STOCKHOLM SCHOOL OF ECONOMICS
Department of Finance
Master Thesis in Finance
Spring 2011

Does Big Brother Get More Attention?

- A Study on Investor (In)attention and Focus on Well-covered Companies

Felipe Gutierrez[β] Leo Nilsson[α]

Abstract

This thesis examines the attention span of investors by observing the impact of earnings surprises on the abnormal return on the announcement day – as proxy of attention we have chosen to look at the number of analysts following the firms. Two hypotheses constituted the foundation for our study. First, we expected that the amount of analyst coverage that a firm received would affect the investors' response to earnings surprises on the announcement day. The effect would ultimately be conveyed as a negative effect on the magnitude of abnormal returns the more attention the firm received. Second, we expected less-covered firms to be neglected by investors on days when their earnings announcements coincide with the earnings announcements of well-covered firms. The attention diversion of the well-covered firms would then cause an underreaction to earnings surprises of less-covered firms. We focus on the Swedish stock market due to its specific characteristics, with few large companies constituting a vast amount of total market value. Using a data sample from 1994-04-30 to 2011-04-30 we conclude that while there is some support for the first hypothesis, the data suggests that investors in less covered firms are not distracted by the announcements of well-covered firms.

Tutor: Ulf von Lilienfeld-Toal
Location: Stockholm School of Economics
Discussants: Erik Svensson

Key words: Investor Inattention, Earnings Surprise, Abnormal Return, Forecast error, Analyst coverage

1. Introduction

The attention of an investor must be allocated selectively due to limitations imposed by the mind. In order to make conscious decisions a certain focus on particular ideas or information is required. Previous literature suggests that limited attention is likely to affect the actions of investors; more specifically an investor's trouble of processing all available information about stock markets, or choice to ignore some of it, causes underreactions to news and public events, and the implications they could have on stock prices. Hirshleifer (2009) conclude that the immediate response to a firm's earnings surprise is affected by the number of earnings announcements by other firms made on the same date. A greater number of announcements distracted investors from processing all of the information causing underreactions to many of the surprises. A similar type of phenomena has been observed by DellaVigna (2005a), who found that limited investor attention caused an underreaction to earning announcements released on Fridays compared to other days of the week. These studies both refer to what is called the investor distraction hypothesis.

We believe that it would be of value to study the investor distraction hypothesis in the context of a smaller market place, dominated by handful larger firms. OMX Stockholmsbörsen is an example of such a stock market; the top thirty companies constitute a vast amount of the total market value. Naturally, this creates some implications for an investor. Firstly, the total market reacts strongly to the performance of a small amount of firms. Secondly, many investors have part of their portfolios invested in these companies and therefore must pay attention to those companies. Finally, the specific firms also attract more attention from analyst houses and figurate on a regular basis in the media. In this paper we will use the number of analyst coverage different firms receive as a metric of attention. First we examine how the amount of analyst coverage affects investors' reactions to earnings surprises on a firm-individual level and second we explore the effect earnings announcements of well-covered firms, i.e. attention-drawing firms, have on an investor's attention to the earnings announcements of other, less covered, firms releasing their report on the same date. To our knowledge this has not previously been tested.

In later years we have seen an emergence of analyst houses concentrating on small- and mid-cap stocks; however, this paper is based on the idea that there is still a clear discrepancy between the coverage of different firms on Stockholmsbörsen. The research questions are specified below:

- Does the amount of analyst coverage affect the attention a firm receives by investors and does it have implications on how investors perceive and process earnings surprises?

- Do earnings announcements of well-covered firms interfere with investors' processing of earnings news of less covered firms causing investors to underreact to material information?

