Swedish post-earnings announcement drift and momentum return

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Abstract

This study is the first to report results on the post-earnings announcement drift in Sweden. Sweden is an especially interesting market to study since previous research has not been able to find the Jagadeesh and Titman (1993) returns momentum in this market, indicating that this market is an exeption to many other developed economies. In contrast to previous studies I find evidence of both a post-earnings announcment drift and a returns momentum effect in the Swedish stock market. I show that a trading strategy based on a long position in the decile of stocks with the highest standardized unexpected earnings (SUE) and a short position in the decile of stocks with the lowest SUE, generates an average return of about 11% over the 12 months following portfolio formation. This return is robust to risk factors such as described by the CAPM and the Fama and French (1993) three-factor model. In four-factor regressions the post-earnings announcment drift is not subsumed by the mometentum factor, which indicates that the two phenomena are related but not totally the same. This confirms the results by Chan, Jegadeesh and Lakonishok (1996) and Chordia and Shivakumar (2006).

Keywords: post-earnings announcement drift, earnings momentum, returns momentum, market efficiency
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1 Introduction

In a seminal paper Fama (1998) reviews the literature of financial market anomalies and states that there is no reason to question the underlying hypothesis of an efficient market. However, he also states that:

> "the granddaddy of underreaction events is the evidence that stock prices seem to respond to earnings for about a year after they are announced" (p.286).

He concludes the paper by saying that the post-earnings announcement drift and the price momentum are above suspicion and still a puzzle to solve.

This paper investigates the post-earnings announcement drift (henceforth called the PEAD or earnings momentum[1]) and the price momentum (henceforth referred to as the returns momentum) in the Swedish stock market. It is the first study on the market's reaction to quarterly accounting information in this market[2].

Ball and Brown (1968) and Jones and Litzenberger (1970) were the first to note the drift in returns subsequent to the announcement of earnings (PEAD). After the announcement of good news returns drifted upwards for several months, whereas returns after the announcement of bad news continued to drift downwards. This pattern in return is not consistent with the notion of an efficient market where prices react timely and correctly to new value-relevant information. Since the first studies many researchers have extensively analyzed the post-earnings announcement drift, among others: Foster, Olsen and Shevlin (1984), Bernard and Thomas (1989), Bernard and Thomas (1990) and Bernard et al. (1997).

The returns momentum effect was first documented by Jagadeesh and Titman (1993). They form portfolios based on the past 3 to 12 months returns, buying (selling) stocks with the highest (lowest) returns over the recent past and document that past winners on average continue to significantly outperform past losers over the next 3 to 12 months.

More recently, findings have been presented on the link between the PEAD and returns momentum. Chan et al. (1996) examine whether earnings momentum (PEAD) can explain the abnormal returns to a returns momentum strategy. They find that returns momentum is partially explained by earnings momentum, but it is not subsumed by it. Chordia and Shivakumar (2006) extend the study by Chan et al. (1996) and find that returns momentum is captured by the systematic component of earnings momentum. Contrary to Chan et al. (1996) they find that returns momentum is subsumed by earnings momentum, but not the other way around. They suggest that returns momentum is a noisy proxy for

[1] Since the PEAD-studies focus on the price reactions to unexpected earnings, the post-earnings announcement drift is sometimes refered to as the SUE-effect, where SUE stands for Standardized Unexpected Earnings (see for example Bernard, Thomas and Wahlen (1997)).

[2] The study adds to previous knowledge about the efficiency of the Swedish stock market. In Appendix 1 the results of other studies, related to market efficiency in Sweden, are presented.

earnings momentum. Both these studies conclude that although earnings surprises and past returns are related they have separate explanatory power for future returns.

This study focuses on the PEAD in the Swedish stock market where it has not yet been studied. Most PEAD-studies focus on a US setting, but there are a number studies on non-US markets[3]. For many European countries the US findings are confirmed and a drift subsequent to earnings news has been found in the United Kingdom, Finland, Spain and Germany.

There is no reason to believe that the Swedish market should differ from other European markets with respect to the drift. However, in addition to providing more out-of-sample evidence on the PEAD, studying the Swedish stock market is of additional interest.

Several empirical studies on international returns momentum have not been able to find returns momentum in Sweden, see for example Rouwenhorst (1998), Griffin, Ji and Martin (2003), Doukas and McKnight (2005) and Söderström (2007). If one believes that the underlying forces of earnings momentum and returns momentum are the same, previous literature suggest that the Swedish market in some ways might be special and that the PEAD would not be able to find in the Swedish market. The aim of this paper is to investigate whether there is a drift in returns subsequent to earnings announcements in the Swedish stock market, and thus contribute to previous research about the link between earning and price momentum.

I find that there is indeed a drift subsequent to quarterly earnings announcements in the Swedish stock market. During the sample period a hedge portfolio, taking a long position in the decile of stocks with the highest SUE (good news) and a short position in the decile of stocks with the lowest SUE (bad news), earns an average risk-adjusted monthly return of 0.9% (10.8% a year). These results are robust in calendar-time regressions on excess market return (CAPM) and risk factors suggested in Fama and French (1993). It can therefore be concluded that the results are a yet another out-of-sample evidence of the US findings of the PEAD. The post-earnings announcement drift seems to be a robust phenomena.

If the PEAD and returns momentum really are measures of the same underlying phenomena (underreaction to information), the results are at first surprising if one considers previous research that cannot find a significant returns momentum in Sweden. However, in further test I show that there is indeed a returns momentum present in the Swedish market. With a holding period of 12 months I show that returns momentum as a fourth factor in the calendar-time regressions is significant. These results thus contribute to, and in fact alters the view, about what we know about momentum in the Swedish stock market. Sweden is not an exception (as previous research has indicated) to other developed stock markets.

[3]In Appendix 2 I present an extensive review of the PEAD-studies in non-US markets.

The remainder of this paper is organized as follows: section 2 describes the sample and the data sources of this study, section 3 presents the overall test design, section 4 and 5 describes the measurement of key variables, section 6 reports the empirical results and section 7 concludes the paper. Appendices are attached in section 8.

2 Sample selection and data

2.1 Sample

The sample in this study comprises of 4241 firm-quarter observations from 130 companies listed in the Swedish stock market during the time period January1990 to June 2005[4]. It includes all companies that were listed on the A-list[5] some time during this time period[6], with the exception of financial firms and firms with fiscal year different from the calendar year. Financial companies (approximately 15 firms) have been excluded due to their divergent accounting principles, which give their accounting numbers a different interpretation. Firms with a fiscal year different from the calendar year (approximately 5 firms) have been excluded as a matter of convenience in the test design. There is no reason to believe that the choice to exclude these observations has biased the sample selection.

In Table 1 some sample descriptives are reported[7].

[4] A description of the sample period and the Swedish stock market can be found in Appendix 3.

[5] In 2005, 52 out of 269 companies were listed on the A-list, making up approximately 80 % of the total market value (see Sweden Statistics (2005)).

[6] On average approximately 80 companies were listed at the same time.

[7] Industry descriptives can be found in Appendix 4 and descriptives with respect to return is provided in the results section.

Table 1. Descriptive Statistics (MSEK)

Variable	Nr Obs.	Mean	Median	Std Dev	Skewness	Kurtosis
Total Assets	3669	30713	7151	57238	2.96	9.06
Debt	3837	18678	4313	37153	3.64	16.45
Equity	3905	11303	2315	22692	3.66	15.69
Market Cap.	3579	34370	4947	125426	9.23	109.88
M/B (eq.)	3324	2.62	1.64	6.29	22.33	690.76
Debt/Equity	3819	2.10	1.70	2.01	7.13	87.26
Debt/Assets	3655	0.62	0.63	0.16	1.73	27.87
ROA	1306	0.07	0.07	0.07	-3.07	47.31
ROE_pretax	1304	0.14	0.16	0.30	-8.15	140.09
ROE_after tax	1303	0.09	0.11	0.22	-5.61	69.52

This table reports descriptive statistics for a sample of 130 Swedish companies listed on the A-list between 1990 and 2005. Besides the number of firm-quarter observations the mean, median, standard deviation, skewness and kurtosis are reported for some key accounting and market variables.Market Cap. is measured as the market price of the share at the the end of the reporting period, times the number of shares outstanding as of December 31 each year. The profitability measures are measured yearly. Return on assets (ROA) is defined as year end EBIT divided by year end Assets. Return on Equity (ROE_pretax and ROE_after tax) is defined as year end Net Income (before or after tax) divided by year end Shareholders' Equity.

The average company in the sample has total assets of approximately 31 billion SEK and a market cap of 34 billion SEK. The median is considerably lower than the mean which is a reflection of the large size differences among companies in the sample. At the end of 2004 the ten companies with the largest market capitalization stood for approximately 75% of the total market capitalization (the measurement of market capitalization is described in the next section). The average market-to-book, that is market capitalization divided by book value of equity, is 2.62 and the average debt-to-equity (measured in book values) is 2.10. The average return on equity (ROE) is 14% before tax and 9% after tax. These profitability measures are calculated on a yearly basis[8] which explains the lower number of observations for these measures. It can also be seen in Table 1 that the median ROE is somewhat higher than the mean ROE. This is a reflection of some extremely low and negative observations of profitability in the sample.

2.2 Data

- The accounting numbers in section 2.1 above have been provided by SIX[9]. The original data from SIX consisted of accumulated results over the year (3 months, 6 months, 9 months and 12-months results). I have converted this data to quarterly

[8] Net Income (before or after tax) divided by year end shareholder's equity.

[9] SIX (Scandinavian Information Exchange) is a Swedish company that delivers financial information to financial market actors and media.

data. As an effect there is for some accounting numbers a substantial loss of observations, compared to the 4241 firm-quarter observations. For example, if a 9 month report is missing in the original database it is not possible to calculate either the third or forth quarter results.

- Accounting numbers (if not in SEK) have been converted to SEK using exchange rates at the end of each reporting period. The exchange rates are obtained from the Ecowin database.
- The earnings announcement dates (3323 observations) have also been provided by SIX.
- The Datastream Return Index is used for the return measurements. The Datastream Returns Index is constructed out of capitalization-adjusted closing prices and gross dividends.
- The return on a Swedish 1 month treasury bill is used as a proxy for the risk-free rate. This data is obtained from the Ecowin database.
- The Morgan Stanley Sweden Index (value-weighted and cum dividend) from Datastream is used as a proxy for the overall market return during the sample period[10].
- The data on the number of shares outstanding for each firm was found to be of very low quality in the standard databases. I have therefore hand-collected this information from the periodical Börsguiden which reports yearly facts about listed companies. As a consequence, I only have each firm's number of shares as of December 31. This affects my measures of market capitalization.
- Market Capitalization (Market Cap) is calculated as the number of shares times the price of the share. If a company has dual-class shares, each class of shares is weighted with the price of that class of shares. Quarterly observations of Market Cap are calculated as the number of shares (as of December 31) times the price of the shares at the last day of the quarter. I assume here that the number of shares is constant over the quarters. This assumption is not valid if there are splits or share repurchases during the year. In order to avoid large problems with this assumption I have scanned the data and adjusted observations that were obviously affected by splits and repurchases during the year. In order to get monthly observations of market cap I then assume that the quarterly market capitalization is constant over the months of that quarter[11].

[10] The development of Morgan Stanley Sweden Index is described graphically in Appendix 3.

[11] This measure of monthly market capitalization is not perfect and could be considered to be quite stale. But, since the measure is used as a size proxy, for scaling other variables or value-weighting returns, I do not believe this measure to affect the results in any systematic way.

3 Overall test design

The test design in this paper follows previous studies on PEAD and returns momentum. Especially the study by Bernard and Thomas (1989) has, in many ways, served as a role model in designing the tests in the present study. Their study is considered to be of very high methodological quality[12].

The most common way to investigate whether there is a drift or not subsequent to the release of value-relevant information is to formulate a trading strategy based on that information. It the new information is rapidly and correctly incorporated into stock prices it will not be possible to gain any return to such a strategy. When testing for the PEAD a common test design is to formulate a trading strategy based on the announced quarterly earnings. Since it is only the part of earnings that is new to the market that will have any effect on prices, the strategy is based on the unexpected earnings. The trading strategy implemented in this study follow the following overall logic: every quarter when the earnings are announced the firms are ranked according to the size of the unexpected earnings and assigned to 10 different portfolios. A long position is taken in the portfolio with the highest unexpected earnings ("good news") and a short position is taken in the portfolio with the lowest unexpected earnings ("bad news"). The portfolio returns are then measured for holding periods of 6 and 12 months. In addition, the return from a combined portfolio, a hedge portfolio, is measured. The hedge portfolio is the long position financed by the short position. If the return to the hedge portfolio is positive and statistically significant it is an indication that the quarterly earnings information has not been incorporated into prices in an efficient way.

It is important that the trading strategy would be possible to implement in real life. As a consequence any hindsight bias must be avoided. In this study I avoid this bias by forming the portfolios the first day of the quarter subsequent to the calander quarter when earnings are announced. This guarantees that the unexpected earnings of all firms are available when the firms are ranked and divided into portfolios. This calendar-approach, which follows Chan et al. (1996), also facilitates the construction of a self-finances portfolios sinces the long and the short position are taken simultaneously.

Since a number of earnings observations are needed for the estimation of SUE (this is described in the following section), is not possible to form portfolios for the beginning of the sample period. In addition, the cross-section of observations with non-missing values of both SUE and announcement date must not be too small. In order for the strategy, of taking positions in the top and bottom of the distribution of SUE, to be meaningful I only implement the strategy when the cross-section of observations for the quarter is

[12] Bernard and Thomas (1989) show abnormal yearly returns of about 8% from a trading strategy, taking long positions in firms reporting unexpectedly high earnings and short positions in stocks from firms reporting unexpectedly low earnings. They also show that it takes about 6 months for the prices to adjust to the new earnings information and that a disproportionate share of the drift is concentrated around the following quarter's earnings announcement.

more than 40 observations. As an implication, the portfolio strategy is implemented over 28 quarters; from Q3-1997 to Q2-2004.

4 Measure of earnings surprise

The PEAD phenomenon assumes that there is a drift in returns with the same sign as the announced earnings surprise[13]. Consequently it is necessary to define a measure of earnings surprise (or unexpected earnings)[14]. Earnings surprise is the difference between the reported earnings and the earnings that the market expected prior to the announcement. There are a number of ways to operationalize the market's expectations and I have in this study chosen to use a time-series model approach following the research by Foster (1977), Foster et al. (1984) and Bernard and Thomas (1989)[15].

