)	-0.007	-0.007
	0.22	*0.23*

** significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level*

In similarity with the total assets benchmark, the returns of the hedge portfolio are insignificant for both risk adjustment measures. This suggests that Hafzalla *et al.*'s (2007) benchmark has not improved the returns from the hedge portfolio. When investigating the quartiles individually, the returns are once again insignificant when applying the CAPM. The statistical significance when using Fama-French 3 factor model has however improved. The returns are then significantly positive at the 5% level for quartile 2 and 3 and at the 10% level for quartiles 1 and 4. Overall, the results from The Fama-French estimation suggest that there is little difference in abnormal returns between the quartiles, as they on average appear to be positive. To see if the size-adjusted buy-and-hold abnormal returns yield similar results, the findings are presented in Table 2b below:

Table 2b. Buy-and-Hold Approach to Earnings Benchmark

Abnormal returns using Buy-and-Hold size matched reference portfolios for the earnings benchmark.

Quartile	Mean return	Conventional t-statistic	Skewness adjusted t-statistic
Quartile 1	0.007	0.272	0.355
Quartile 2	0.006	0.274	0.297
Quartile 3	-0.007	-0.335	-0.422
Quartile 4	-0.007	-0.460	-0.551
Hedge portfolio (Q1-Q4)	0.015	0.469	0.511

The critical t-value using the standard t-distribution is 2.228 at the 5% significance level and 1,812 at the 10% level.

Table 2b above presents the mean buy-and hold returns as well as the t-statistics for the conventional t-test and the skewness adjusted t-test. When comparing the t-statistics, the skewness adjusted t-statistic is slightly higher for the hedge portfolio as well as quartile 1 and 2. However, in similarity to the total assets benchmark, the mean buy-and-hold abnormal returns cannot be concluded to be significantly different from zero for either the quartiles nor the hedge portfolio. Again, the results from all three risk adjustment measures indicate that the accruals based trading strategy does not yield significant abnormal returns on the Swedish stock market.

4.2.3 Comparing the results to previous research[9]

The results in relation to previous studies supporting the accruals anomaly

As presented in the beginning of this paper, several researchers have found that the accruals based trading strategy yields positive abnormal returns to an investor (Sloan, 1996; Collins & Hribar, 2000; Bradshaw *et al.*, 2001; Xie, 2001; Zach, 2003; LaFond, 2005; Hafzalla *et al.*,

[9] As the results of both benchmarks yield similar returns they are analysed together in relation to previous research.

2007; Pincus *et al.*, 2007). Sloan (1996) finds that the mean size-adjusted buy-and-hold abnormal returns from the accruals based trading strategy is 10.4%. He attributes this to the earnings fixation hypothesis and argues that investors fail to identify the components of earnings which cause them to incorrectly price firms' future earnings potentials. When looking at the results for the individual quartiles in this study, the average monthly abnormal returns for quartile 1 (table 1a and 2a) appear to be positive when applying the calendar time approach with Fama-French 3 factor model. This suggests that the findings in quartile 1 are in line with the Sloan's (1996) earnings fixation hypothesis as it predicts that investors in low accrual firms are positively surprised by the persistence in earnings, resulting in positive abnormal stock returns. On the other hand, the positive abnormal returns for the 4th quartile do not support this theory. This is because high accrual firms are expected to experience negative abnormal returns as a result of investors being unable to acknowledge that accruals are less persistent in predicting earnings than cash flows, and are therefore surprised when the future earnings are lower than expected. Similarly, the results for the hedge portfolio return not either support Sloan's findings as the abnormal returns of the hedge portfolio cannot be said to be significantly different from zero using any of the three risk-adjustment measures.