2. Theoretical framework

2.1 The efficient market hypothesis (EMH)

Fama (1970) defines market efficiency as: “A market in which prices always ‘fully reflect’ all available information is called efficient”. Only new information regarding a specific stock should then affect the price and no investor should be able to beat the average market return consistently. Further criteria to define an efficient market are:

1. No transaction costs in trading stocks
2. All available information is costlessly available to all market participants
3. All agree on the implications of current information for the current price and distribution of future prices of each security

Should these criteria hold true, the current share price would reflect all available information regarding the stock (Fama, 1970). Information about a stock would be immediately incorporated in the price and should not be affected by surrounding information, i.e. all earnings reports should receive sufficient attention for the stock prices to adjust accordingly. What becomes particularly interesting in this paper is the semi strong form of the EMH which defines “all available information” as history of past prices, volumes, short interests, fundamental data of the firm’s product line, quality of management, balance sheet composition, patents held, earnings forecasts and accounting practices. The hypothesis expects all this information to be publicly available and thus incorporated in the current stock price (Fama, 1970). The theoretical implication of firms receiving different amounts of attention and if there would be resulting underreactions in stock prices for the less attention-drawing firms is that an investor would find momentum in these situations by investing in such firms and wait for the stock price to adjust until it reflected the fundamentals. Bear in mind that there is a slight difference to exploiting investor inattention and thinking that the market undervalues the fundamentals of a company. What is interesting about investor distraction is that investors might ignore obvious value-relevant signals, which is one of the reasons we will study earnings surprises.

2.2 Earnings surprises and abnormal return

Several types of news can affect stock prices; however, earnings announcements are one of the more important indicators since it is directly value-relevant and has the advantage of occurring frequently (Hirshleifer (2009)). More specifically earnings surprises (in other words: forecast errors) is the metric of interest since stock prices should already be incorporating the expectations of investors. Deviations from those expectations should materialize as abnormal returns ($AR_{i,t}$) in the stock price. AR is defined as the difference between the actual market return ($R_{i,t}$) and the expected return ($E(R_{i,t})$) for a given stock i at time t. The expected return is what an investor should expect given that no unforeseen event takes place.

$$AR_{i,t} = R_{i,t} - E(R_{i,t})$$

According to the strongest form of EMH, actual return would on average be equal to the expected return, which means that abnormal returns on average would be zero. Furthermore, the consequent abnormal return of an earnings surprise for a specific firm would not be affected by the presence of other earnings reports since all investors would observe all available information.

2.3 Investor distraction hypothesis – previous findings

Previous literature suggests that limited attention affects stock price reactions to a firm's earnings announcements. Bernard and Thomas (1989) found that some investors at least temporarily neglect the information in earnings surprises about future profitability, which was the conclusion of observing a post-earnings announcement drift anomaly. Further research suggests that market reactions to earnings announcements are more quickly incorporated in stock prices in situations where investors are assumed to pay attention to earnings: DellaVigna and Polet (2005a) concluded that investor attention was higher on regular weekdays rather than on Fridays as the weekend approaches and Francis, Pagach and Stephan (1992) suggests the same to hold true during trading hours rather than non-trading hours (also suggested by Bagnoli, Clement, and Watts (2006)). Furthermore, several theoretical models have recently been developed to examine how constraints on processing multiple information signals affect perceptions of security market prices. Of relevance to this paper are findings of a mispricing effect related to publicly available accounting information (Hirshleifer and Teoh (2003)), excessive asset price co-movement as investors choose to ignore some firm-specific aspects (Peng and Xiong (2006)) and faster rate of incorporation of information by large than by small stocks (Peng (2005)). A popular belief is also that some firms manage to exploit distracted investors by the disclosure of bad news coinciding with other firm's salient disclosures (Hirshleifer, Lim, and Teoh (2004). Hirshleifer, Lim, and Teoh (2009) find investor distraction to have two consequences on observed stock prices: greater investor distraction, imposed by the amount of reports released in a single day, implies more severe underreaction to the firm's earnings news, i.e. a weaker immediate reaction to the earnings surprise, and a stronger post-earnings announcement drift. Our study will share the vantage point of Hirshleifer et al (2009) with regards to the interrelation of firms' earnings announcements:

"[The] concept of `extraneous' news does not require that earnings news about other firms be completely irrelevant for the valuation of a given firm. Indeed there is literature that explores whether one firm's earnings announcement conveys information relevant for other firms in the same or different industries. Even if such news is relevant for the given firm, it may be much more relevant for valuing other firms than the given firm's own earnings announcement. Thus, if attention is limited, news announcements about other firms call attention to purposes other than valuing the given firm, thereby reducing the given firm's stock price reaction to its earnings surprise."