Foster et al. (1984) and Bernard and Thomas (1989), use a simple AR(1) model that only considers the first autocorrelation between seasonal differences, and so will I in this study[16]. Following Bernard and Thomas (1990) and Liu et al. (2003), I also include an intercept as a trend term.

$$[Ear_{i,t} - Ear_{i,t-4}] = \alpha_i + \beta_i \times [Ear_{i,t-4} - Ear_{i,t-8}] + \varepsilon_i \qquad (1)$$

where:

$Ear_{i,t}$ = the quarterly earnings (before extraordinary items) of firm i in quarter t.
$\alpha_{i,t}$ = the firm-specific intercept
$\beta_{i,t}$ = the autoregressive term for firm i in quarter t.
$\varepsilon_{i,t}$ = the residual for firm i in quarter t.

The variables in the model, the seasonal differences, are the differences between quarterly earnings that are one year apart (four quarters), where earnings are defined as "earnings before extraordinary items"[17]. The model is estimated on a firm-specific level in order to get firm-specific parameter estimates that can be used to forecast quarterly earnings for each firm. I estimate the model using a rolling window (following Bernard and Thomas (1989)) with the 9 most recent quarterly earnings[18]. Since I, in the estimation,

[13] It is only the new or unexpected earnings that have an impact on prices.

[14] In this study I use earnings surprise and unexpected earnings interchangably.

[15] An other alternative is to measure the market's expectations by analyst consensus forecasts of earnings, following for example Liu, Strong and Xu (2003). Consensus forecasts of quarterly earnings are not available on a large scale for Swedish companies in any of the standard databases.

[16] For a description of the time-series properties of quarterly earnings in my sample, see appendix 5.

[17] It is more common to use earnings per share (EPS), when estimating SUE. I have not done this in the present study since EPS is not reported in the databases and because the data on the number of shares is only available on an annual basis as was described in section 2.1.

[18] Bernard and Thomas (1989) use a maximum of 24 observations and a minimum of 16 observations and Foster (1977) use a maximum of 20 observations and a minimum of 10 observations. Liu et al. (2003) also use a miniumum of 9 observations in their estimations.

only use quarterly earnings prior to the quarter I want so forecast, I avoid hindsight bias. This method also allows the parameter estimates for each firm to vary over the sample period.

When the parameters of the forecasting model have been estimated, forecasts of quarterly earnings (expected earnings)[19] are generated for each firm-quarter.

There are a total of 1896 generated earnings forecasts and when subtracting the earnings actually reported I end up with a total of 1852 unexpected earnings. The mean, maximum and minimum of both forecasted earnings and unexpected earnings are reported in Table 2 panel A and B.

Table 2. Descriptive statistics for forecasted earnings, unexpected earnings and SUE (MSEK)

Panel A	Nr Obs.	Mean	Std	Min	Max
Forecast of Earnings	1896	432.36	1850.55	-16190.74	30192.82
Panel B	Nr Obs.	Mean	Std	Min	Max
Unexpected Earnings	1852	14.35	1746.00	-28925.82	26748.84
Panel C	Nr Obs.	Mean	Std	Min	Max
SUE	1852	0.08	2.96	-63.09	42.88

This table reports descriptive statistics for forecasted earnings, unexpected earnings and standardized unexpected earnings (SUE). Forecasted earnings are calculated with firm-specific parameter estimates from an AR(1) model in quarterly seasonal differences estimated with a rolling window of 9 observations. Unexpected earnings are the forecasted earnings minus the earnings reported for the same quarter. Standardized unexpected earnings (SUE) is the unexpected earnings devided by the standard deviation of forecasted earnings.

The mean unexpected earnings are 14.35 MSEK and the standard deviation is very high. This could be an indication of that the forecasting model is not working very well. It could also be an effect of the large size differences in the sample. In order to alleviate the problem of heteroskedasticity I use a scaling factor to scale the unexpected earnings. I follow Bernard and Thomas (1989) and Liu et al. (2003) (among others) and use the standard deviation of expected earnings as the scaling factor of unexpected earnings. The logic of this measure is that, the more certain the forecast is (low standard deviation),

[19] In this study I use earnings forecast and expected earnings interchangably.

the stronger is the surprise signal. In this sense, the measure of unexpected earnings is standardized and has given name to SUE: standardized unexpected earnings[20].

The expression of SUE is consequently:

$$SUE_{it} = \frac{Ear_{it} - E_{i,t-1}\left[Ear_{it}\right]}{\sigma_{it}} \tag{2}$$

where:

SUE_{it}	= the standardized unexpected earnings for firm i at time t.
Ear_{it}	= the reported quarterly earnings for firm i at time t.
$E_{i,t-1}\left[...\right]$	= the expected value of [...] for firm i at time $t-1$.
σ_{it}	= the standard deviation of expected earnings i at time t.

Descriptive statistics for this SUE measure is reported in panel C of Table 2.

5 Measuring return

I use two metrics to evaluate the returns to the SUE-portfolios. First, I calculate the buy-and-hold returns (BHAR) for different holding periods and display the BHAR of the long, short and hedge portfolio in a classic PEAD-graph following the spirit of Bernard and Thomas (1989). Second, for statistical inference I follow Chan et al. (1996) and use the intercept of monthly calender-time regressions as a measure of the average monthly return to the SUE-strategy (equivalent to Jensen's alpha). In these regressions I also include risk-factors such as described by the CAPM-model and by Fama and French (1993) and Fama and French (1996). As a final step I include a fourth factor controlling for the momentum effect (see for example Carhart (1997) and Chan et al. (1996)).

The simple net return for stock i can be expressed as:

$$R_{i,t} = \frac{P_{i,t} + DIV_{i,t}}{P_{i,t-1}} - 1 \tag{3}$$

where:

[20] Another common scaling factor is the market capitalization, see for example Bernard and Thomas (1990) and Bernard et al. (1997). It turns out that the SUE measure that is scaled by the standard deviation of expected earnings is highly correlated with the SUE measure that is scaled by market cap (a Spearman rank correlation of 0.89). The two measures thus seem to be equivalent. But, since there is a larger number of missing observations of the market cap in the sample, I have chosen to use the SUE measure with the standard deviation as a scalar.

In their study Bernard and Thomas (1990) find that the two approaches yield simliar amounts of return drifts. Results using SUE scaled by market cap is reported in Appendix 7a.

$R_{i,t}$ = the net return of share i at time t.
$P_{i,t}$ = the price of share i at time t.
$DIV_{i,t}$ = the dividend of share i at time t.

I use monthly net returns for each firm as my main return metric. Before compounding the returns over longer holding periods (to produce the PEAD-graph) I make a rough adjustment for expected monthly return[21] Following Bernard et al. (1997) I use a value-weighted market index (market return) as a proxy for expected return[22]:

$$AR_{i,t} = R_{i,t} - Rm_t \tag{4}$$

where:
$AR_{i,t}$ = the abnormal return of share i at time t.
$R_{i,t}$ = the net return of share i at time t.
Rm_t = the "market return", the net return of a value-weighted market index at time t..

The abnormal returns are then compounded [23] over different holding period; from 1 month up to 12 months.

$$BHAR_{i,T} = \prod_{t=1}^{T} (1 + AR_{i,t}) - 1 \tag{5}$$

where:
$BHAR_{i,T}$ = the buy-and-hold return of firm i for holding period (T).
T = the holding period measured in months. $T = 1, 2, ..., 12$.
$AR_{i,t}$ = the abnormal return of share i at time t.

The shares in the SUE-portfolios are equally-weighted, so that the portfolio return is the mean return of the shares in that portfolio.

The portfolio BHAR is thus:

$$BHAR_{p,T} = \frac{1}{N} \sum_{i=1}^{N} BHAR_{i,T} \tag{6}$$

where:

[21] In some BHAR measures the expected return is deducted after compounding returns.

[22] There are many other alternatives as a proxy for expected return. Bernard and Thomas (1989) use a matching technique and use the return to a portfolio of firms from the same size decile as the event firm. They do this to control for the size effect first noted by Banz (1981). I control for the size effect later in this paper.

[23] Bernard and Thomas (1989) sum abnormal returns over time, but in a footnote they mention that compounded returns give practically the same results.

$BHAR_{p,T}$	= the buy-and-hold return of portfolio p after T months.
p	= the type of portfolio, $p = 1(SHORT), 2, ...9, 10(LONG)$.
N	= the number of firms in portfolio p, $i = 1, 2, \ldots, N$.
$BHAR_{i,T}$	= the buy-and-hold return of share i after T months.

Note that there are 10 portfolios and that portfolio p=1 is also called the SHORT position and p=10 is called the LONG position, which mirrors that the strategy implies taking a short position in the decile with the lowest SUE and a long position in the decile with the highest SUE.

When implementing the zero-cost portfolio strategy, a short position in one portfolio finances a long position in another portfolio, so that the cost of investing in the combined portfolio is zero. I refer to this combined (hedge) portfolio as a PEAD portfolio. To evaluate the return of the PEAD for holding period T , the BHAR of the short position is subtracted from the BHAR of the long position.

$$BHAR_{PEAD,T} = BHAR_{LONG,T} - BHAR_{SHORT,T} \quad (7)$$

where:

$BHAR_{PEAD,T}$	= the BHAR of a $PEAD$ portfolio with holding period T.
$BHAR_{LONG,T}$	= the BHAR of a $LONG$ portfolio with holding period T.
$BHAR_{SHORT,T}$	= the BHAR of a $SHORT$ portfolio with holding period T.
T	= the holding period measured in months. $T = 1, 2, ..., 12$.

Throughout the entire sample period the strategy is implemented 28 times and thus generates a series of BHARs for the PEAD-, the LONG- and the SHORT- portfolios respectively. :

$$\{BHAR_{PEAD,T,f}; \quad f = 1, 2, 3, ...28\}; \quad T = 1, 2, ..., 12. \quad (8)$$

$$\{BHAR_{LONG,T,f}; \quad f = 1, 2, 3, ...28\}; \quad T = 1, 2, ..., 12. \quad (9)$$

$$\{BHAR_{SHORT,T,f}; \quad f = 1, 2, 3, ...28\}; \quad T = 1, 2, ..., 12. \quad (10)$$

where:

T	= the holding period measured in months. $T = 1, 2, ..., 12$.
f	= the formation date. $f = 1, 2, ...33$, where $f = 1$ is Q3 1997 and $f = 28$ is Q2 2004.

When evaluating the whole sample period I calculate a total mean for each of the positions:

$$BHAR_{pos,T} = \frac{1}{28}\sum_{f=1}^{28} BHAR_{pos,T,f} \tag{11}$$

where:

$BHAR_{pos,T}$	= the mean BHAR of all portfolios of the same position.
pos	= the type of position of the portfolio, $pos \in \{PEAD, LONG, SHORT\}$.
T	= the end of the holding period.$T = 1, 2, ..., 12$.
f	= the formation date. $f = 1, 2, ...33$, where $f = 1$ is Q3 1997 and $f = 28$ is Q2 2004.

In Figure 1, these total BHAR means for the positions PEAD, LONG and SHORT are displayed for holding period 1 to 12 months in a classic PEAD graph.

The advantage of the BHAR measure is that it mimics investor experience, noted by Barber and Lyon (1997). It does not require monthly rebalancing of the portfolio as is assumed when using a CAR measure where the monthly abnormal returns are summed. However, the BHARs can, as pointed out by Mitchell and Stafford (2000), give a false impression on the adjustment speed[24]. Even though there is no additional difference between the returns of the event firm and the benchmark firm, the method might give an impression of additional abnormal return. Consider the following example (from Fama (1998)): after the first year subsequent to the event the return to the event firm is 10% and 0% for the benchmark firm. BHAR is thus 10% after the first year. Now suppose that for the second year the return to both the event firm and the benchmark firm increases by 300%, that is they increase exactly the same. The return to the event firm will after two years thus be 3.3 (1.1*3.0) and for the benchmark firm it will be 3 (1.0*3.0). The BHAR will thus be 30% after 2 years, compared to 10% after 1 year. Consequently, even though there was no increase in the difference between the event firm and the benchmark firm during the second year the BHAR measure gives a false impression that additional abnormal return was earned.

In addition to the problems mentioned above, the measure of BHAR does not lend itself easily to statical inferences. For example Mitchell and Stafford (2000) have shown that the distribution of firm-specific BHARs are skewed and generally not centered around zero. In addition the series of BHARs suffers from overlapping observations which introduces the problem of autocorrelation. One solution, used by for example Ikenberry, Lakonishok and Vermaelen (1995), is to use a bootstrapping procedure which provides an empirical distribution under the null hypothesis of no abnormal return which can be used for statistical testing.

[24] Another drawback, pointed out by Fama (1998) is if one deducts the measure of expected returns after compounding over time. As Fama discusses, for longer time horizons it is not possible to use asset-pricing models to measure expected returns, which is a limitation. Expected returns must be modelled by return on a benchmark firm or portfolio.

Despite the problems of the BHAR measure, I have chosen to use this measure because of its advantage of mimicking investor behavior. Further, I only use the BHAR measure to study the PEAD graphically and therefore I do not consider the problems of BHAR to distort the conclusions drawn in this study. When testing for the PEAD statistically I use monthly calendar-time regressions which is proposed by Fama (1998) to control for the problems above.

5.1 Calendar-time regressions

As a starting point I use the monthly returns in equation 3 and calculate equally-weighted portfolio means as follows:

$$R_{p,t} = \frac{1}{N}\sum_{i=1}^{N} R_{i,t} \tag{12}$$

$R_{i,t}$ = the net return of share i at month t.
$R_{p,t}$ = the net return of portfolio p at time t.
p = the type of portfolio, $p = 1(SHORT), 2, ...9, 10(LONG)$.
t = the month after formation date. $t = 1, 2, ...12$.

Note that these portfolio returns are not equivalent to the BHAR above, but rather an average monthly portfolio return[25].

In the regressions I focus on portfolios 1 and 10, equivalent to the SHORT and LONG position. As before the PEAD position is a combined portfolio of the LONG position minus the SHORT position. The monthly regressions, described below, are run for each of the three positions.

The mean monthly portfolio return in equation 12 is calculated for the 12 months following formation date, which means that I get 12 monthly observations for each portfolio for each formation date. When running the regression on all portfolios with the same position I thus get 336 observations of monthly portfolio return (12*28).

This is a slight difference compared to how the regression is implemented by Chan et al. (1996). I keep all the 28 strategies with different formation dates separate, whereas they weigh them all together to get 1 portfolio return for every calendar month. With a holding period of 12 months I have 4 overlapping portfolios every calender month. I show in appendix 6 that using the method exactly like Chan et al. (1996) yields the same

[25] Since the portfolio mean is calculated for each month, this average monthly portfolio return assumes that the portfolios are rebalanced every month to keep the weights equal.

results. I have however chosen to present the results with my alternative regressions since, holding the 28 strategies separate, is in line with the results reported in Figure 2.