A possible explanation for the similar positive abnormal returns in quartile 1 and 4 and thus divergence from the earnings fixation hypothesis, could be that the firms in quartile 4 appear to have similar earnings characteristics as those in quartile 1. Based on the classifications, firms in the high accrual portfolio are expected to have relatively low cash flow component in earnings and a relatively high accruals component, while those in quartile 1 are expected to experience the opposite. However, as discussed in section 4.1, it is clear that quartile 1 and 4 have the expected characteristics (compare Appendix 3: figure 6a &7a). Thus the similarity in returns in quartiles 1 and 4 cannot be explained by the quartile firm characteristics. An alternative explanation for the positive return in quartile 4 is that the level of accruals do not reverse to the same extent in Sweden as in the US market, and instead appear to continuously remain at high levels. If investors then continue to focus on earnings, and price the firms accordingly, then maintaining high accruals will likely continue to ensure positive returns on the stock. A third explanation may be that investors do recognize the difference in accruals, and initially overreact to the high accruals in quartile 4's firms causing negative returns. However, they are later positively surprised when they realize that they have reacted too strongly, leading to subsequent positive abnormal returns. An initial negative overreaction,

followed by positive returns in the following months, may explain the positive monthly mean. It can also explain the low significance of the statistical tests as the tests are done on all months in a year, and do not distinguish between the returns during the beginning and the end of the year. Finally, one should keep in mind that the results for the individual quartiles discussed above are only found using one of the three risk-adjustment methods. Thus, the results do not hold for the size-adjusted buy-and-hold abnormal returns or the calendar time approach with the CAPM and are therefore not robust to different methods of risk-adjustment.

An alternative theory to the earnings fixation hypothesis is the agency theory of overvalued equity. Kothari *et al*. (2006) found that the return from the high accrual firms had -7.6% in abnormal returns but that low accruals firms' abnormal returns were insignificant. They argue that the agency theory of overvalued equity was a possible explanation to the finding as managers of overvalued firms had an incentive to adjust earnings upward with the use of accruals, but that managers of undervalued firms did not have the same incentive to use accruals to adjust earnings downward. The abnormal returns in high accrual portfolio are therefore predicted to be negative and significant, while the returns in the low accrual portfolio are expected to be insignificant. As the results in this study show significant positive returns in quartile 1 when using the Fama-French factor adjusted calendar time approach (table 1a and 2a) and the positive abnormal returns for quartile 4, this study does not support the agency theory of overvalued equity explanation. However, if the agency theory of overvalued equity would be accepted as the reasoning behind the accruals anomaly, the results in this study suggest that the overvalued firms with high accruals continue to be overvalued and generate abnormal returns to the investor. If this is the case, then the low persistence of accruals should not be considered an issue as positive returns can be maintained in spite of high accruals. However, as the results are not robust to different measures of risk-adjustment, such a conclusion cannot be drawn.

Hafzalla *et al.* (2007) find that when sorting firms by the total assets benchmark, the low accrual portfolio as well as the hedge portfolio is insignificant. The high accrual portfolio return is significantly negative, -6.3%. However, when instead sorting by earnings, all returns are significant at the 1% level. In their study, the low accruals portfolio yields an abnormal return of 5.4%, the high accruals portfolio, -6.9% and the hedge portfolio, 12.4%. The results in this study are not in line with Hafzalla *et al*. (2007) as the abnormal returns for the quartiles

have varying significance and sign, and the earnings benchmark does not seem to improve the abnormal returns that may be earned from the accruals based trading strategy. As discussed in section 4.1.2 of the analysis, Hafzalla *et al.* (2007) found that firms in quartile 1 sorted by the earnings benchmark are four times larger than the firms sorted by the total assets benchmark. This difference is substantially larger than the classifications in this study. While the relative size of the firms may impact the potential and actual returns in the portfolios, it does not explain the difference between the results in this study and Hafzalla *et al*. (2007). This is because the methods of risk-adjustment, buy-and-hold abnormal return using size matched reference portfolios (used in both studies) and the calendar time approach using the Fama-French 3 factor model (used in this study) control for the size-effect on returns.