This study will also build further on the findings of Hong, Lim and Stein (2000) who provided evidence that momentum strategies proved more profitable with stocks with low analyst coverage (holding size fixed); the study was based on the hypothesis that momentum comes from gradual information flow and there should then be more momentum if the information comes out more slowly. However, what distinguishes our study is the focus on competing signals that distract investors and the focus on very specific events with short-term, but possibly significant, effects.

With regards to examining potential post-announcement drift a specific paper by Fama (1998) calls upon researchers to be cautious. Even though previous papers have found evidence of post announcement-drift (See Hirshleifer and Dellavigna) or long-term return anomalies there are many other papers with diversified findings with regards to abnormal returns related to news announcements about a firm and the subsequent drift in the corresponding return. The paper by Fama summarizes several findings and also gives examples of how "reasonable" alterations to the method of choice can easily affect the results. Different time-windows will give different amounts of noise for instance. He concludes that on average long-term return drift anomalies average out or are insignificant. Such flaws will become evident in our findings and Fama's paper gives a good background of why different studies may provide disperse results.

2.4 Addressing psychological elements of the investor distraction hypothesis

We will provide a limited but descriptive elaboration on what underlies the investor distraction hypothesis and the behavioral elements from which it draws many of its points.

Psychologists have provided a great deal of evidence on the matter of processing multiple information sources and to handle multiple tasks simultaneously. The Stroop task is a famous example of how extraneous events interfere with our minds (Stroop (1935)). Many have been subject to the test of naming the color of a word where the print color does not match the color spelled by the text. This is also referred to as selective attention where the mind focuses on only a portion of stimuli. This is only one example of many others confirming our limited ability to process surrounding information.[1]

In the perspective of finance psychological findings provide the fundamental idea that evaluating the impact of several coinciding earnings announcements might divide the attention of the investor. Regardless of whether this is the case; more generally, an individual investor is restricted by factors such as time and cognitive capacity, which ultimately could affect his or her reactions to market information. Eventhough it can make sense for an investor to focus on specific stocks in the light of limited attention capacity, on an aggregate level one could expect stocks to receive enough attention to observe expected reactions to value-indicative factors such as earnings announcements. This paper sets out with the idea that this is not the case since all investors have limited attention capabilities, and

[1] For further information on the matter we refer to the examples of Hirshleifer et al. (2009)

that there is no way to eliminate the effects of limited attention (see, e.g., Hirshleifer and Teoh (2005)). An interesting thought, however, is that even if investors allocate high attentive resources to a specific stock at a given time this entails withdrawal of cognitive resources from other activities, so we cannot conclude that such an investor will be more successful than others, i.e. that someone focusing on less covered stocks would do better than someone focusing on well-covered stock.