The dependent variable in the regressions is portfolio excess return, which is defined as the portfolio return minus the monthly risk free interest rate (following Chan et al. (1996)). As a first test I regress the dependent variable on a constant to see if the intercept is significant[26] This intercept is obviously not a measure of "abnormal return", but a way to test the significance of the portfolio returns in excess of the risk free rate.

$$R_{p,t,f} - Rf_t = \alpha + C + \varepsilon \qquad (13)$$

$R_{p,t,f}$	= the portfolio return at month t of a portfolio with position p and formation date f.
p	= the type of portfolio, $p \in \{1(SHORT), 10(LONG)\}$.
f	= the formation date. $f = 1, 2, ...28$, where $f = 1$ is Q3 1997 and $f = 28$ is Q2 2004.
Rf_t	= the return of Swedish Treasury Bill (30 day) at month t.
C	= a constant factor.

Secondly, the monthly portfolio excess returns are regressed on the excess market return (RMRF), which is the risk-factor as described by the CAPM-model.

$$R_{p,t,f} - Rf_t = \alpha^{capm} + \beta^{capm} RMRF_t + \varepsilon^{capm} \qquad (14)$$

$R_{p,t,f}$	= the portfolio return at month t of a portfolio with position p and formation date f.
p	= the type of portfolio, $p \in \{1(SHORT), 10(LONG)\}$.
f	= the formation date. $f = 1, 2, ...28$, where $f = 1$ is Q3 1997 and $f = 28$ is Q2 2004.
Rf_t	= the return of Swedish Treasury Bill (30 day).
$RMRF_t$	= the excess market return: Rm - Rf.

Thirdly, the monthly portfolio excess returns are run in a three-factor model following Fama and French (1993)[27].

[26] This approch is also used in Brooks (2002).

[27] No asset pricing model can fully explain the cross-section of average returns. The Fama-French three-factor model which is the most widely used asset-pricing model comes a long way, but still has difficulties explaining the size effect in the lowest book-to-market portfolios. This was pointed out by Fama and French (1993) as well as Fama (1998), and they conclude that the three-factor model does not even explain return differences along the dimensions that the model's risk factors were designed to explain. Despite its known deficiencies this is the most established asset-pricing model.

$$R_{p,t,t} - Rf_t = \alpha^{3f} + b^{3f} RMRF_t + s^{3f} SMB_t + h^{3f} HML_t + \varepsilon^{3f} \quad (15)$$

$R_{p,t,f}$	= the portfolio return at month t of a portfolio with position p and formation date f.
p	= the type of portfolio, $p \in \{1(SHORT), 10(LONG)\}$
f	= the formation date. $f = 1, 2, ...28$, where $f = 1$ is Q3 1997 and $f = 28$ is Q2 2004.
Rf_t	= the return of Swedish Treasury Bill (30 day)
$RMRF_t$	= the excess market return: Rm - Rf
SMB_t	= the monthly return of a hedge portfolio based on size (MarketCap)
HML_t	= the monthly return of a hedge portfolio based on book-to-market.

Following Fama and French (1993) I estimate the factors SMB and HML as follows.

The SMB-portfolios are based on firm size, measured as market capitalization (the share price times the number of shares outstanding). Firms are ranked on market cap by June 30 each year and divided into two portfolios; portfolio Big and portfolio Small. The SMB factor is the monthly value-weighted return of the Small portfolio minus the monthly return of the Big portfolio. Monthly returns are measured from July 1 and 12 months ahead.

The HML-portfolios are based on book-to-market (book value of equity divided by market capitalization). Firms are ranked on book-to-market by December 31 each year and divided into three portfolios; portfolio Value (high book-to-market), portfolio Neutral and portfolio Growth (low book-to-market). The HML factor is the monthly value-weighted return of the Value portfolio minus the monthly return of the Growth portfolio. Monthly returns are measured from July 1 (six months after portfolio formation) and 12 months ahead.

The regressions 13, 14 and 15 above are run for the LONG and the SHORT positions. In addition, regressions are run with the hedge returns of the PEAD position as the dependent variable[28]:

$$R_{PEAD,t,f} = \alpha + C + \varepsilon \quad (16)$$

$$R_{PEAD,t,f} = \alpha^{capm} + \beta^{capm} RMRF_t + \varepsilon^{capm} \quad (17)$$

$$R_{PEAD,t,f} = \alpha^{3f} + b^{3f} RMRF_t + s^{3f} SMB_t + h^{3f} HML_t + \varepsilon^{3f} \quad (18)$$

The estimated coefficients for the Long, Short and Hedge positions are reported in Table 3 in section 6.

[28] The variable definitions are the same as for regressions 9, 10 and 11 above.

6 Results

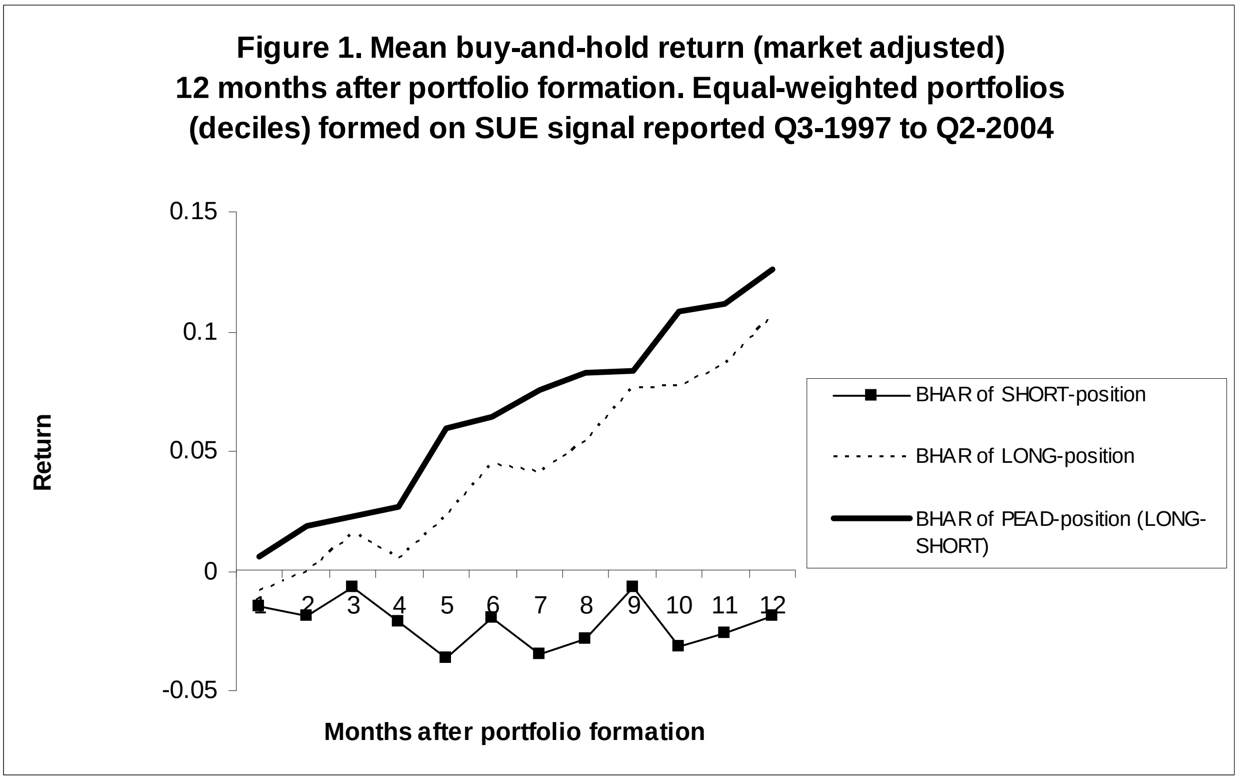


Figure 1 presents the classic PEAD-graph[29]. It displays the mean buy-and-hold abnormal return (market adjusted) for each of the positions LONG, SHORT and PEAD (LONG-SHORT) for 1 to 12 months after portfolio formation. Just looking at the graph it seems like there is indeed a drift in returns after the announcement of quarterly earnings in the Swedish stock market. The mean BHAR of all the PEAD-positions over the sample period seems to be about 12 % after a holding period of 12 months, which indicates that it is on average possible to earn a market-adjusted return of 12% with a trading strategy

[29]The PEAD graph in Bernard and Thomas (1989) is done in event-time whereas my positions are taken the first day of the quarter subsequent to the quarter when the SUE was announced. Consequently, I loose some power in my tests. In Appendix 6 I show a graph in event-time (equivalent to Figure 1) where positions are taken the day after the earnings announcement. It can in that graph be seen that during the first 64 trading days (approximately the first 3 months) there is just a small increase in hedge returns (the PEAD position). I can therefore conclude that it does not seem that I loose a lot of power by excluding the trading days between the earnings announcement and the first day of the subsequent quarter (the day of portfolio formation). The graph also indicates that the hedge return in the months immediately following the earnings announcement is not crucial for the overall success of the trading strategy.

that takes a long position in the decile of firms with the highest SUE and a short position in the decile of firms with the lowest SUE. It is worth noting that most of the return comes from the long position which has a BHAR of about 10 % over 12 months, whereas the short position seems to be only slightly below zero. It also seems like most of the return to the PEAD position is earned in the middle of the holding period. The low return in the first three months diverge from the results of Bernard and Thomas (1989). They find a cumulative abnormal return to the hedge portfolio of about 4.2% during the first 60 trading days (approximately 3 calendar months)[30].

Before looking more into these questions I want to test the statistical significance and make sure that the observed return is not just a compensation for risk. If the long position and the short position have different risk exposure, the hedge position will also be exposed to risk and the hedge return might be a reward for taking on that risk. I run the monthly portfolio returns (12 month holding period) in three different regressions; with a constant as the explaining variable, with the market return as the explaining variable (CAPM) and finally with market return, SMB and HML as the explaining variables (Fama-French three-factor model). The coefficients of the calendar-time returns regressions are reported in Table 3 below. The results for the positions LONG, SHORT and PEAD (LONG-SHORT) positions can be found in panel A, B and C respectively.

From Table 3 panel C, it can be noted that for the PEAD position the intercept of the first regression has a t-value of 2.29 which is significant on a 5 %-level. It indicates a monthly return of 0.9%. Compounded over a year this is equivalent to about 11% yearly return and it thus confirms the results from Figure 1. From the second and third regressions in panel C it is also clear that the monthly return to the PEAD position is robust to risk-factors such as described by the CAPM and the 3-factor model by Fama and French (1993). Neither the market return, the return on the SMB portfolio or the return of the HML portfolio can explain the return of the PEAD-position.

It is also confirmed in Table 3 that the return to the PEAD position is generated by the long position. The average monthly return to position LONG is 0.7 % when controlling for risk-factors, whereas the average monthly return to position SHORT is not significant in either of the three regressions. For both the long and short positions the loading on RMRF is highly significant. It should also be noted that the beta is almost the same for the two positions, which is also confirmed by the insignificant beta in the hedge returns-regression. This is an indication that the two positions have similar risk exposure in terms of co-movement with the overall market. Regarding the co-movement with the SMB and HML factor, the two positions differ slightly. The long position has a significant loading on the HML-factor, indicating that the returns to this position can be an effect of stocks

[30] This comparison of results assumes that my rough risk-adjustment (adjusting for market return) is working equally well as the risk-adjustment made by Bernard and Thomas (1989) (adjusting for return on a portfolio from the same size decile).

Table 3. Average Monthly Abnormal Return to Extreme SUE Portfolios

Panel A. Portfolios in position LONG (High SUE)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.011				0.000
(t-stat)	*3.07*				
Coefficient	0.008	0.584			0.510
(t-stat)	*3.24*	*18.69*			
Coefficient	0.007	0.692	0.075	0.143	0.559
(t-stat)	*2.74*	*18.07*	*1.28*	*3.24*	

Panel B. Portfolios in position SHORT (Low SUE)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.003				0.000
(t-stat)	*0.65*				
Coefficient	0.000	0.542			0.402
(t-stat)	*-0.06*	*15.03*			
Coefficient	-0.002	0.664	0.140	0.089	0.442
(t-stat)	*-0.60*	*14.76*	*2.04*	*1.70*	

Panel C. Portfolios in position PEAD (LONG-SHORT)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.009				0.000
(t-stat)	*2.39*				
Coefficient	0.009	0.042			0.000
(t-stat)	*2.33*	*0.95*			
Coefficient	0.009	0.028	-0.065	0.054	-0.004
(t-stat)	*2.29*	*0.48*	*-0.74*	*0.82*	

This table reports the coefficents from calender-time portfolio return regressions, for the 12 months after portfolio formation, with the monthly portfolio excess returns (monthly portfolio return minus the return of a Swedish Treasury Bill (30days)) as the dependent variable. The results for the positions LONG, SHORT and PEAD (LONG-SHORT) can be found in panel A, B and C respectively. LONG is a long position in the decile with the highest SUE and SHORT is a short position in the decile with the lowest SUE. All positions are taken the first day of the quarter subsequent to the quarter when the earnings are announced. RMRF is the excess market return measured as the Morgan Stanley Sweden index minus the return of Swedish Treasury Bill (30days). SMB is the monthly value-weighted return of a hedge portfolio based on size (MarketCap). Firms are ranked on Market Cap. by June 30 each year and divided into 2 portfolios; portfolio Big and portfolio Small. The SMB factor is the monthly value-weighted return of the Small portfolio minus the monthly return of the Big portfolio. Monthly returns are measured from July 1 and 12 months ahead. HML is the monthly value-weighted return of a hedge portfolio based on book-to.market. Firms are ranked on book-to-market by December 31 each year and divided into 3 portfolios; portfolio Value (high book-to-market), Neutral and Growth (low book-to-market). The HML factor is the monthly value-weighted return of the Value portfolio minus the monthly return of the Growth portfolio. Monthly returns are measured from July 1 (six months after portfolio formation) and 12 months ahead.

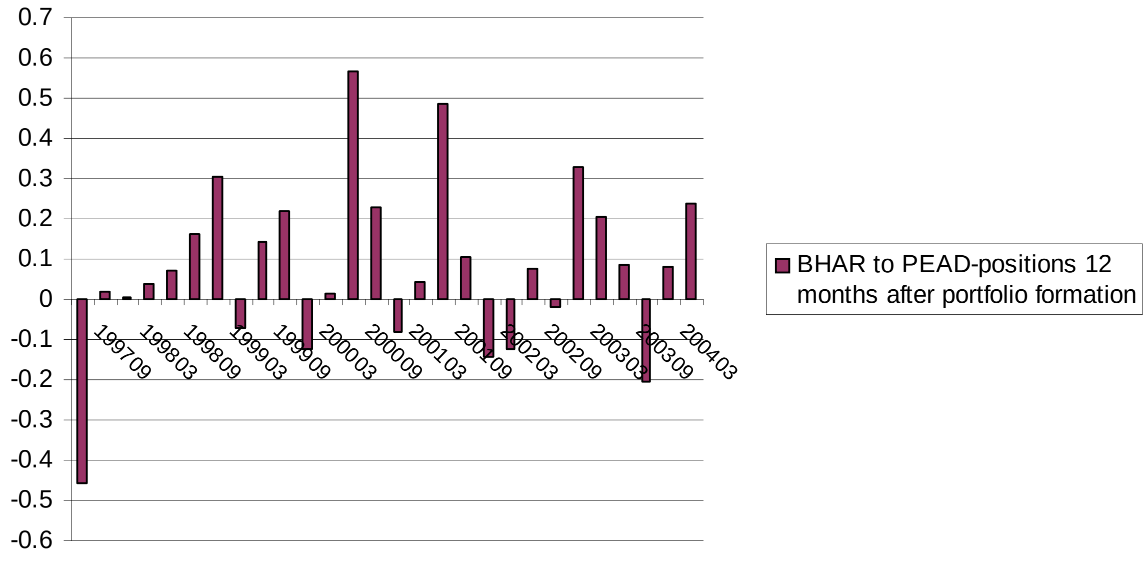
with high book-to-market. In contrast, the short position has a significant loading on the SMB-factor, indicating that the returns to this position partially can be explained by a size effect. However, in the combined portfolio, the long and short positions seem to control for each other in terms of these risk exposures.