LaFond (2005) finds that the monthly abnormal return from the hedge portfolio in Sweden has an alpha value of 0.69, significant at the 10% level. LaFond (2005) applies the calendar time approach using the Fama-French 3 factor model, as is done in this study. The difference in results may be due to the fact that LaFond (2005) investigates a longer time period. However, in spite of the longer time frame, LaFond's study only attains a low significance level and the results in his study should be considered with caution. Together, the low significance in LaFond (2005) and the lack of significance in this study suggest that the accruals based trading strategy does not yield persistent monthly abnormal returns in Sweden. Furthermore, this study does not support Giaever & Gabrielsson (2007) who found that it was possible to earn abnormal returns by forming a hedge portfolio based on accruals. However, Giaever & Gabrielsson (2007) use a different methodology compared to this study and estimate abnormal returns based on historical values of the CAPM-model which may explain the difference in the results. Additionally, it seems that Giaever & Gabrielsson (2007) only calculate the mean abnormal returns to the hedge portfolio but fail to perform statistical significance tests on the data. This makes it difficult to compare the results and draw any further conclusions.

Khan (2008) and Wu *et al*. (2009) argued that the accruals anomaly could be largely attributed to misspecified risk adjustments. In this study, the abnormal returns of the hedge portfolio are insignificant when applying the calendar time approach using CAPM and Fama-French 3 factor model, as well as when applying the size-adjusted buy-and-hold abnormal returns. However, by applying Khan (2008) and Wu *et al.*'s (2009) reasoning, it may be

expected that at least one of the risk adjustment measures employed in this study would show support of the existence of the accruals anomaly. A possible explanation for the failure to find evidence in support of the anomaly would be if the mispricing was too small and short lived for any of the risk adjustment measures to capture it. However in such a case, it may be discussed if the anomaly is present, as the market corrects for it relatively quickly.

The results in relation to previous studies contradicting the accruals anomaly

The efficient market hypothesis (Fama, 1970) suggests that financial markets today are semi-strong were all public information, such as accounting data, are incorporated into firms' stock prices. As discussed in chapter 2, evidence against the hypothesis is market anomalies, states of inefficiency and mispricing. However, as this study does not find significant abnormal returns for the hedge portfolio with any of the risk adjustment methods, there is no evidence of market inefficiency due to mispricing of accruals. Thus, with respect to firms' accruals and earnings components, the Swedish stock market does not seem to be inefficient.

Pincus *et al*. (2007) finds that the accruals based trading strategy does not yield significant abnormal returns in Sweden. They partly attribute this to their empirical finding that the accruals anomaly is less likely to be present in civil law countries. However they fail to theoretically motivate this finding as common law countries are generally found to be more efficient, leaving less room for anomalies to appear (Hung, 2001). Still, as Sweden has a civil law tradition, the results of this study are in line with the findings in Pincus *et al*. (2007). Pincus *et al. (2007)* also suggest that the accruals anomaly is more likely to occur in countries where investors pay little attention to the components of earnings. As Swedish firms on NASDAQ OMX Stockholm main market are required to publish cash flow statements, the information needed to determine the accruals component is made easily accessible. The high transparency may increase the attention awarded to the components of earnings. By this reasoning investors are more likely to price firms accurately with respect to their accruals, making it is less likely for the anomaly to appear. The easy access to information in Sweden may explain the lack of abnormal returns in this study. A final finding by Pincus *et al.* (2007) is that the accruals anomaly is more likely to be present in countries with strict laws against insider-trading. The reason that strict insider trading laws would give rise to the accruals anomaly is that insiders are likely to have more extensive information on the future earnings possibilities of the firm, which outsiders lack. When insiders are prohibited from trading on

their non-public information, it would suggest that mispricing is not arbitraged away as quickly as the market lacks the insider's extensive information. However, Pincus *et al*. (2007) find that Sweden is considered to have relatively strict regulations on insider trading. As this study finds that the accruals anomaly is not present in Sweden in spite of this, the results do not to support Pincus *et al*. (2007) in this regard. Instead, it seems that the investors' access to information outweighs the information gap between insiders and the market.