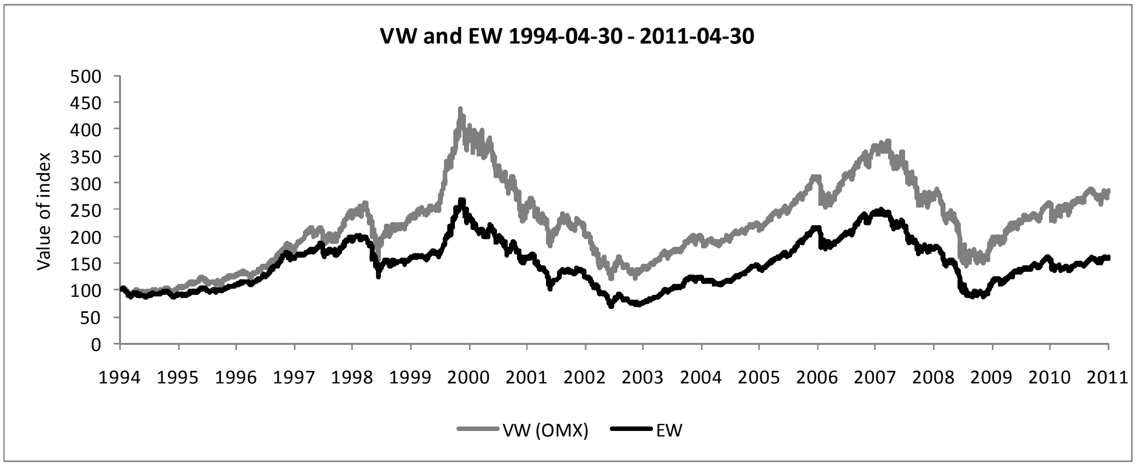
3. Data

The time period for the study is 1994-04-30 to 2011-04-30. The study will focus on earnings announcements as the events of interest and two time windows surrounding those events. First we look at the announcement window to see the direct effect that earnings surprises have on abnormal returns. Then we look at the post-announcement window to examine if there is a significant lag in investor reactions to earnings announcements. The announcement window starts at the day of the announcement and ends at close of the following trading day and the post-announcement window stretches from the second trading day and two months ahead.[2] The cumulative abnormal returns of the announcement window and post-announcement window are defined as the difference between the buy-and-hold return of the announcing firm and the expected return, calculated according to the MacKinely market model.[3]

3.1 Stock returns and benchmark indices

The stock data is retrieved from Thomson Datastream and includes all stocks listed on OMX Stockholmsbörsen at the end of the period. In total this currently include 283 listings but as stated we will focus on stocks in the IBES database which narrows our sample to 249 companies. The data will suffer from a survivorship bias but that should not have any direct implications on the phenomena that we are trying to study, which has a clear focus on specific earnings surprises with different amounts of coverage. To estimate the parameters of the market model we will use one value-weighted index and one equal-weighted index respectively. The OMX Stockholm Index will serve as the value-weighted index. The equally-weighted index could give interesting results since it attributes a higher weight to small-stock returns, which generally tend to be covered by fewer analysts. *Graph 1* below pictures the movement of the two indices with the base at the period start (1994-04-30).

[2] This is described in the methodology section below
[3] See methodology section below



Graph 1. *Value weighted and equally weighted benchmark indices (1994-04-30-2011-04-30)*

3.2 IBES data

We use quarterly earnings announcement data from the IBES database where available. For some companies only yearly announcements are recorded and will be used in those cases. Data before 1994 is considered to disperse and noisy for the intent of the study, also more recent reports may fall outside the sample if it is not possible to calculate the post-announcement drift and the equivalent estimate. Our sample includes the 249 firms that have IBES coverage and over the time period there are a total of 4038 reports of interest. Earnings surprises are measured by the forecast errors (FE_{it}), which are calculated as the difference between announced earnings as reported by IBES (e_{it}) and the IBES consensus earnings forecast defined as the mean of the forecasts from individual analysts (F_{it}). When calculating the consensus forecast, we only include 1- quarter future forecasts and the closest fiscal year forecasts. If there have been multiple forecasts from a single analyst we use the most recent forecast. The use of the most recent forecasts should also eliminate some of the effects that other firms could have on another firm's earnings surprise since analysts could have revised their predictions according to what has previously been reported by other firms. The difference between the announced earnings and the consensus forecast is normalized by the stock price at the date of the announcement (P_{it}), where earnings, forecasts, and stock prices are all split-adjusted. This method of normalization has been used in previous studies to give a comparable measure over the sample (See Hirshleifer (2009), and DellaVigna (2005a))

$$FE_{it} = \frac{e_{it} - F_{it}}{P_{it}}$$

IBES also provides the data to determine the amount of coverage a firm receives, i.e. the number of analysts that provides estimates for each report. We also downloaded the dates of earnings announcements from COMPUSTAT to compare if there were any discrepancies between the two databases. If that was the case we corrected the difference by finding the specific report or we eliminated the observation in case we determined that the information was unavailable.