Overall, the results from Table 3[31] strengthens the results from Figure 1: there is a post-earnings announcement drift in the Swedish stock market. A SUE-trading strategy implemented in the Swedish stock market is able to earn a yearly abnormal return which is in line with what has been found in other stock markets. Bernard et al. (1997) showed that the SUE-strategy implemented on a US sample on average earned 6.3% over four quarters. The strategy implemented by Forner, Sanabria and Marhuenda (2006) on a Spanish sample of firms earned an average cumulative return of 7.3% over 12 months. Liu et al. (2003) had a hedge return of 10.8% over 12 months following the earnings announcement in their study of the PEAD in the UK market.

Bernard et al. (1997) propose yet another way to evaluate a trading strategy; that is to study how many of the times the strategy is implemented it succeeds and how many times it fails. Figure 2 presents the BHAR (with a holding period of 12 months) for the PEAD position (LONG-SHORT) for each of the 28 formation periods.

[31] In Appendix 6 the results from calendar-time regressions implemented as in Chan et al. (1996) are presented. The pattern is the same as in Table 3, but the coefficients are now only significant on a 10%-level which is an effect of a lower number of observations.

Figure 2. Buy-and-hold return 12 months after portfolio formation to all PEAD positions (LONG-SHORT) taken during the sample period (Q3-1997 to Q2-2004)



It can graphically be noted that most of the returns are positive. Out of the 28 quarters when the trading strategy is implemented, it gains a positive return in 20 quarters and a negative return in 8 quarters. Additionally, it can be noted that in 9 quarters the hedge return is more than 15%, but when the strategy looses, only at 2 times does it loose more than 15% A statistical test[32] also shows that if the 28 "trials" can be considered independent and the underlying probability of the strategy succeeding is 50%, the probability of succeeding more than 19 out of 28 trials is only about 1.8 %. I can thus conclude that the success of the strategy cannot be explained by chance and this adds to the robustness of my results.

As described earlier, the regressions are only run on extreme portfolios (the highest and lowest deciles). In order to get a more nuanced picture I present some descriptives of all the 10 portfolios and their average monthly return (with a holding period of 12 months) during the sample period.

[32] Assuming a binomial distribution

Table 4. Portfolio Descriptives

Portfolio	SUE		Return		MarketCap
(SHORT) 1	-3.562	(-28.04)	0.004	(0.60)	55068
2	-1.213	(-25.75)	0.008	(1.65)	31086
3	-0.624	(-18.04)	0.012	(2.21)	65318
4	-0.268	(-9.60)	0.011	(2.02)	33558
5	-0.041	(-1.81)	0.006	(1.11)	36950
6	0.189	(9.73)	0.007	(1.33)	41710
7	0.423	(22.42)	0.007	(1.22)	31197
8	0.739	(35.83)	0.009	(1.44)	45214
9	1.308	(42.49)	0.010	(1.74)	53623
(LONG) 10	4.515	(20.30)	0.011	(1.84)	78636

This table reports descriptive statistics for 10 portfolios formed on SUE (t-values in parentheses).Portfolios are formed at the first day of the quarter preeceding the quarter when the SUE is announced. Return is the average monthly equal-weighted return over the whole sample period (96 months) when each portfolio is held for 12 months. SUE is measured as [Reported Earnings - Expected Earnings]/std of Expected Earnings. Expected Earnings are measured through a firm-specific time-series model of seasonal differences with a rolling window of 9 observations.
Market Cap is measured as the number of stocks at the end of the fiscal year times the price of stock at the end of each fiscal quarter. Market Cap is reported in MSEK.

Indeed, Table 4 gives a more nuanced picture. The SHORT position (with the lowest SUE) also has the lowest average monthly return following the earnings announcement and the LONG position has the highest average monthly return. However, there is no monotonic rise in returns from the lowest to the highest SUE-portfolio. This patterns indicates that the drift might not be very robust in the Swedish market. It might also be an effect of the small sample. Each SUE-portfolio consists of a maximum of 10 stocks, and during some periods only 4 stocks are included in the same SUE-portfolio. That means that small variations in returns have large effects on the portfolio return[33].

Table 4 also reports the average Market Cap (in MSEK) for each portfolio. The distribution of Market Cap is quite even across portfolios, but it is worth noting that the LONG position has the highest Market Cap. Again, the portfolio means are sensitive to small variations, but the high Market Cap of this portfolio could be an indication that the results are at least not driven by small stocks.

In order to investigate more closely the possible effect of size in my results, I run the monthly regressions on value-weighted SUE-portfolios as well. When SUE-portfolios are value-weighted each stock gets a weight in proportion to its Market Cap (Market Cap is lagged one month to avoid hindsight bias). Consequently, larger stocks gets a higher weight. In Appendix 7 d the results of these regressions are presented (equivalent to Table

[33]In Appendix 7 b results for portfolios formed on quintiles are reported.

3). It turns out that the coefficient for the PEAD positions are not longer significant on a reasonable level and I conclude that the results reported in Table 3 are driven by small stocks in the extreme portfolios (which is in line with the results of Bernard and Thomas (1990)). Since small stocks are often associated with lower analyst coverage, this might be an indication that the underreaction to quarterly earnings is driven by information uncertainty which has been put forward by Francis, LaFond, Olsson and Schipper (2007).

One can conclude that the trading strategy of taking a long position in the decile of the highest SUE and a short position in the decile with the lowest SUE, on average is profitable during the sample period. After controlling for conventional risk factors, the monthly average return to the hedge portfolio is 0.9%. However, the strategy is not at all risk free. As can been seen in appendix 7, the results are sensitive to the measure of SUE and the use of quintiles instead of deciles in portfolio formation. In addition, the return to the PEAD position is not significant if a holding period of 6 months is used instead of 12 months[34]

Still the main results show that there is a PEAD in Sweden and this confirms the results of studies in other markets. As an out-of-sample test this study thus dismiss "data-snooping" as an explanation for the previously observed returns drift. The underreaction to earnings news seems to be a robust phenomena.

If the returns momentum and the PEAD is indeed manifestations of the same phenomena the finding of a PEAD in the Swedish market is most surprising. Either the link between returns momentum and PEAD should be reconsidered, or the previous studies on returns momentum in Sweden are sample specific. Before investigating this further, I test for returns momentum as a forth factor in my calendar-time regressions, following Carhart (1997) and Chordia and Shivakumar (2006)[35].

The studies that have not been able to confirm a returns momentum drift in Sweden all follow Jagadeesh and Titman (1993) and rank firms on past 6 months returns and hold them for 6 months. I construct my momentum factor in the same way to be able to compare the results[36].

As can been seen from Table 5, the momentum factor (MOM-factor), when included as a forth factor in the regressions, is not significant. This confirms the results of Rouwenhorst (1998), Griffin et al. (2003) and Doukas and McKnight (2005). Since the holding period for the PEAD positions is also 6 months, the intercept is barely significant on a 10%-level (as previously reported in Appendix 7 c). In Appendix 9 I also present results

[34] The results of robustness checks are presented in Appendix 7 and summerized in a table in Appendix 7 f.

[35] An alternative would to be to follow Chan et al. (1996) and test the two momentum strategies by a double sorting of stocks. First they sort the stocks on basis of their past six-months return and divide them into 3 portfolios. Independently they sort the stocks on SUE and group them into three portfolios. The two-way classification yields 9 portfolios.

[36] To be consistent with the PEAD-strategy I also form the momentum factors based on decile-portfolios.

from a trading strategy basen only on momentum. The table shows that the return to a hedge portfolio, taking a long position in the decile of stocks with the highest past return and a short position in stocks with the lowest past return, is not significant either in a CAPM-model or a three-factor model.

Table 5. Average Monthly Abnormal Return to Extreme SUE Portfolios (holdingperiod is 6 months)

Panel A. Portfolios in position LONG (High SUE)

	Intercept	RMRF	SMB	HML	MOM	Adj. R2
Coefficient	0.007	0.666	0.151	0.148	-0.060	0.569
(t-stat)	*2.16*	*12.20*	*1.90*	*2.45*	*-1.58*	

Panel B. Portfolios in position SHORT (Low SUE)

	Intercept	RMRF	SMB	HML	MOM	Adj. R2
Coefficient	-0.001	0.590	0.097	0.067	-0.057	0.447
(t-stat)	*-0.20*	*9.21*	*1.04*	*0.97*	*-1.28*	

Panel C. Portfolios in position PEAD (LONG-SHORT)

	Intercept	RMRF	SMB	HML	MOM	Adj. R2
Coefficient	0.008	0.076	0.054	0.080	-0.003	-0.002
(t-stat)	*1.63*	*0.94*	*0.46*	*0.92*	*-0.05*	

This table reports the coefficents from calender-time portfolio return regressions, for the 6 months after portfolio formation, with the monthly portfolio excess returns (monthly portfolio return minus the return of a Swedish Treasury Bill (30days)) as the dependent variable. The results for the positions LONG, SHORT and PEAD (LONG-SHORT) can be found in panel A, B and C respectively. LONG is a long position in the decile with the highest SUE and SHORT is a short position in the decile with the lowest SUE. All positions are taken the first day of the quarter subsequent to the quarter when the earnings are announced. RMRF is the excess market return measured as the Morgan Stanley Sweden index minus the return of Swedish Treasury Bill (30days). SMB is the monthly value-weighted return of a hedge portfolio based on size (MarketCap). Firms are ranked on Market Cap. by June 30 each year and divided into 2 portfolios; portfolio Big and portfolio Small. The SMB factor is the monthly value-weighted return of the Small portfolio minus the monthly return of the Big portfolio. Monthly returns are measured from July 1 and 12 months ahead. HML is the monthly value-weighted return of a hedge portfolio based on book-to.market. Firms are ranked on book-to-market by December 31 each year and divided into 3 portfolios; portfolio Value (high book-to-market), Neutral and Growth (low book-to-market). The HML factor is the monthly value-weighted return of the Value portfolio minus the monthly return of the Growth portfolio. Monthly returns are measured from July 1 (six months after portfolio formation) and 12 months ahead. MOM is the monthly equal-weighted return to hedge portfolios (with holdingperiod 6 months), taking a long position in the decile with highest past 6 months returns and a short position in the decile with the lowest past 6 months returns.

These results confirm previous studies that there is no returns momentum effect in Sweden. However, when extending the holding period from 6 months to 12 months for both the PEAD position and the momentum factor, the results change dramatically.

The momentum factor is now highly significant, as can be seen in Table 6[37]. The returns to the PEAD position is still significant on a 10% level, though slightly subsumed by the momentum factor. It can thus be concluded that there is both a momentum effect

[37] Results from the momentum strategy alone (with a holding period of 12 months) are presented in Appendix 10.

and a PEAD present in the Swedish stock market. These results thus contribute to, and in fact alters the view, about what we previously knew about momentum in the Swedish stock market. Sweden is not an exception (as previous research has indicated) to other developed stock markets.

Table 6. Average Monthly Abnormal Return to Extreme SUE Portfolios (holdingperiod is 12 months)

Panel A. Portfolios in position LONG (High SUE)

	Intercept	RMRF	SMB	HML	MOM	Adj. R2
Coefficient	0.008	0.648	0.081	0.128	-0.103	0.565
(t-stat)	*3.20*	*15.48*	*1.40*	*2.90*	*-2.47*	

Panel B. Portfolios in position SHORT (Low SUE)

	Intercept	RMRF	SMB	HML	MOM	Adj. R2
Coefficient	0.001	0.563	0.154	0.055	-0.237	0.479
(t-stat)	*0.39*	*11.77*	*2.32*	*1.08*	*-4.98*	

Panel C. Portfolios in position PEAD (LONG-SHORT)

	Intercept	RMRF	SMB	HML	MOM	Adj. R2
Coefficient	0.007	0.085	-0.073	0.074	0.134	0.007
(t-stat)	*1.83*	*1.34*	*-0.84*	*1.11*	*2.14*	

This table reports the coefficents from calender-time portfolio return regressions, for the 12 months after portfolio formation, with the monthly portfolio excess returns (monthly portfolio return minus the return of a Swedish Treasury Bill (30days)) as the dependent variable. The results for the positions LONG, SHORT and PEAD (LONG-SHORT) can be found in panel A, B and C respectively. LONG is a long position in the decile with the highest SUE and SHORT is a short position in the decile with the lowest SUE. All positions are taken the first day of the quarter subsequent to the quarter when the earnings are announced. RMRF is the excess market return measured as the Morgan Stanley Sweden index minus the return of Swedish Treasury Bill (30days). SMB is the monthly value-weighted return of a hedge portfolio based on size (MarketCap). Firms are ranked on Market Cap. by June 30 each year and divided into 2 portfolios; portfolio Big and portfolio Small. The SMB factor is the monthly value-weighted return of the Small portfolio minus the monthly return of the Big portfolio. Monthly returns are measured from July 1 and 12 months ahead. HML is the monthly value-weighted return of a hedge portfolio based on book-to.market. Firms are ranked on book-to-market by December 31 each year and divided into 3 portfolios; portfolio Value (high book-to-market), Neutral and Growth (low book-to-market). The HML factor is the monthly value-weighted return of the Value portfolio minus the monthly return of the Growth portfolio. Monthly returns are measured from July 1 (six months after portfolio formation) and 12 months ahead. MOM is the monthly equal-weighted return to hedge portfolios (with holdingperiod 12 months), taking a long position in the decile with highest past 6 months returns and a short position in the decile with the lowest past 6 months returns.

The results also confirm the results of Chan et al. (1996) and Chordia and Shivakumar (2006) that PEAD and returns momentum are interlinked but not totally subsumed by each other. Additional indication that the two momentum effects are interlinked can be seen in Table 7. It shows the average SUE and RET-6 (return during 6 months previous to portfolio formation) for the 10 portfolios, ranked on SUE. Portfolio 1 with the lowest SUE also has the lowest past return and portfolio 10 with the highest SUE also has the highest past return. The two measures of a company are thus, as expected, highly correlated.