The results of this study are in line with Green *et al*. (2011) who find that the accruals based trading strategy does not yield abnormal returns. In particular, the findings by Green *et al*. (2011) indicate that the abnormal returns generated by an accruals based trading strategy on the US market seem to have declined after 2004. They attribute this to the extensive research on the subject and the widespread implementation by practitioners, which have caused the accruals anomaly to be arbitraged away. To test if the results of this study support the predictions made by Green *et al.* (2011), the sample is divided into two sub periods; one ranging from June 2002 to June 2008 and one ranging from June 2008 to June 2013. The tests are only performed using the calendar time approach as the buy-and-hold abnormal returns only generate one yearly mean, which makes the sample too small to ensure statistical reliability when the sample is divided. The results from the calendar time approach using CAPM and Fama-French 3 factor model are shown in the table 3a and 3b below:

Table 3a. Total Assets Benchmark (Sub periods)

Abnormal returns for sub periods using the calendar time approach for the total assets benchmark. The top value represents the time series means of abnormal return (alpha) and the number below is the p-value corresponding to the t-test.

Quartile	CAPM	Fama-French 3 factor	CAPM	Fama-French 3 factor
	2002-2008		2008-2013	
Quartile 1	0.008	0.008	-0.003	0.001
	0.18	*0.05***	*0.47*	*0.67*
Quartile 4	0.004	0.004	0.000	0.003
	0.33	*0.21*	*0.99*	*0.36*
Hedge portfolio (Q1-Q4)	-0.022	-0.021	-0.01	-0.012
	*0.00****	*0.00****	*0.26*	*0.13*

** significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level*

Table 3b. Earnings Benchmark (Sub periods)

Abnormal returns for sub periods using the calendar time approach for the earnings benchmark. The top value represents the time series means ofabnormal return (alpha) and the number below is the p-value corresponding to the t-test.

Quartile	CAPM	Fama-French 3 factor	CAPM	Fama-French 3 factor
	2002-2008		2008-2013	
Quartile 1	0.005	0.004	-0.002	0.002
	0.18	*0.09**	*0.63*	*0.57*
Quartile 4	0.005	0.005	-0.001	0.002
	0.26	*0.14*	*0,75*	*0.55*
Hedge portfolio (Q1-Q4)	-0.027	-0.026	-0.008	-0.010
	*0.00****	*0.00****	*0.37*	*0.19*

** significant at the 10% level, ** significant at the 5% level, *** significant at the 1 % level*

As shown in table 3a and 3b above, the return for the hedge portfolio during the time period 2002-2008 is significant when using the Fama-French 3 factor model, however the returns are negative. For the period 2008-2013 the hedge portfolio returns are insignificant. As the results are significant for the earlier period and insignificant for the later period, the results initially seem to support that the accruals anomaly has been arbitraged away. However, as the hedge portfolio returns for the period 2002-2008 have a negative alpha value of roughly -2% for both benchmarks and both the CAPM and Fama-French risk adjustment, the results do not support Green *et al*. (2011). Furthermore, in the CAPM estimation, it seems puzzling that the returns for the hedge portfolio are negative while the returns for the individual quartiles are not significantly different from zero. However, looking at it mathematically, when regressing the hedge portfolio returns on the market excess return, the risk-free rate is deducted from the raw hedge portfolio return (i.e. the return from quartile 1 minus the return from quartile 4). Thus, if the returns from quartiles 1 and 4 cannot be said to be significantly different from zero, the risk free rate will be deducted from zero, giving a negative hedge portfolio return. In the case of the Fama-French estimation, the returns from the lowest quartile appear to be positive at a low significance, while the returns from the high accruals portfolio remain insignificant. As the returns of the hedge portfolio are still significantly negative, it suggests that the monthly risk-free interest rate during the period was higher than the raw mean monthly return in the low accruals portfolio. One reason why the results are different from Green *et al*. (2011) could be the difference in investigation periods. As the investigation

period begins only a couple of years before the time that Green *et al.* says the anomaly would have been arbitraged away (i.e. 2004), the sample of this study is likely too small to establish any statistical significance. Perhaps if the sample period had been extended to several years prior to 2004, the results would have been different.