4. Methodology

4.1 Hypotheses

There are two main hypotheses that will be tested in this thesis.

1. *H_0: The number of analysts covering a firm will have no significant effect on abnormal return related to a firm reporting an earnings surprise.*
2. *H_0: There will be no significant effect on abnormal return for less covered firms reporting an earnings surprise on a day coinciding with the reports of well-covered firms.*

It is important to consider the alternative possibility that the number of distracting well-covered earnings announcements affects the informativeness of the less covered firm's earnings about fundamental value, or whether for reasons other than limited attention the number of distracting events might affect the sensitivity of a firm's abnormal return to its earnings forecast error. However, consider that a less covered firm's earnings were more informative at times when there are few competing earnings announcements from well-covered firms; then, we would expect an immediate and total price response to the firm's earnings announcement to be larger at such times. We cannot find a clear reason why the number of competing well-covered announcements should affect the informativeness of a less covered firm's earnings surprise or the sensitivity of its stock price to its own earnings surprise. Furthermore, the number of well-covered announcements by other firms could provide information about the market. The market factor would be affected by this and probably the return of a less covered firm as well. However, we are not studying if the firm earns positive returns, but are interested in the relation between the firm's abnormal return after adjusting for the market factor and its own earnings surprise.

We should comment on our choice of distraction proxy. The amount of analysts covering a company might not be the ideal proxy. The literature is divided on this issue and after careful consideration we choose that proxy as it is also easily attainable and is carefully documented for each earnings report. It is important to realize that our choice of proxy is closely related to other proxies such as firm size, the larger the company the more analysts tend to follow it. Hence, as will be elaborated on below we have avoided using size as a control variable.

4.2 Event study

This study will apply the MacKinlay methodology (1997) for conducting event studies summarized below in five steps:

1. Define the event of interest and identify the event window
2. Determine the selection criteria for the inclusion of a given firm in the study
3. Decide which model to use to measure abnormal return
4. Define the estimation window
5. Design the test frameworks

While the selection criteria were presented in the data section above, below follows the definitions with regards to our study.

4.2 Event window

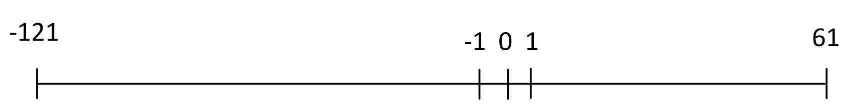
The actual event of interest is the release of a firm's earnings report. We will look at the return of the stock on that specific day to determine the immediate effect of the earnings release. Also, the day after is observed to include reports that are released at the end of a trading day.

To determine if there is a lag-effect in the stock price we also observe the 61 following trading days. The event window should incorporate the full change in stock price that the investor tried to anticipate when trading in the stock. Simultaneously, a longer event window gives noisy data and lessens the relevance of the results obtained. There are several studies on the ideal length of an event window; however we choose the same definition as used by Hirshleifer et al. (2009) based on the findings of Bernard and Thomas (1989), which state that most of the drift occurs during the first 60 trading days after the event window.

4.3 Estimation window

MacKinlay (1997) states that with daily data an estimation window of about 120 trading days prior to the specific event serves as a good approximation and we will use the same amount of days in this study. The estimation window is used to predict the expected return of a stock, given that no significant event takes place, i.e. that we observe no earnings surprise from the firm in question. The estimation window should reflect current performance and not be influenced by older specific events or previous earnings surprises. The specific event date is not included in the estimation window to assure that the market model parameters are not influenced, causing a bias.