Table 7. Mean SUE and mean RET-6 for decile portfolios ranked on SUE

Portfolio	Mean SUE		Mean RET-6	
(SHORT) 1	-3.562	(-28.04)	0.028	(1.89)
2	-1.213	(-25.75)	0.063	(4.85)
3	-0.624	(-18.04)	0.075	(4.81)
4	-0.268	(-9.60)	0.069	(4.62)
5	-0.041	(-1.81)	0.058	(4.22)
6	0.189	(9.73)	0.057	(3.93)
7	0.423	(22.42)	0.057	(3.82)
8	0.739	(35.83)	0.067	(4.13)
9	1.308	(42.49)	0.081	(5.32)
(LONG) 10	4.515	(20.30)	0.109	(6.32)

This table reports descriptive statistics for 10 portfolios formed on SUE (t-values in parentheses). Portfolios are formed at the first day of the quarter preeceding the quarter when the SUE is announced.
SUE is measured as [Reported Earnings - Expected Earnings]/std of Expected Earnings.
Expected Earnings are measured through a firm-specific time-series model of seasonal differences with a rolling window of 9 observations.
RET-6 is measured as the sum of the 6 monthly return preeceding portfolio formation.

It is worth noting that both the PEAD and the returns momentum are weak for a holding period of 6 months, but highly significant with a holding period of 12 months. This is not in line with previous research of Bernard and Thomas (1989), Bernard and Thomas (1990) and Chan et al. (1996) which have shown that most of the drift occurs within 6 months of portfolio formation. The results of the present study could be interpreted as if the price adjustment to new information is slower in the Swedish stock market than in other markets.

7 Conclusions

This paper is the first comprehensive study of the post-earnings announcement drift in the Swedish stock market. With a sample of firms listed during the period of 1990 to 2005, I show that there is indeed a drift in returns subsequent to the announcement of quarterly earnings. Good earnings news (high SUE) are followed by a drift upwards and bad news (low SUE) are followed by a drift downwards. Using this return pattern in a trading strategy, taking a long position in stocks with good news and a short position in stocks with bad news, it is possible to earn a return of almost 11% over the 12 months following portfolio formation.

I also show that the return gained on the trading strategy is robust in both the CAPM and the 3-factor models. The long and short positions have practically the same exposure to risk as measured by the CAPM-model, so that the hedge position is not exposed to risk in that sense. Further, the additional risk factors suggested by Fama and French (1993) cannot explain the returns to the hedge portfolios.

The results also show that it is small stocks that generate the drift in the extreme portfolios. Since size can be considered a rough proxy for information uncertainty this result indicates support for the arguments put forward in Francis et al. (2007).

The finding of a post-earnings drift was at first somewhat surprising, since previous studies have not been able to find a Jagadeesh and Titman (1993) returns momentum effect in the Swedish market and the two momentum effects have been shown to be interlinked. However, in contrast to previous studies, I do find a returns momentum effect; stocks that perform well in the stock market during a six month period, continue to outperform stocks with low past returns. With a holding period of 12 months the average monthly return to a momentum strategy is over 1%, adjusted for risk factors in a three-factor model.

In line with previous research by Chan et al. (1996) and Chordia and Shivakumar (2006) I find that the two momentum effects are overlapping but not totally the same. If indeed the returns drifts are driven by underreaction, the market reacts to two different (yet overlapping) pieces of information. This is of course in line with what we know about the relation between earnings and returns. Earnings are value-relevant information, but returns can in addition to earnings incorporate other (and more timely) value-relevant information about the performance of a firm.

To conclude, this study provides evidence of both earnings momentum and returns momentum in the Swedish stock market. These results contribute to what we previously knew about momentum in Sweden. Another contribution of this paper is the observation that it seems like the underreaction to past performance is longer in Sweden than in many other markets. In contrast to the findings of many other markets, neither of the returns drifts are significant for a period of 6 months after portfolio formation. However, if the holding period is extended to 12 months they are both significant. The delay of the drift is a sign of slow price adjustment in the Swedish stock market. Why this adjustment might be slower than in other stock markets is a subject for further research.

It is also worth noting that for both momentum effects, the drift is significantly larger for positive news. Almost all of the return to the trading strategies are generated on the long position. This result could be interpreted as a sign of caution by the Swedish market actors, reacting faster to bad news than to good news.

8 Appendices

Appendix 1. Previous research on market efficiency in Sweden

The aim of this paper is to test for the post-earnings announcement drift in the Swedish stock market. This study will thus add to previous knowledge about the efficiency of this market. Forsgårdh and Hertzen (1975) performed a study of market efficiency in the Swedish market during the 1960's and 1970's. They conclude that the Swedish market is efficient with regard to reported earnings and that the prices adjust in a timely manner during this time period. In addition, they find that most of the adjustment to new information happen during the day of the report and that no further price adjustment happen a week after the earnings had been reported. Further, Liljeblom (1989) investigates whether analysts' forecasts published in the journal Veckans Affärer can be used in trading strategies that generate abnormal returns. She cannot reject the hypothesis of an efficient market

In a much later study, Skogsvik (2002) investigates if accounting information is useful in predicting the future book return on owner's equity (ROE) and if the Swedish stock market is efficient with regard to these accounting measures. She observes abnormal returns to trading strategies that are based on the forecasted ROE's, which is a sign of inefficiencies in the market. However, she also find that her findings are sensitive to the time period studied.

In a recent study, Skogsvik and Skogsvik (2005) find evidence that is not consistent with an efficient market. They use an investment strategy based on the Residual Income Valuation model and also consider the expectations on ROE that are already incorporated into prices. Investigating a sample of firms between 1983 and 2003 they find that this strategy earn abnormal returns that are considerably higher than for the type of pr-strategy used by Ou and Penman (1989).

Novak and Hamberg (2005) also present some evidence on market efficiency in the Swedish market. They investigate whether the market-to-book anomaly and the P/E-anomaly exist in the Swedish stock market. Using a sample of Swedish firms from 1980 to 2004 they find that these two anomalies can be used to earn abnormal returns. Consequently they reject the hypothesis that the Swedish market is efficient with respect to this information.

Even though the later studies seem to support the notion that the Swedish stock market is not efficient, it can be concluded that the empirical findings on market efficiency are ambiguous. There is thus a need for more knowledge about the efficiency of the Swedish stock market. The present study is the first study to investigate market efficiency with respect to quarterly earnings information in the Swedish stock market.

Appendix 2. Previous research on PEAD in non-US stock markets

United Kingdom

Hew, Skerratt, Strong and Walker (1996) investigate the post-earnings announcement drift in the UK. They study a limited sample of 206 companies listed on the London Stock Exchange from 1989 to 1992, covering seven half-year earnings announcements. Their results show a drift in returns after the announcements, but it is not statistically significant for larger companies. Hence, they conclude that the drift might be explained by trading costs, trading volumes and the amount of information available to investors before the announcement.

In a more comprehensive study of British data, Liu et al. (2003) find strong evidence of a post-earnings announcement drift in the UK stock market. Mean buy-and-hold returns are reported for equal-weighted decile portfolios for the following holding periods: the previous six months and over the following 3- ,6-, 9- and 12-months. For the hedge portfolio (high minus low) based on a time-series SUE-measure, they report a raw return of 2.9%, 5.2%, 8.2% and 10.8% at 3- ,6-, 9- and 12-months investment horizons. When controlling for Fama-French-factors the return to the hedge portfolio is 0.706% per month (measuring 6 months after portfolio formation).

They further test three alternative earnings surprise measures; based on i) time-series of earnings, ii) market prices and iii) analyst forecasts, and find that the results are robust to all of these measures. The drift is strongest for the price based SUE-measure and when tested together the drift from this measure largely subsumes the drift from the other two SUE-measures. However, the SUEs based on time-series of earnings and analyst forecasts both have marginal predictive power for the drift, which the authors interpret as if each measure captures somewhat different dimensions of earnings news.

Contrary to Hew et al. (1996) Liu et al. (2003) find no evidence that the drift can be explain by size and market microstructure effects. There are no significant differences between the highest and lowest SUE-deciles when it comes to analyst coverage or market values.

The authors also confirm the results from the US market that a disproportionate component of the drift occurs around the subsequent earnings announcement and that SUE at the earnings announcement has predictive power for SUE at the subsequent announcement. This is consistent with investors underestimating the correlation between successive earnings changes. Liu et al. (2003) conclude that the UK market is inefficient in processing earnings information.

Finland

In the Finnish market there is some mixed evidence on the PEAD. Kallunki (1996) finds a drift after the announcement of bad earnings news, but no corresponding drift after the announcement of good earnings news. He explains this pattern with the restrictions in short-selling that was present in the Finnish market during the sample period. Since the investors were note allowed to short sell they could not take advantage of the bad news to the same extent as with the good news.

However, in another study, Booth, Kallunki and Martikainen (1996) find that the drift after the announcement of positive earning surprises (measured as market-adjusted return around the announcement) is actually larger than the one after negative earning surprises. It should be noted however that the drift in this study is only measured over 10 trading days after the announcement of earnings. Booth et al. (1996) also find that the drift is larger for companies that do not smooth their income series and they explain this by higher information processing costs for these companies.

In yet another study of the Finnish stock market, Vieru, Perttunen and Schadewitz (2005) in their working paper confirm the results of Kallunki (1996) that there is only a drift in returns after negative interim earnings news. (Again, the drift is only measured for 10 trading days after the announcement.) Vieru et al. measure SUE by the abnormal returns (market model) during the announcement day. The companies in the portfolio with the highest (lowest) returns are considered to have announced a positive (negative) earnings surprise. The authors find negative returns of 2.8% for the quintile of companies with the least favorable earnings news (all events are lumped together before grouping).

The main purpose of the Vieru et al. (2005) – study is to investigate the association between post-earnings announcement drift and the trading activity of non-institutional investors. They use data from all trades executed on the Helsinki stock exchange during 1996-2000 and classify all traders into five categories based on their trading activity. The results are strongest for the portfolio of firms with the least favorable earnings news. These returns are associated with excess buying (positive net trades) of passive and intermediate active investors and the authors interpret this as a sign that this non-institutional trading intensifies the negative post-earnings announcement drift. For positive earnings news, there are only weak results and for moderate earnings news the authors do not find any association between returns and trading activity class.

The trading database used in Vieru et al. (2005) is also employed in a recent working paper by Booth, Kallunki, Sahlström and Tynnelä (2006). They examine the trading behavior of foreign and domestic investors around interim earnings announcements. They stipulate that foreign institutional investors are more sophisticated in their information processing than domestic institutional investors. The least sophisticated and thus the slowest to react to the information content is the domestic non-institutional investors. They find evidence of such a pattern in their study. Foreign investors are the first to react to announced information and they buy (sell) shares of firms with positive (negative) earnings news (measured as day -1 to day +1 returns minus the return of a value-weighted index). The domestic investors react in the opposite direction and are thus found to have a contrarian strategy. The difference in trading behavior last many days after the announcement day and the authors argue that their results support the notion that the post-earnings announcement drift is the result of heterogeneous investor information processing abilities.

Belgium

van Huffel, Joos and Ooghe (1996) study the post-earnings announcement drift in the Belgian stock market for the years 1990-1993. They measure expected earnings with a naive forecast model, assuming that semi-annual earnings follow a random walk. Expected returns are measured either with a market model (following Sharpe 1964) or through a size-adjusted returns model (following Foster et al. (1984)). They do not find a significant drift for either of the return measures. However, when splitting the sample on size they find size-adjusted returns for large companies subsequent to the announcement that are in line with previous studies on the PEAD. They argue that a plausible explanation for the difference in drift between small and large companies is that the naïve earnings expectations model is more accurate for large firms.

Poland

In his working paper Szyszka (2002) reports some preliminary results on the post-earnings announcement drift in the Warsaw Stock Exchange. He measures earnings surprise following Foster et al. (1984), but finds only a statistically significant drift for the least favorable SUE-group (he divides the whole sample of events into 6 groups). For this group of companies (29 events) the average cumulative market-adjusted returns were -12.5% for the trading days +2 to +60 after the announcement. The beta is equivalent in the top and bottom SUE-groups but he does not control for risk according to Fama and French (1993).

Szyszka does not use a method that mimics an implementable trading strategy. In addition he also mentions that an investor in the Polish stock market cannot take advantage of the results since short selling his prohibited in this market.

Germany

Dische (2002) describes his study as the first out-of-sample test of some behavioral models on how investors react to earning information. His results confirm the model by Barberis, Schleifer and Vishny (1998) who states that investors are conservative and adjust their beliefs slowly to new evidence. This model is based on the theories of Griffin and Tversky (1992) that showed that people focus too much on the strength of information and too little on its statistical weight, relative to a rational Bayesian model. (Too much focus on the recommendation letter and too little focus on the reliability of the author of the letter.)

Dische translates the predictions of the model into that investors should underestimate the importance of a reliable signal, i.e. an earnings forecast revision that has a low dispersion should have a higher drift than an earnings forecast revision with a high dispersion. He finds this in his data.

Using a German sample of firms between 1987 and 2000 he finds a raw return of 10.6% for a holding period of 12 months, from a trading strategy taking long position in the portfolio of firms (quintiles) with the most favorable earnings revision (approx. high SUE) and a short position in the portfolio of firms with the least favorable earnings revision (low SUE). He also finds that the optimal trading strategy is six months and with this holding period the strategy earns an average market-adjusted return of approximately 1% per month.

The strategy that, in addition to the earnings revisions, also forms the portfolios on the dispersion of the earnings revisions, earns an incremental return of 0.96% per month. That is: the drift is even stronger for firms with low dispersion in earnings revisions. Dische argues that a low dispersion indicates lower risk and hence the returns to the strategy could not be explained as a compensation for higher risk.

Spain

Forner et al. (2006) find evidence of a very robust post-earnings announcement drift in the Spanish stock market. They measure SUE in three alternative ways: with a time-series (a random walk and then scale unexpected earnings with book value of equity), with the revision in analyst forecasts (scaled by book value of equity) and by the cumulative market-adjusted return around the announcement day. They do not find a significant drift for the last SUE measure.

Forner et al. (2006). use the calendar-time approach (following Chan et al. (1996)) when evaluating the portfolios. At the beginning of each calendar month they select and rank all stocks that had an earnings surprise in the previous three months (if there were more than one SUE they choose the most recent one). They divide the stocks into three equally-weighted portfolios which are held for 3, 6, 9 and 12 months.