4.2.4 Results from testing the trading strategy after winsorizing outliers

Kraft *et al*. (2006) argue that a great deal of the abnormal returns in the accruals based trading strategy in previous research is attributable to outliers. To investigate if the insignificant results in this study are caused by outliers, 5% of the abnormal returns are winsorized. While winsorizing returns does help investigate the reliability of the results, it is not practically implementable for the investor, which should be kept in mind when assessing the results. Table 4a below presents the results from the calendar time approach using CAPM and Fama-French risk adjustments to the total assets benchmark.

Table 4a. Total Assets benchmark (winsorized 5%)

Abnormal returns using the calendar time approach for the total assets benchmark. The top value represents the time series means of abnormal return (alpha) and the number below is the p-value corresponding to the t-test.

Quartile	Return CAPM	Return Fama-French 3 factor
Quartile 1	-0.010	-0.009
	*0.06**	*0.09**
Quartile 2	0.000	0.002
	0.86	*0.43*
Quartile3	0.000	0.001
	0.84	*0.51*
Quartile 4	-0.011	-0.010
	*0.03***	*0.04***
Hedge portfolio (Q1- Q4)	-0.020	-0.020
	*0.00****	*0.00****

** significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level*

Based on the outcome in the table 4a above, it may be understood that the returns in the low and high accruals portfolios become statistically significant from zero when outliers are winsorized. Furthermore, the abnormal returns that were previously positive are now negative. This indicates that the positive abnormal returns presented in Table 1a are due to

some outliers with extremely positive monthly abnormal returns, but that the majority of the abnormal returns in the quartile are substantially lower. The average monthly return for the majority of extreme accrual firms are therefore likely negative in the year following the portfolio formation. However, the gains from the short position in high accrual firms are not sufficient to compensate for the negative returns generated by the long position in low accrual firms. As a result, the monthly hedge portfolio return is negative at a high significance level. Interestingly, the abnormal returns for the middle quartiles are no longer significantly different from zero once the outliers are winsorized, suggesting that the positive abnormal returns in tables 1a and 2a may have been due to certain outliers. However, winsorization is a way of influencing the data and should, if possible, be avoided. The results in table 1a and 2a should therefore be considered more accurate portrayals of the empirical returns from the trading strategy. The same procedure is done for the earnings benchmark portfolios and the results are presented in Table 4b below:

Table 4b. Earnings benchmark (winsorized 5%)

Abnormal returns using the calendar time approach for the earnings benchmark. The top value represents the time series means of abnormal return (alpha) and the number below is the p-value corresponding to the t-test.

Quartile	Return CAPM	Return Fama-French 3 factor
Quartile 1	-0.010	-0.009
	*0.04***	*0.06**
Quartile 2	0.00	0.002
	0.97	*0.36*
Quartile3	0.001	0.003
	0.71	*0.20*
Quartile 4	-0.012	-0.011
	*0.02***	*0.03***
Hedge portfolio (Q1- Q4)	-0.019	-0.020
	*0.00****	*0.00****

** significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level*

The findings presented in table 4b are similar to the findings in table 4a. The monthly calendar time abnormal returns for extreme accrual firms are significantly negative, as is the return for the hedge portfolio.

The findings in tables 4a and 4b do not support the earnings fixation hypothesis proposed by Sloan (1996) as the earnings fixation hypothesis does not explain the negative abnormal return earned by the lowest accrual portfolio. On the contrary, the earnings fixation hypothesis suggests that the earnings surprise from firms in low accrual firms should be positive, as there are low or few reversals in the year after the accruals have been measured. The positive earnings surprise should thereby generate positive abnormal returns to the investor in a low accrual firm. The findings cannot either be explained by the agency theory of overvalued equity as proposed by Kothari *et al*. (2006). This theory predicts that the high accrual quartile would experience negative abnormal returns as the high accruals of overvalued firms reverse, while the returns of the lowest accrual quartile are likely to be statistically insignificant. As the results in tables 4a and 4b show that the returns of the low accruals portfolio (quartile 1) are significantly negative, the findings do not support the agency theory of overvalued equity.