Below follows a clarification, including denotations, of the different time periods used.



$T_0 - T_1 = Estimation\ window$

$E = Event\ window\ (date\ of\ transaction)$

$T_2 - \ E = Post - Event\ window$

4.4 Market Model

The expected return for each stock at the earnings announcement is calculated using the MacKinlay market model (1997).

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t}$$

$$E(\varepsilon_{i,t}) = 0 \qquad Var(\varepsilon_{i,t}) = \sigma^2_{\varepsilon_i}$$

$R_{i,t} = Return\ for\ stock\ i\ at\ time\ t$

$\alpha_i = Alpha\ value\ for\ stock\ i$

$\beta_i = Beta\ value\ for\ stock\ i$

$R_{m,t} = \ Market\ return\ at\ time\ t$

$\varepsilon_{i,t} = Error\ term\ for\ stock\ i\ at\ time\ t$

Abnormal return for stock i at time t is calculated using the formula below with $R_{i,t}$ signifying the actual return and $E(R_{i,t})$ the expected return.

$$AR_{i,t} = R_{i,t} - E(R_{i,t})$$

$AR_{i,t} = Abnormal\ return\ for\ stock\ i\ at\ time\ t$

Actual return for stock i at time t is calculated as:

$$R_{i,t} = ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right)$$

$P_{i,t} = Price\ index\ on\ stock\ i\ at\ time\ t$

$P_{i,t-1} = Price\ index\ on\ stock\ i\ at\ time\ t - 1$

The expected return for stock i at time t is calculated as:

$$E(R_{i,t}) = \hat{\alpha}_i + \hat{\beta}_i R_{m,t}$$

$\hat{\alpha}_i = Estimated\ alpha\ value\ for\ stock\ i$

$\hat{\beta}_i = Estimated\ beta\ value\ for\ stock\ i$

The beta value for stock i is estimated under the conditions stated above about the estimation window, using 120 days for the estimation.

$$\hat{\beta}_i = \frac{\sum_{t=T_0+1}^{T_1} (R_{i,t} - \hat{\mu}_i)(R_{m,t} - \hat{\mu}_m)}{\sum_{t=T_0+1}^{T_1} (R_{m,t} - \hat{\mu}_m)^2}$$

Where,

$$\hat{\mu}_i = \frac{1}{L_1} \sum_{t=T_0+1}^{T_1} R_{i,t}$$

$\hat{\mu}_i = Estimated\ return\ for\ stock\ i$

$L_1 = Number\ of\ days\ in\ the\ estimation\ window$

And,

$$\hat{\mu}_m = \frac{1}{L_1} \sum_{t=T_0+1}^{T_1} R_{m,t}$$

$\hat{\mu}_m = Estimated\ market\ return$

The alpha for stock i is also estimated under the conditions stated above about the estimation window.

$$\hat{\alpha}_i = \hat{\mu}_i - \hat{\beta}_i \hat{\mu}_m$$

Abnormal returns are calculated for the 2 day event-window as well as the 61 day post-event window for each of the earnings announcements. Cumulative abnormal return (CAR_i) for each report is calculated as:

$$CAR_i = \sum_{t=T_1+1}^{T_2} AR_{i,t}$$

$$CAR_i = Cumulative\ abnormal\ return\ for\ stock\ i\ during\ event\ window$$

The variance of the abnormal return ($\sigma^2(AR_{i,t})$) consists of two components where the first component is the variance of the error term in the market model ($\sigma^2_{\varepsilon_i}$) and the second component includes variance related to sampling error in α_i and β_i. As the estimation window increases this sampling error diminishes and the second component of the variance formula approaches zero. An estimation window of 120 working days is sufficient and thus we can set $\sigma^2(AR_{i,t})$ equal to $\sigma^2_{\varepsilon_i}$ according to the market model (MacKinlay, 1997).