They also use a second approach where they measure the monthly return that an investor would have gained if he/she had several parallel PEAD-portfolios. Each month a new PEAD strategy is implemented and held for 3, 6, 9 or 12 months, so with a holding period of 12 months the investor will have invested in 12 PEAD portfolios at the same time. When investing in a new PEAD portfolio, it replaces the oldest PEAD portfolio which has then been hold for 12 months already. The return during a specific calendar month is the return from the 12 parallel PEAD portfolios. The authors have chosen to replace the return of de-listed stocks by the average return of the remaining stocks in the portfolio (this must give a higher drift than if replace by the market index).

The results show an average cumulative return of 7.3% over a holding period of 12 months for the time-series based SUE- measure. For the earnings forecast revisions they find a smaller drift and an average cumulative return of 3.4%. In addition they find that the two measures have marginal explanatory power when they are controlled for each other (they use a double-rank portfolio construction procedure following Liu et al. (2003)).

The average monthly calendar-time return with a holding period of 3 months is 0.73%

and for a holding period of 12 months it is 0.4%. These results are robust to risk-controls such as described by the CAPM-model and the Fama-French three-factor model. In addition, Forner et al. form control portfolios by size and book-to-market ratio in order to secure that these effects cannot explain the drift in returns. As an extra robustness check, a forth factor is added to the three-factor model. This momentum factor is a control for the price momentum-effect discovered by Jagadeesh and Titman (1993). When SUE is measured by a time-series model, the four-factor model explains the post-earnings announcement drift. However, when testing the momentum and PEAD with a double-criterion portfolio construction procedure, the PEAD controlled for momentum is still significant (for both of the SUE measures). The momentum is also significant when controlled for PEAD, indicating that the two phenomena are related but not exactly the same. A combined strategy using both momentum and PEAD also yields a greater return than that provided by both strategies separately.

As a final robustness check, Forner et al. (2006) test if their results can be explained by conditional risk models. In this way, they allow risks and returns to vary over time depending on the economic cycle (measured as the aggregate book-to-market ration). They find that the PEAD results are robust to these risk controls.

In a separate working paper Forner and Sanabria (2007) deepen the analysis of the PEAD in the Spanish market. The find that the returns from the PEAD strategy reverse two years after the portfolio formation date which they interpret as supporting evidence for the behavioral stories behind the drift, i.e. that the drift is due to an under-reaction and/or over-reaction by the investors. However, when they try to test the behavioral models by Daniel, Hirshleifer and Subrahmanyam (1998) and Hong and Stein (1999) more explicitly they find no support for these models. Daniel et al. (1998) propose that the drift is due to investors' "overconfidence" and that this effect is greater when ambiguity is higher, as for example growth stocks (measured as low book-to-market ratio). Contrary to this proposition, Forner and Sanabria (2007) find in their tests (double-criterion portfolios) that the drift is lower for growth stocks.

According to the Hong and Stein (1999) model, the returns continuation has its origin in a slow diffusion of firm-specific information across investors. Forner and Sanabria (2007) follow the study by Hong et al. (2000) and use size as a proxy for information diffusion speed. According to their story, information from smaller companies disseminates more slowly and should thus be followed by a stronger drift in returns. For the SUE-measure based on time-series they find that the drift is stronger for small firms, but for the SUE-measure based on earnings forecast revisions they find no association between size and the drift. Forner and Sanabria (2007) conclude that they "find scarcely evidence supporting two of the main behavioral finance models…".

Sweden

There are no previous extensive studies of the PEAD in the Swedish stock market. However, in a recent working paper Griffin, Kelly and Nardari (2006) investigate market efficiency in 56 international markets. Amongst other things, they test for the post-earnings announcement drift after annual earnings announcements using data from 1994 to 2005. Earnings surprise is measured as the difference between the actual reported earnings per share and the mean analyst earnings per share forecast from I/B/E/S, and then scaled by the price as of six days prior to the announcement date (which they proxy by the reporting date). The authors divide all SUE (not an implementable strategy) into groups of positive and negative surprises and then report the 60 % of positive and 60% of negative earnings surprises. They then measure the market-adjusted cumulative return over the trading days +2 to +126 after the announcement (approximately 6 months). Looking in figure 4 in their paper it seems like they for the Swedish market only find a significant drift in returns after negative SUE of about 8-9%. But since the results are only reported graphically, it is not possible for me to relate to these results.

Other markets

Hong, Lee and Swaminathan (2003) in their working paper investigate earnings momentum returns in international markets for the years 1987 to 2001. They find evidence of a significant post-earnings announcement drift in Australia, Canada, France, Germany, Hong Kong and the UK, but not in Malaysia, South Korea, Japan, Singapore or Taiwan. They measure earnings surprise as the revision in earnings forecasts during the previous 3 or 6 months (and scale by price) and argue that the advantage of this measure is that they get a more timely measure even in markets where only annual earnings are reported. In addition, using time series models for expected earnings using annual data have little power.

Hong et al. (2003) also document a one-to-one correspondence between earnings momentum and price momentum, which is consistent with the behavioral models of under-reaction. Consistent with Chan et al. (1996) (who studied only the US market) they also find that the returns to a combined strategy of sorting on both past returns and earnings revisions, yields a greater return than just trading on one of the momentum anomalies (price momentum is also stronger than earnings momentum). This further strengthens the notion that both momentum effects represent under-reaction to similar, but not identical, types of information

Hong et al. (2003) also show that the earnings revisions are correlated over time, so that stocks with the most favorable earnings forecast revisions continue to experience more favorable revisions over the next three to six months. This results hold for all of the 11 countries in the sample; also for those with neither earnings momentum nor price momentum. This evidence suggests that the pattern of gradual information-diffusion is observed among analysts in all countries even though return continuation is observed among only some countries.

The authors argue that there must be some institutional factors that can explain why the sluggish analyst response observed in all countries, only lead to momentum in some countries. They hypothesize and test whether the existence of constrained arbitrage can explain momentum returns. If a country has a high level of investor protection it could potentially constrain informational arbitrage. In line with this hypothesis they find that their primary proxy (Corruption Perception Index), which indicates lower investor protection, is higher in countries with no momentum returns.

Appendix 3. Description of the Swedish stock market

In the following section a brief description of the Swedish stock market will follow, together with a some facts about the Swedish economy during the time period studied. For a non-Swedish reader, this might be valuable background reading in order to understand the setting of this project.

The Swedish stock market is the biggest equity market in the Nordic countries and the 5th largest in Europe[38], with a total market cap of approximately 3,000 billion SEK in June 2005 (approximately 410 billion USD[39]). The same year, average daily turnover was 15,160 million SEK (approximately 2,100 million USD), with approximately 35,000 trades per day and 253 trading days per year according to OMX (2005).

Stockholm Stock Exchange uses an electronic open-book limit-order trading system. The electronic trading system, SAX, was introduced in 1989 and fully in place by June 1 1990.

A large proportion of the listed companies in Sweden has a dual-class share system separating voting rights from capital rights[40]. This system has lead to a corporate control that is very concentrated. According to Agnblad, Berglöf, Högfeldt and Svancar (2001) over 80% of the Swedish listed companies have a well-identified owner with more than 25% of the votes. The majority of these controlling owners is a single individual or family. As an example, due to the dual-class system and cross-owning, the Wallenberg foundation which in 1998 owned 1 % of the total market capitalization, had control of 14 listed companies which constituted 42% of the total market value. However, according to Henrekson and Jakobsson (2003) the concentrated ownership in the Swedish market seems to be diminishing and in 2002 the Wallenberg family only had more than 20 % voting power in 7 listed firms.

In June 2005, 20.8 % of the Swedish population owned 15% of the stocks listed in Sweden. However, if indirect ownership through financial institutions is also considered, over 80 % of the Swedish population owns stocks (see Sweden Statistics (2005) and Aktiefrämjandet (2004)). The other ownership groups are according to Sweden Statistics (2005): foreign investors (34.6%), financial companies (28.9%), public sector (8.4%), non-financial companies (8.3%) and non-profit organizations (4.5%).

In this project the time period studied are the years between 1990 and 2005. In the beginning of the 1990's the Swedish economy experienced the deepest crisis since the 1930's, following a bubble in the banking and financial sectors. With a high unemployment and large public sector the public finances deteriorated rapidly and by 1994 the government budget deficit exceeded 15 %. Following the crisis a large number of reforms took place; the large tax reform of 1991, a floating exchange rate in 1992, a restructured economic

[38] According to World Fedederation of Exchanges, (www.world-exchanges.org).

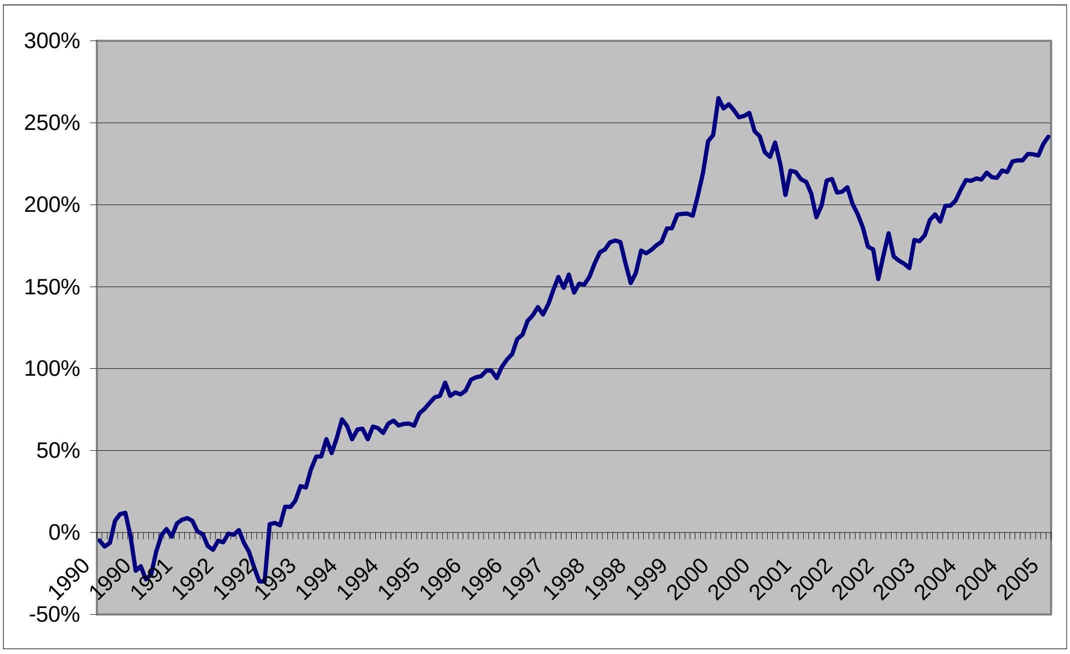
[39] Where amounts in SEK are translated into USD in this text, the exchange rate of September 7, 2006 is used where 1 SEK = 0.14 USD.

[40] The most common voting right differential is one to ten.

policy focusing on low inflation and other measures in order to improve public finances. When Sweden joined the European Union in 1995 the Swedish economy was again in good shape[41]. In a referendum in 2003 the Swedish population voted against joining the European Monetary Union.

By the end of the 1990's there was a new bubble in the economy, this time driven by the overvaluation of IT stocks. The bubble burst in 2001 and led to a downturn in the economy, with high unemployment especially in the IT-sector. Since then, GDP has grown steadily which is also reflected in a rising stock market, as can be seen in Figure 3.

Figure 3: Cumulative return of the Morgan Stanley Sweden Index: 1990-2005



It can also be noted in Figure 3 that there are both upturns and downturns in the market during the time period studied. In this respect this time period ought to be representative of other time periods. However, there are some changes in the market that should be noted. At the Stockholm Stock Exchange both the daily turnover and the number of trades per day has tripled between 1990 and 2005 and foreign ownership has increased from 10% in 1990 to 35% in 2005 (see OMX (2005) and Sweden Statistics (2005)). As with any study covering a long time-period, these institutional changes should be kept in mind when interpreting the results.

[41] see www.sweden.se

Appendix 4. Industry descriptives

The 130 companies come from ten different industries, but the sample is dominated by industrial companies, which makes up almost half of the sample. As can be seen from Table 8 the second largest industry is Basic Materials, with 20 companies. Two industries, Oil&Gas and Telecommunications, only consist of one company each. This should be kept in mind when reading Table 8 which presents some mean accounting and market measures for each industry. Health Care is the most profitable industry with a return on equity (after tax) of 18 %, which seems reasonable considering the effect of conservative accounting on the valuation of their assets. This is also reflected in the relatively high market-to-book for health care companies. Real Estate is the least profitable industry in the sample, which is mainly due to the real estate crises in the beginning of the sample period.

Table 8. Industry Descriptives

Industry (ICB)	Nr Obs.	Nr Comp.	Mean M/B	Mean D/Assets	Mean Assets	Mean ROE
Oil & Gas	47	1	1.65	0.64	152709	0.12
Basic Materials	665	20	2.08	0.57	46130	0.13
Industrials	1849	54	2.08	0.64	22909	0.08
Consumer Goods	402	12	2.03	0.67	15771	0.09
Health Care	212	8	4.13	0.53	54934	0.18
Consumer Services	250	7	3.73	0.66	8705	0.09
Telecommunications	27	1	2.19	0.49	137911	0.08
Utilities	130	4	1.77	0.50	17622	0.11
Real Estate	335	14	1.39	0.64	7448	0.01
Technology	324	9	6.93	0.58	66091	0.10
Total sample	4241	130	2.11	0.63	28388	0.09

This table reports descriptive statistcs per industry, for a sample of 130 Swedish companies listed on the A-list between 1990 and 2005. Industry classification is based on ICB codes. Besides the number of companies and observations, the mean market-to-book (M/B), mean debt-to-assets (D/Assets), mean assets and mean ROE (after tax) are reported for each industry. Market values are measured as the market price of the share at the the end of the reporting period, times the number of shares outstanding as of December 31 each year. Mean ROE(after tax) is measured as Net Income divided by end of period book value of equity.

Appendix 5. Time-series properties of quarterly earnings in sample

Since this study is the first to study quarterly accounting data from Swedish companies it is motivated to study the time-series properties of quarterly earnings somewhat closer. It also alleviates comparisons to the study by Bernard and Thomas (1990).

The mean sample autocorrelations are reported in panel A in Table 9. There is a seasonal pattern in quarterly earnings in the sample. The highest mean autocorrelation (0.152) is between earnings that are four quarters apart (lag 4). When differencing the earnings series the autocorrelation structure changes. In Table 9 panel B the mean autocorrelations in seasonally differenced earnings (differences between quarters that are four quarters apart) are 0.053, 0.061, 0.001 and -0.357 for one to four lags respectively. The first three lags have positive autocorrelations, whereas the forth lag has a negative autocorrelation. This pattern is consistent with results of the time-series behavior of quarterly earnings on US data (see for example Bernard and Thomas (1990) and Rangan and Sloan (1998)). However, it should be noted that the coefficients on the first three lags are lower than the ones estimated in the sample of Bernard and Thomas (1990).