Instead, the results from the winsorized regressions seem to be in line with the inverted U-shape pattern in Kraft *et al.*'s. (2006) study. As mentioned in chapter 2, the inverted U-shape refers to the relationship between the size of a firm's accruals and its abnormal stock return. It suggests that any firm with extreme accruals, either high or low, will likely suffer from negative abnormal stock returns in the year after the portfolio formation.

According to Kraft *et al*. (2006) the significantly negative abnormal stock return in the 1st and 4th quartiles suggest that investors overreact to the positive accruals announcement but underreact to negative accruals. In this explanation, the investors understand the difference in components but under- and overreact to the information. Intuitively it can be explained as, investors in low accrual firms should react positively as the firms have relatively high cash flows, and these have higher persistence in earnings than accruals. However, the majority of investors underreact to the potential for persistent future earnings, resulting in negative returns. In the meantime, investors in high accrual firms should react negatively to the high accruals in their firms' reporting, as these are less persistent in future earning as cash flows.

However, investors in high accrual firms seem to overreact, reducing the stock price too much, which leads to negative abnormal returns in the high accrual portfolio. As this is not what alternative theories (such as the earnings fixation hypothesis and the agency theory of overvalued equity) predict, Kraft *et al*. (2006) present an alternative explanation; that there are certain unspecified firms characteristics that are found in extreme accrual firms and may be associated with the negative returns.

When investigating the characteristics of the firms classified in each portfolio in section 4.1, there is a pattern present in the total assets benchmark that is not found to the same extent in the earnings benchmark. In the total assets benchmark, the extreme accruals portfolios are characterized by smaller firms (measured both as market capitalization and total assets), substantially lower cash flows from operations and lower stock prices (see figures 4; 8; 5; 7 respectively).

Kraft *et al*. (2006) argue that low stock prices are an indication that firms have performed poorly in the past. Assuming this argument is true, the poor past performance may be an explanation for the expected continued poor performance in extreme accrual firms (sorted on total assets) that results in negative abnormal returns. As the same pattern is only found to a limited extent in the earnings benchmark, the results for the earnings benchmark cannot be explained by the same reasoning.

5. CONCLUSION

The final chapter presents conclusions based on the results of the study. The aim is to connect back to the research questions and suggest possible topics for further research.

The study has investigated the possibility to earn abnormal returns for portfolios based on firms' accruals on the Swedish stock market. Each year, between the years 2002 to 2012, firms listed on NASDAQ OMX Stockholm main market are classified into quartiles based on the size of their accruals in the previous year's financial statements. Starting in June each year, the stock prices are recorded on a monthly basis to calculate the monthly returns on each stock. The monthly portfolio returns for each quartile and the hedge portfolio are calculated and then adjusted using three different methods of risk adjustment in order to investigate if the portfolios yield abnormal returns to an investor.

The first research question in this study was; to what extent is the measure that normalizes accruals by earnings more effective than normalizing by total assets when attempting to create a trading strategy exploiting the accruals anomaly? The results show that the benchmarks differ primarily in relation to the firms classified in the low accruals quartile. The discussion in the first part of the analysis finds that when comparing the benchmarks' low accruals classifications, the earnings benchmark seems to select firms that are larger, have a higher stock prices (that by extension are argued to have lower relative transaction costs), and higher cash flows from operations. Therefore, the earnings benchmark seems to be preferable in this comparison. Unfortunately, the improved classification does not spill over to the abnormal returns earned by the investor. With relation to abnormal returns, the benchmarks seem to generate similar results in the hedging strategy, as well as in the individual quartile portfolios.

The second research question in this study was; to what extent is it possible to earn abnormal returns from an accruals based trading strategy in Sweden? The results do not support that there may be positive abnormal returns from the accruals based trading strategy in Sweden. These results are robust to three different methods of estimating abnormal returns. While the findings initially appear to contradict several previous research papers, the results are not surprising. Firstly, Green *et al*. (2011) argue that the anomaly has been arbitraged away due to the attention the subject has received during the years. While this study fails to find

differences in abnormal returns between sub periods, extending the investigation period may lead to findings that support this view. Furthermore, Kraft *et al.* (2006) argue that the majority of previous accruals research is affected by biases, and once these are corrected for the, results are significantly different. The two main biases are the look-ahead bias and the bias arising from outliers. By including firms that have been delisted during the portfolio year, the results in this study are less likely to suffer from an upward bias. Furthermore, after the outliers have been winsorized, the abnormal returns on the high and low accruals portfolios are negative and significant. This supports the inverted U-shaped relationship found in Kraft *et al*. (2006) that suggests that extreme accrual firms experience negative abnormal returns during the portfolio year.