$$\sigma^2(AR_{i,t}) = \hat{\sigma}^2_{\varepsilon_i} = \frac{1}{L_1 - 2} \sum_{t=T_0+1}^{T_1} (R_{i,t} - \hat{\alpha}_i - \hat{\beta}_i R_{m,t})^2$$

$$\hat{\sigma}^2_{\varepsilon_i} = Estimated\ variance\ of\ the\ error\ term$$

Under the same assumptions the variance of the cumulative abnormal return for stock i ($\sigma^2(CAR_i)$) is calculated using the following formula.

$$\sigma^2(CAR_i) = (T_2 - T_1 + 1)\ \hat{\sigma}^2_{\varepsilon_i}$$

This setup allows for aggregating the cumulative abnormal returns into specific groups of interest and to calculate the average cumulative abnormal return (ACAR), which is necessary for performing the tests and regressions presented below.

4.5 Data sorting and initial tests

To conduct this study we are using several methods to ensure a robust result. Our study will first include a univariate analysis to examine the effect that analyst attention have on different firms and also whether more well-covered firms distract investors from information about other less covered firms. The earnings announcements are first categorized in a two-way independent sort based on the amount of analysts covering a specific report and the magnitude of the earnings surprise. The data is summarized in *Table 1* in the appendix. The earnings surprises are divided into 10 groups with the most positive labeled FE decile 10 and the most negative FE decile 1 – where FE is an abbreviation for forecast error. The data is also divided into four analyst coverage groups which are specified in *Table 2* in the appendix. The group of lowest coverage is labeled AC1 and the highest is AC4 (AC refers to Analyst coverage). About half of the reports in the sample have 1-2 analysts covering them and they will constitute AC1, AC2 includes 3-7 analysts, AC3 and AC4 will almost make up the last quintile of the sample (18%), where AC3 includes reports covered by 8-13 analysts and AC4 includes all reports covered by >13 analysts. For each coverage group we calculate the mean announcement day and post-announcement day cumulative abnormal returns (ACARs) for the most positive (FE decile 10) and the most negative surprise deciles (FE decile 1) and the difference in ACAR between the two extremes. The spread of announcement-day abnormal returns between earnings surprise deciles 10 and 1 (FE decile 10 – FE decile 1) measures the degree of stock price responsiveness to earnings announcements; the spread is an indication of how strongly investors react to earnings news on the announcement date – where a higher spread means stronger reactions. On the other hand, the spread of post-announcement abnormal returns between earnings surprise deciles 10 and 1 measure the degree of underreaction to earnings news that shows up as subsequent drift. A higher positive spread in the post-announcement abnormal return indicates underreaction to earnings news since positive abnormal returns follow good news and negative abnormal returns follow bad news.

A similar analysis will be conducted for the earnings reports of firms within AC1 and AC2 but the data set will instead be tested against the amount of well-covered reports (AC3 and AC4 reports) that are released on the same day. The groups will be labeled AD1 to AD3 (AD refers to Attention diversion) where AD1 means zero reports and AD3 is the 90^{th} percentile of the amount of reports (AD2 is everything in between). This will be tested using only the AC4 reports as well as the total amount of well-covered reports, respectively. See *Table 3* in appendix for a more elaborate description of the categorization and resulting data sample.