Table 9. Time-series behavior of quarterly earnings, 130 firms, 1990-2005

Panel A. Distribution of firm-specific autocorrelations in quarterly earnings

Lag	1	2	3	4
	n=111	*n=98*	*n=111*	*n=111*
Mean	0.094	0.082	0.036	0.152
25th percentile	-0.107	-0.040	-0.080	0.007
Median	0.065	0.079	0.025	0.125
75th percentile	0.271	0.309	0.191	0.299

Panel B. Distribution of firm-specific autocorrelations in seasonally-differenced quarterly earnings

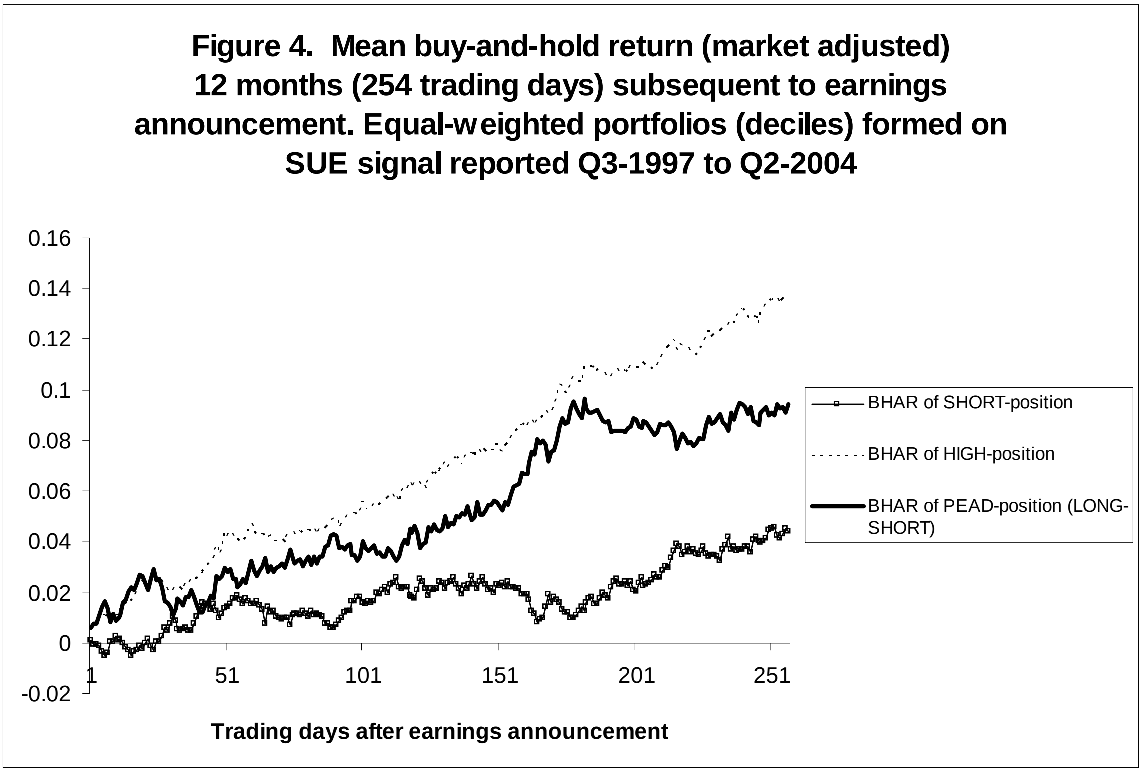
Lag	1	2	3	4
	n=101	*n=90*	*n=100*	*n=101*
Mean	0.053	0.061	0.001	-0.357
25th percentile	-0.131	-0.053	-0.091	-0.504
Median	0.043	0.047	-0.001	-0.381
75th percentile	0.211	0.152	0.135	-0.188

This table reports the time-series behaviour of firm-specific quarterly earnings (panel A) and seasonally differenced quarterly earnings (panel B).
The mean of firm specific autocorrelations have been calculated for lags 1, 2, 3 and 4 respectively.
Quarterly earnings are defined as earnings before extraordinary items.

Bernard and Thomas (1990) use an illustrative example to give an intuitive sense for the implications of these autocorrelations. Using the estimated coefficients of the Swedish sample, consider the following example. A firm reports quarterly earnings in year 0 of 10 MSEK, 10 MSEK, 10 MSEK and 20 MSEK for quarter 1 to 4 respectively. In the first quarter of year 1 the firm reports actual earnings of 11 MSEK, which is an increase of 1 MSEK compared to the first quarter of year 0. The autocorrelation structure in seasonally differenced earnings, tells us something about how persistent this increase in earnings is. If we assume that the mean autocorrelations in panel B is applicable to this firm (and there is no linear trend in earnings), the forecasts for the 3 subsequent quarterly earnings changes will be 0.053 MSEK, 0.061 MSEK and 0.001 MSEK, leading to quarterly earnings forecasts of 10.053 MSEK, 10.061 MSEK and 20.001 MSEK respectively. The forecasted change for the quarter that is four quarters ahead (that is the first quarter of year 2) is -0.357. This leads to a forecasted quarterly earnings for quarter 1 year 2 of 10.643 MSEK, which is the previous years' earnings for the same quarter (11 MSEK) plus the reversion of the previous years' earnings increase (-0.357 MSEK).

	Year 0	Year 1	Year2
Quarter 1	10 MSEK	11 MSEK	10.643 MSEK
Quarter 2	10 MSEK	10.053 MSEK	
Quarter 3	10 MSEK	10.061MSEK	
Quarter 4	20 MSEK	20.001MSEK	

Appendix 6. PEAD strategy implemented in event-time



Appendix 7. Robustness checks

The main results (presented in Table 3) are generated from tests with the following assumptions and key constructs:

- SUE is scaled by the standard deviation of forecasted earnings.
- Portfolio formation is based on deciles.
- Holding of SUE-portfolios is 12 months
- SUE-portfolios are equally weighted.
- The market return is proxied by a value-weighted market index (Morgan Stanley Sweden index).

In this Appendix I test the robustness of my main results, by relaxing each assumption at a time (all other assumptions remain constant). The results of these robustness checks are presented in Appendix 7 a to 7 e. These tables are equivalent to Table 3. In Appendix 7 f I present an overview of all the robustness checks (only the three-factor regression on the hedge return is presented here).

Appendix 7 a. SUE scaled by Market Cap

Table 10. Average Monthly Abnormal Return to Extreme SUE Portfolios (SUE scaled by Market Cap)

Panel A. Portfolios in position LONG (High SUE)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.015				0.000
(t-stat)	*3.74*				
Coefficient	0.013	0.581			0.408
(t-stat)	*3.94*	*15.22*			
Coefficient	0.010	0.778	0.286	0.066	0.488
(t-stat)	*3.47*	*16.99*	*4.09*	*1.22*	

Panel B. Portfolios in position SHORT (Low SUE)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.008				0.000
(t-stat)	*2.01*				
Coefficient	0.005	0.435			0.269
(t-stat)	*1.68*	*11.14*			
Coefficient	0.003	0.611	0.200	0.132	0.361
(t-stat)	*1.05*	*12.98*	*2.78*	*2.42*	

Panel C. Portfolios in position PEAD (LONG-SHORT)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.008				0.000
(t-stat)	*2.09*				
Coefficient	0.007	0.150			0.029
(t-stat)	*1.92*	*3.31*			
Coefficient	0.007	0.167	0.086	-0.067	0.026
(t-stat)	*1.92*	*2.92*	*0.98*	*-1.02*	

This table reports the coefficents from calender-time portfolio return regressions, for the 12 months after portfolio formation, with the monthly portfolio excess returns (monthly portfolio return minus the return of a Swedish Treasury Bill (30days)) as the dependent variable. The results for the positions LONG, SHORT and PEAD (LONG-SHORT) can be found in panel A, B and C respectively. LONG is a long position in the decile with the highest SUE and SHORT is a short position in the decile with the lowest SUE. All positions are taken the first day of the quarter subsequent to the quarter when the earnings are announced. RMRF is the excess market return measured as the Morgan Stanley Sweden index minus the return of Swedish Treasury Bill (30days). SMB is the monthly value-weighted return of a hedge portfolio based on size (MarketCap). Firms are ranked on Market Cap. by June 30 each year and divided into 2 portfolios; portfolio Big and portfolio Small. The SMB factor is the monthly value-weighted return of the Small portfolio minus the monthly return of the Big portfolio. Monthly returns are measured from July 1 and 12 months ahead. HML is the monthly value-weighted return of a hedge portfolio based on book-to.market. Firms are ranked on book-to-market by December 31 each year and divided into 3 portfolios; portfolio Value (high book-to-market), Neutral and Growth (low book-to-market). The HML factor is the monthly value-weighted return of the Value portfolio minus the monthly return of the Growth portfolio. Monthly returns are measured from July 1 (six months after portfolio formation) and 12 months ahead.

Appendix 7 b. Quintiles in portfolio formation

Table 11. Average Monthly Abnormal Return to Extreme SUE Portfolios (quintiles)

Panel A. Portfolios in position LONG (High SUE)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.010				0.000
(t-stat)	*3.05*				
Coefficient	0.008	0.563			0.570
(t-stat)	*3.38*	*21.08*			
Coefficient	0.006	0.671	0.078	0.139	0.628
(t-stat)	*2.84*	*20.91*	*1.59*	*3.74*	

Panel B. Portfolios in position SHORT (Low SUE)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.006				0.000
(t-stat)	*1.95*				
Coefficient	0.004	0.450			0.474
(t-stat)	*1.64*	*17.41*			
Coefficient	0.002	0.579	0.180	0.051	0.543
(t-stat)	*1.02*	*18.61*	*3.79*	*1.43*	

Panel C. Portfolios in position PEAD (LONG-SHORT)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.005				0.000
(t-stat)	*1.81*				
Coefficient	0.004	0.113			0.039
(t-stat)	*1.62*	*3.84*			
Coefficient	0.004	0.092	-0.102	0.087	0.045
(t-stat)	*1.56*	*2.42*	*-1.75*	*1.98*	

This table reports the coefficents from calender-time portfolio return regressions, for the 12 months after portfolio formation, with the monthly portfolio excess returns (monthly portfolio return minus the return of a Swedish Treasury Bill (30days)) as the dependent variable. The results for the positions LONG, SHORT and PEAD (LONG-SHORT) can be found in panel A, B and C respectively. LONG is a long position in the quintile with the highest SUE and SHORT is a short position in the quintile with the lowest SUE. All positions are taken the first day of the quarter subsequent to the quarter when the earnings are announced. RMRF is the excess market return measured as the Morgan Stanley Sweden index minus the return of Swedish Treasury Bill (30days). SMB is the monthly value-weighted return of a hedge portfolio based on size (MarketCap). Firms are ranked on Market Cap. by June 30 each year and divided into 2 portfolios; portfolio Big and portfolio Small. The SMB factor is the monthly value-weighted return of the Small portfolio minus the monthly return of the Big portfolio. Monthly returns are measured from July 1 and 12 months ahead. HML is the monthly value-weighted return of a hedge portfolio based on book-to.market. Firms are ranked on book-to-market by December 31 each year and divided into 3 portfolios; portfolio Value (high book-to-market), Neutral and Growth (low book-to-market). The HML factor is the monthly value-weighted return of the Value portfolio minus the monthly return of the Growth portfolio. Monthly returns are measured from July 1 (six months after portfolio formation) and 12 months ahead.

Appendix 7 c. 6-months return in returns regressions

Table 12. Average Monthly Abnormal Return to Extreme SUE Portfolios (holdingperiod is 6 months)

Panel A. Portfolios in position LONG (High SUE)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.011				0.000
(t-stat)	*2.23*				
Coefficient	0.008	0.540			0.473
(t-stat)	*2.26*	*12.29*			
Coefficient	0.006	0.694	0.145	0.155	0.565
(t-stat)	*1.93*	*13.38*	*1.82*	*2.60*	

Panel B. Portfolios in position SHORT (Low SUE)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.002				0.000
(t-stat)	*0.43*				
Coefficient	-0.001	0.530			0.425
(t-stat)	*-0.15*	*11.16*			
Coefficient	-0.002	0.617	0.091	0.074	0.445
(t-stat)	*-0.40*	*10.16*	*0.98*	*1.07*	

Panel C. Portfolios in position PEAD (LONG-SHORT)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.009				0.000
(t-stat)	*1.84*				
Coefficient	0.009	0.010			-0.006
(t-stat)	*1.82*	*0.16*			
Coefficient	0.008	0.077	0.054	0.081	0.004
(t-stat)	*1.64*	*1.02*	*0.46*	*0.92*	

This table reports the coefficents from calender-time portfolio return regressions, for the 6 months after portfolio formation, with the monthly portfolio excess returns (monthly portfolio return minus the return of a Swedish Treasury Bill (30days)) as the dependent variable. The results for the positions LONG, SHORT and PEAD (LONG-SHORT) can be found in panel A, B and C respectively. LONG is a long position in the decile with the highest SUE and SHORT is a short position in the decile with the lowest SUE. All positions are taken the first day of the quarter subsequent to the quarter when the earnings are announced. RMRF is the excess market return measured as the Morgan Stanley Sweden index minus the return of Swedish Treasury Bill (30days). SMB is the monthly value-weighted return of a hedge portfolio based on size (MarketCap). Firms are ranked on Market Cap. by June 30 each year and divided into 2 portfolios; portfolio Big and portfolio Small. The SMB factor is the monthly value-weighted return of the Small portfolio minus the monthly return of the Big portfolio. Monthly returns are measured from July 1 and 12 months ahead. HML is the monthly value-weighted return of a hedge portfolio based on book-to.market. Firms are ranked on book-to-market by December 31 each year and divided into 3 portfolios; portfolio Value (high book-to-market), Neutral and Growth (low book-to-market). The HML factor is the monthly value-weighted return of the Value portfolio minus the monthly return of the Growth portfolio. Monthly returns are measured from July 1 (six months after portfolio formation) and 12 months ahead.