From an investor perspective the results suggest that it is unlikely to earn arbitrage profits from taking long and short positions in firms based on their accruals. It is likely that the market has already recognized the importance of earnings components and priced firms accordingly. Thus, in order to make profitable investments, investors should look to other factors that create value in a firm. From the firm perspective these results suggest that high accruals need not necessarily be negatively perceived by the market. On the other hand, as they do not either lead to significantly positive returns, firms should be careful not to use doubtful accrual criteria in an attempt to manipulate and increase earnings.

As the results are not in line with the earnings fixation hypothesis, or the agency theory of overvalued equity, there is a need for a different theoretical explanation for the inverted U-shaped pattern. While this study has not been able to find any generally applicable firm characteristics that may explain the results, future research may find this to be an interesting task. Future research may also choose to focus on differences in accruals between industries. Perhaps the anomaly is more likely to exist within certain industries? However, in order to do this, it is recommended to choose a broader market than the one in this study in order to ensure enough observations within each industry group.

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APPENDIX

Appendix 1

Figure 1. Summary of test statistics calculations when testing the buy-and-hold abnormal returns:

	ATA Q1	ATA Q2	ATA Q3	ATA Q4	NI Q1	NI Q2	NI Q3	NI Q4	NI HEDGE	ATA HEDGE
	Average BHAR each year									
2002	-0,0356	0,0241	0,0098	0,0032	-0,0594	0,0505	0,0265	-0,0150	-0,0444	-0,0388
2003	0,0270	0,0365	-0,0812	0,0146	0,2261	-0,0379	-0,1914	-0,0013	0,2274	0,0124
2004	0,0585	-0,0344	0,1006	-0,1254	0,0007	0,1264	0,0219	-0,1465	0,1471	0,1839
2005	0,0551	-0,0612	0,0484	-0,0435	-0,0093	0,1021	-0,0468	-0,0440	0,0348	0,0986
2006	-0,0738	0,0766	0,0081	-0,0063	-0,0105	-0,0161	0,0125	0,0142	-0,0246	-0,0675
2007	-0,0441	-0,0038	0,0251	0,0232	-0,0224	-0,0344	0,0316	0,0251	-0,0475	-0,0673
2008	-0,0365	-0,0230	0,0054	0,0250	-0,0151	-0,0372	0,0444	-0,0208	0,0057	-0,0614
2009	0,0019	-0,0273	-0,0241	0,0495	-0,0871	-0,0249	0,0531	0,0590	-0,1461	-0,0476
2010	0,0647	-0,0069	-0,0345	-0,0243	0,0550	0,0414	-0,0781	-0,0196	0,0745	0,0889
2011	-0,0417	-0,0131	0,0302	0,0249	-0,0504	-0,0065	0,0456	0,0121	-0,0625	-0,0665
2012	-0,0436	0,0253	-0,0483	0,0659	0,0481	-0,1017	-0,0007	0,0507	-0,0027	-0,1095
n	11	11	11	11	11	11	11	11	11	11
Average portfolio BHAR	-0,0062	-0,0007	0,0036	0,0006	0,0069	0,0056	-0,0074	-0,0078	0,0147	-0,0068
Standard Deviation	0,0496	0,0385	0,0498	0,0520	0,0840	0,0675	0,0732	0,0555	0,1039	0,0917
Conventional t-stat	-0,4139	-0,0580	0,2386	0,0398	0,2719	0,2748	-0,3359	-0,4677	0,4697	-0,2463
S	-0,1248	-0,0175	0,0720	0,0120	0,0820	0,0829	-0,1013	-0,1410	0,1416	-0,0742
γ	0,2839	0,4003	0,1522	-1,0766	1,4378	0,3831	-1,3944	-1,1509	0,5711	0,8229
Skewness adj t-stat	-0,3947	-0,0378	0,2472	-0,0145	0,3549	0,2970	-0,4218	-0,5508	0,5111	-0,1999