Appendix 7 d. Value-weighted SUE-portfolios

Table 13. Average Monthly Abnormal Return to Extreme SUE Portfolios (value-weighted)

Panel A. Portfolios in position LONG (High SUE)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.011				0.000
(t-stat)	*2.03*				
Coefficient	0.007	0.782			0.412
(t-stat)	*1.71*	*15.35*			
Coefficient	0.007	0.757	-0.187	0.192	0.420
(t-stat)	*1.59*	*11.59*	*-1.87*	*2.55*	

Panel B. Portfolios in position SHORT (Low SUE)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.003				0.000
(t-stat)	*0.61*				
Coefficient	0.000	0.720			0.381
(t-stat)	*-0.09*	*14.38*			
Coefficient	-0.001	0.720	-0.134	0.168	0.387
(t-stat)	*-0.24*	*11.12*	*-1.36*	*2.25*	

Panel C. Portfolios in position PEAD (LONG-SHORT)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.008				0.000
(t-stat)	*1.23*				
Coefficient	0.008	0.058			-0.001
(t-stat)	*1.18*	*0.74*			
Coefficient	0.008	0.037	-0.052	0.024	-0.007
(t-stat)	*1.19*	*0.37*	*-0.34*	*0.21*	

This table reports the coefficents from calender-time portfolio return regressions, for the 12 months after portfolio formation, with the monthly portfolio excess returns (monthly value-weighted portfolio return minus the return of a Swedish Treasury Bill (30days)) as the dependent variable. The results for the positions LONG, SHORT and PEAD (LONG-SHORT) can be found in panel A, B and C respectively. LONG is a long position in the decile with the highest SUE and SHORT is a short position in the decile with the lowest SUE. All positions are taken the first day of the quarter subsequent to the quarter when the earnings are announced. RMRF is the excess market return measured as the Morgan Stanley Sweden index minus the return of Swedish Treasury Bill (30days). SMB is the monthly value-weighted return of a hedge portfolio based on size (MarketCap). Firms are ranked on Market Cap. by June 30 each year and divided into 2 portfolios; portfolio Big and portfolio Small. The SMB factor is the monthly value-weighted return of the Small portfolio minus the monthly return of the Big portfolio. Monthly returns are measured from July 1 and 12 months ahead. HML is the monthly value-weighted return of a hedge portfolio based on book-to.market. Firms are ranked on book-to-market by December 31 each year and divided into 3 portfolios; portfolio Value (high book-to-market), Neutral and Growth (low book-to-market). The HML factor is the monthly value-weighted return of the Value portfolio minus the monthly return of the Growth portfolio. Monthly returns are measured from July 1 (six months after portfolio formation) and 12 months ahead.

Appendix 7 e. Equal-weighted sample mean return as a measure of market return

Table 14. Average Monthly Abnormal Return to Extreme SUE Portfolios (Market return proxied by sample mean return)

Panel A. Portfolios in position LONG (High SUE)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.011				0.000
(t-stat)	*3.07*				
Coefficient	0.002	1.060			0.618
(t-stat)	*0.85*	*23.31*			
Coefficient	0.002	1.020	-0.095	0.022	0.623
(t-stat)	*1.06*	*20.96*	*-1.93*	*0.52*	

Panel B. Portfolios in position SHORT (Low SUE)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.003				0.000
(t-stat)	*0.65*				
Coefficient	-0.007	1.052			0.560
(t-stat)	*-2.61*	*20.68*			
Coefficient	-0.007	1.050	0.004	-0.045	0.560
(t-stat)	*-2.50*	*19.14*	*0.07*	*-0.94*	

Panel C. Portfolios in position PEAD (LONG-SHORT)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.009				0.000
(t-stat)	*2.39*				
Coefficient	0.009	0.006			-0.003
(t-stat)	*2.34*	*0.08*			
Coefficient	0.009	-0.031	-0.099	0.066	-0.004
(t-stat)	*2.38*	*-0.39*	*-1.23*	*0.97*	

This table reports the coefficents from calender-time portfolio return regressions, for the 12 months after portfolio formation, with the monthly portfolio excess returns (monthly portfolio return minus the return of a Swedish Treasury Bill (30days)) as the dependent variable. The results for the positions LONG, SHORT and PEAD (LONG-SHORT) can be found in panel A, B and C respectively. LONG is a long position in the decile with the highest SUE and SHORT is a short position in the decile with the lowest SUE. All positions are taken the first day of the quarter subsequent to the quarter when the earnings are announced. RMRF is the excess market return measured as the sample mean return minus the return of Swedish Treasury Bill (30days). SMB is the monthly value-weighted return of a hedge portfolio based on size (MarketCap). Firms are ranked on Market Cap. by June 30 each year and divided into 2 portfolios; portfolio Big and portfolio Small. The SMB factor is the monthly value-weighted return of the Small portfolio minus the monthly return of the Big portfolio. Monthly returns are measured from July 1 and 12 months ahead. HML is the monthly value-weighted return of a hedge portfolio based on book-to.market. Firms are ranked on book-to-market by December 31 each year and divided into 3 portfolios; portfolio Value (high book-to-market), Neutral and Growth (low book-to-market). The HML factor is the monthly value-weighted return of the Value portfolio minus the monthly return of the Growth portfolio. Monthly returns are measured from July 1 (six months after portfolio formation) and 12 months ahead.

Appendix 7 f. Overview of robustness checks

Table 15. Average Monthly Abnormal Return to Extreme SUE Portfolios

Panel A. Portfolios in position PEAD (LONG-SHORT)

	Intercept	RMRF	SMB	HML	Adj. R2
Main Results	0.009	0.028	-0.065	0.054	-0.004
(t-stat)	*2.29*	*0.48*	*-0.74*	*0.82*	
SUE scaled by Market Cap	0.007	0.167	0.086	-0.067	0.026
(t-stat)	*1.92*	*2.92*	*0.98*	*-1.02*	
Quintile-portfolios	0.004	0.092	-0.102	0.087	0.045
(t-stat)	*1.56*	*2.42*	*-1.75*	*1.98*	
6 months holdingperiod	0.008	0.077	0.054	0.081	0.004
(t-stat)	*1.64*	*1.02*	*0.46*	*0.92*	
Value-weighted portfolio returns	0.008	0.037	-0.052	0.024	-0.007
(t-stat)	*1.19*	*0.37*	*-0.34*	*0.21*	
Sample mean as Market Return	0.009	-0.031	-0.099	0.066	-0.004
(t-stat)	*2.38*	*-0.39*	*-1.23*	*0.97*	

This table presents an overview of the results of tables 10-14. Only the coefficients of the PEAD position in the 3 factor-model are presented. SMB is the monthly value-weighted return of a hedge portfolio based on size (MarketCap). Firms are ranked on Market Cap. by June 30 each year and divided into 2 portfolios; portfolio Big and portfolio Small. The SMB factor is the monthly value-weighted return of the Small portfolio minus the monthly return of the Big portfolio. Monthly returns are measured from July 1 and 12 months ahead. HML is the monthly value-weighted return of a hedge portfolio based on book-to.market. Firms are ranked on book-to-market by December 31 each year and divided into 3 portfolios; portfolio Value (high book-to-market), Neutral and Growth (low book-to-market). The HML factor is the monthly value-weighted return of the Value portfolio minus the monthly return of the Growth portfolio. Monthly returns are measured from July 1 (six months after portfolio formation) and 12 months ahead. The first line presents the main results which are based on equal-weighted decile PEAD-portfolios ranked on SUE scaled by std of expected earnings. Positions are held for 12 months and the market returns is proxied by the Morgan Stanley Sweden index. In the following lines results are reported where these assumptions are tested one at a time.

Appendix 8: Calender-time regressions following Chan et al. (1996)

Table 15. Average Monthly Abnormal Return to Extreme SUE Portfolios

Panel A. Portfolios in position LONG (High SUE)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.011				0.000
(t-stat)	*1.84*				
Coefficient	0.008	0.598			0.669
(t-stat)	*2.13*	*13.68*			
Coefficient	0.006	0.701	0.085	0.125	0.721
(t-stat)	*1.88*	*13.61*	*1.08*	*2.10*	

Panel B. Portfolios in position SHORT (Low SUE)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.004				0.000
(t-stat)	*0.60*				
Coefficient	0.000	0.540			0.582
(t-stat)	*0.05*	*11.36*			
Coefficient	-0.001	0.654	0.128	0.089	0.632
(t-stat)	*-0.32*	*11.39*	*1.46*	*1.34*	

Panel C. Portfolios in position PEAD (LONG-SHORT)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.008				0.000
(t-stat)	*2.10*				
Coefficient	0.007	0.057			0.006
(t-stat)	*2.00*	*1.26*			
Coefficient	0.007	0.048	-0.043	0.037	-0.013
(t-stat)	*1.96*	*0.81*	*-0.48*	*0.54*	

This table reports the coefficents from calender-time portfolio return regressions, for the 12 months after portfolio formation, with the monthly portfolio excess returns (monthly portfolio return minus the return of a Swedish Treasury Bill (30days)) as the dependent variable. The results for the positions LONG, SHORT and PEAD (LONG-SHORT) can be found in panel A, B and C respectively. LONG is a long position in the decile with the highest SUE and SHORT is a short position in the decile with the lowest SUE. All positions are taken the first day of the quarter subsequent to the quarter when the earnings are announced. RMRF is the excess market return measured as the Morgan Stanley Sweden index minus the return of Swedish Treasury Bill (30days). SMB is the monthly value-weighted return of a hedge portfolio based on size (MarketCap). Firms are ranked on Market Cap. by June 30 each year and divided into 2 portfolios; portfolio Big and portfolio Small. The SMB factor is the monthly value-weighted return of the Small portfolio minus the monthly return of the Big portfolio. Monthly returns are measured from July 1 and 12 months ahead. HML is the monthly value-weighted return of a hedge portfolio based on book-to.market. Firms are ranked on book-to-market by December 31 each year and divided into 3 portfolios; portfolio Value (high book-to-market), Neutral and Growth (low book-to-market). The HML factor is the monthly value-weighted return of the Value portfolio minus the monthly return of the Growth portfolio. Monthly returns are measured from July 1 (six months after portfolio formation) and 12 months ahead.

Appendix 9. Results of returns momentum strategy - 6 months holding period

Table 16. Average Monthly Abnormal Return to Extreme Momentum Portfolios

Panel A. Portfolios in position LONG (High RET-6)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.020				0.000
(t-stat)	*2.68*				
Coefficient	0.017	0.427			0.234
(t-stat)	*2.63*	*5.39*			
Coefficient	0.016	0.535	0.153	0.044	0.246
(t-stat)	*2.46*	*5.29*	*0.98*	*0.38*	

Panel B. Portfolios in position SHORT (Low RET-6)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.008				0.000
(t-stat)	*0.85*				
Coefficient	0.003	0.878			0.557
(t-stat)	*0.44*	*10.80*			
Coefficient	0.001	0.979	0.060	0.150	0.573
(t-stat)	*0.22*	*9.56*	*0.38*	*1.30*	

Panel C. Portfolios in position PEAD (LONG-SHORT)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.011				0.000
(t-stat)	*1.16*				
Coefficient	0.014	-0.451			0.147
(t-stat)	*1.57*	*-4.10*			
Coefficient	0.014	-0.445	0.093	-0.110	0.132
(t-stat)	*1.58*	*-3.12*	*0.42*	*-0.67*	

This table reports the coefficents from calender-time portfolio return regressions, for the 6 months after portfolio formation, with the monthly portfolio excess returns (monthly portfolio return minus the return of a Swedish Treasury Bill (30days)) as the dependent variable. The results for the positions LONG, SHORT and PEAD (LONG-SHORT) can be found in panel A, B and C respectively. LONG is a long position in the decile with the highest RET-6 and SHORT is a short position in the decile with the lowest RET-6. All positions are taken the first day of the month subsequent to the six months when the past returns are evaluated. RET-6 is the measure of past returns and is calculated as the sum of 6 monthly returns prior to portfolio formation.
RMRF is the excess market return measured as the Morgan Stanley Sweden index minus the return of Swedish Treasury Bill (30days). SMB is the monthly value-weighted return of a hedge portfolio based on size (MarketCap). Firms are ranked on Market Cap. by June 30 each year and divided into 2 portfolios; portfolio Big and portfolio Small. The SMB factor is the monthly value-weighted return of the Small portfolio minus the monthly return of the Big portfolio. Monthly returns are measured from July 1 and 12 months ahead. HML is the monthly value-weighted return of a hedge portfolio based on book-to.market. Firms are ranked on book-to-market by December 31 each year and divided into 3 portfolios; portfolio Value (high book-to-market), Neutral and Growth (low book-to-market). The HML factor is the monthly value-weighted return of the Value portfolio minus the monthly return of the Growth portfolio. Monthly returns are measured from July 1 (six months after portfolio formation) and 12 months ahead.

Appendix 10. Results of returns momentum strategy - 12 months holding period

Table 17. Average Monthly Abnormal Return to Extreme Momentum Portfolios

Panel A. Portfolios in position LONG (High RET-6)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.015				0.000
(t-stat)	*2.66*				
Coefficient	0.012	0.460			0.485
(t-stat)	*2.98*	*9.36*			
Coefficient	0.011	0.556	0.151	0.020	0.512
(t-stat)	*2.79*	*9.05*	*1.60*	*0.27*	

Panel B. Portfolios in position SHORT (Low RET-6)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.005				0.000
(t-stat)	*0.54*				
Coefficient	0.000	0.835			0.602
(t-stat)	*-0.07*	*11.84*			
Coefficient	-0.002	0.953	0.083	0.162	0.632
(t-stat)	*-0.38*	*10.93*	*0.62*	*1.60*	

Panel C. Portfolios in position PEAD (LONG-SHORT)

	Intercept	RMRF	SMB	HML	Adj. R2
Coefficient	0.010				0.000
(t-stat)	*1.45*				
Coefficient	0.012	-0.375			0.207
(t-stat)	*2.02*	*-5.00*			
Coefficient	0.013	-0.397	0.068	-0.142	0.208
(t-stat)	*2.12*	*-4.12*	*0.46*	*-1.27*	

This table reports the coefficents from calender-time portfolio return regressions, for the 6 months after portfolio formation, with the monthly portfolio excess returns (monthly portfolio return minus the return of a Swedish Treasury Bill (30days)) as the dependent variable. The results for the positions LONG, SHORT and PEAD (LONG-SHORT) can be found in panel A, B and C respectively. LONG is a long position in the decile with the highest RET-6 and SHORT is a short position in the decile with the lowest RET-6. All positions are taken the first day of the month subsequent to the six months when the past returns are evaluated. RET-6 is the measure of past returns and is calculated as the sum of 6 monthly returns prior to portfolio formation.
RMRF is the excess market return measured as the Morgan Stanley Sweden index minus the return of Swedish Treasury Bill (30days). SMB is the monthly value-weighted return of a hedge portfolio based on size (MarketCap). Firms are ranked on Market Cap. by June 30 each year and divided into 2 portfolios; portfolio Big and portfolio Small. The SMB factor is the monthly value-weighted return of the Small portfolio minus the monthly return of the Big portfolio. Monthly returns are measured from July 1 and 12 months ahead. HML is the monthly value-weighted return of a hedge portfolio based on book-to.market. Firms are ranked on book-to-market by December 31 each year and divided into 3 portfolios; portfolio Value (high book-to-market), Neutral and Growth (low book-to-market). The HML factor is the monthly value-weighted return of the Value portfolio minus the monthly return of the Growth portfolio. Monthly returns are measured from July 1 (six months after portfolio formation) and 12 months ahead.

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