Appendix 2

OLS corrections

For several of the calendar time regressions, the Jarque-Bera null hypothesis is rejected. However, as the regression for each portfolio consists of at least 581 observations, the non-normality is assumed to not have a significant impact. The tests for the remaining assumptions all show that the regressions fulfil the OLS requirements, those that are corrected for are presented in figure 2 and 3 below:

Figure 2. Corrections in Percent Accruals calendar time regressions:

Quartile	CAPM	Fama-French 3 factor
Quartile 1	none	Whites robust SE
Quartile 2	none	Whites robust SE
Quartile 3	none	Whites robust SE
Quartile 4	none	Whites robust SE
Hedge portfolio	Whites robust SE	Whites robust SE

Figure 3. Corrections in Size Accruals calendar time regressions:

Quartile	CAPM	Fama-French 3 factor
Quartile 1	none	none
Quartile 2	none	Whites robust SE
Quartile 3	none	Whites robust SE
Quartile 4	none	none
Hedge portfolio	Whites robust SE	Whites robust SE

Appendix 3.

Figure 4b

Market capitalization				
	Size accruals		Percent Accruals	
	Mean	Median	Mean	Median
Quartile 1	5310	459	9470	864
Quartile 2	18167	1205	12200	894
Quartile 3	11671	1310	12518	1040
Quartile 4	6037	995	6856	920
				(mSEK)

Figure 5b

Stock Price				
	Size Accruals		Percent Accruals	
	Mean	Median	Mean	Median
Quartile 1	80,50	26,47	78,58	34,17
Quartile 2	105,86	42,40	105,73	39,85
Quartile 3	67,11	44,40	70,92	43,67
Quartile 4	80,54	33,69	78,89	32,94
				(SEK)

Figure 6b

Net income before extraordinary events				
	Size accruals		Percent Accruals	
	Mean	Median	Mean	Median
Quartile 1	88	-9	177	11
Quartile 2	811	50	679	45
Quartile 3	756	73	763	57
Quartile 4	509	55	542	53
				(mSEK)

Figure 7b

Cash flow from operations				
	Size accruals		Percent Accruals	
	Mean	Median	Mean	Median
Quartile 1	671	48	1277	106
Quartile 2	1831	127	1283	85
Quartile 3	1057	105	950	65
Quartile 4	216	17	248	12
				(mSEK)

Figure 8a

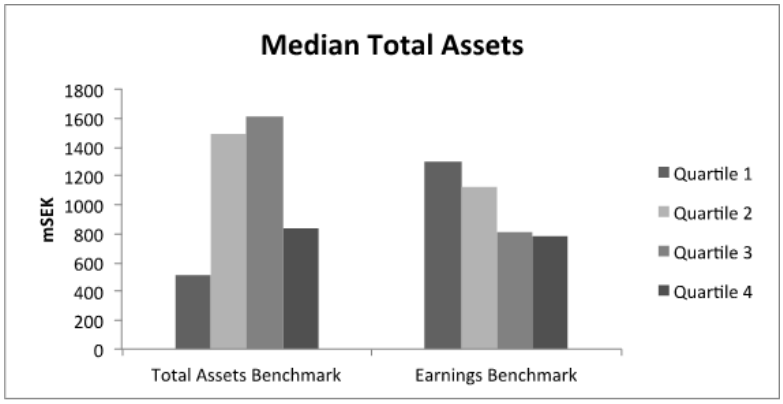

Figure 8b

Total assets				
	Size accruals		Percent Accruals	
	Mean	Median	Mean	Median
Quartile 1	4926	513	13667	1299
Quartile 2	17508	1486	12287	1124
Quartile 3	13740	1618	9556	816
Quartile 4	6611	833	7049	786

(mSEK)