To examine the interaction effect of earnings surprises and the amount of analyst coverage, we use an ANOVA procedure to test if the difference in abnormal returns between the top and bottom earnings surprise deciles is significantly different between well-covered firms and other firms. The same procedure is again used to examine if investors neglect firms in the lower coverage groups, i.e. if there are underreactions to earnings surprises, if they release their report on the same day as well-covered firms. This is equivalent to testing the significance of the interaction term a_3 in the following two regressions, using all announcements in the top and bottom of the earnings surprise deciles and top and bottom of the analyst coverage metrics (AC in the first regression and AD in the second).

$$CAR = a_0 + a_1(FE10) + a_2(AC4) + a_3(FE10)(AC4) \quad (1)$$

$$For groups\ AC1 - 2 : CAR = a_0 + a_1(FE10) + a_2(AD3) + a_3(FE10)(AD3) \quad (2)$$

FE10 is an indicator variable equal to 1 for the top decile of earnings surprises, AC4 is an indicator variable that is equal to 1 for the group of highest analyst coverage, and AD3 indicates the highest group of well-covered reports released on the same day. CAR = CAR[0; 1] for the announcement date abnormal returns, and CAR = CAR[2; 61] for the post-announcement cumulative abnormal return. The ANOVA procedure is a way of testing if the difference between two extreme earnings surprise groups is greater in the top groups of AC and AD compared to the bottom groups using all four groups relevant for each regression ($(FE10 - FE1)|_{AC=4} > (FE10 - FE1)|_{AC=1}$, for all firms and $(FE10-FE1)|_{AD=3} > (FE10-FE1)|_{AD=1}$ for the firms within groups AC 1-2).

4.6 The two main regressions

To control further for possible determinants of investor reactions to earnings announcements, we perform a series of multivariate tests with respect to the amount of analyst coverage and the occurrence of distracting reports for less covered firms. We will first run regressions of two-day announcement abnormal return (CAR[0,1]) and 60-day post-announcement abnormal return (CAR[2,61]) on the earnings surprise decile (FE decile), the analyst coverage groups (AC), their interaction term (FE decile*AC), and control variables. We will also do the same regression replacing AC with the raw number of analysts (See regression 3).

For the less covered companies within AC 1-2 we will run the same type of regression replacing AC with the amount of well-covered reports on that day, both using the groups (AD 1-3) and the raw number of reports to examine whether the number of well-covered reports released on a single day can affect the attention of investors. (See regression 4)

$$CAR = a_0 + a_1 FE + a_2 AC + a_3 (FE * AC) + \sum_{i=1}^{n} b_i (FE * X_i) + \sum_{i=1}^{n} c_i X_i \quad (3)$$

$$For\ AC1-2: CAR = a_0 + a_1 FE + a_2 AD + a_3 (FE * AD) + \sum_{i=1}^{n} b_i (FE * X_i) + \sum_{i=1}^{n} c_i X_i \quad (4)$$

The investor distraction hypothesis posits that the abnormal return on announcement is less sensitive and post-announcement return is more sensitive to earnings news. Hence, in both regressions, we expect a_3 to be negative when we use CAR[0,1] as dependent variable and positive when we use CAR[2,61] as dependent variable.

Past literature has used the decile rank of forecast error as opposed to the forecast error itself. Previous findings suggest that this has the advantage of reducing the influence of outliers (Hirshleifer et al. (2009)), and linearizes the relation between abnormal returns and the earnings surprises (see *Graph 2* in appendix). We include control variables for month and year dummies since quarterly reports naturally tend to cluster around specific months, and the interaction terms of the earnings surprise rank with a Friday dummy (FE * X_i). The use of the Friday dummy is motivated by the findings of DellaVigna and Pollet (2005a) that investor reactions to earnings news are weaker when earnings are announced on Fridays. We will also do the regressions with size-category dummies (small-medium-large according to division within the OMX index) mainly to confirm the theory explained above that size and the amount of analysts covering the company are too related to use size as a control variable. The interaction of size with earnings surprise decile rank (FE) is based on findings by Bernard and Thomas (1989).

We re-estimate regression equations 3 and 4 with extreme earnings surprise deciles only by replacing FE decile with FE10 which is an indicator variable that equals 1 for the most positive earnings surprise decile and 0 for the most negative surprise decilce, FE1.

$$CAR = a_0 + a_1 FE10 + a_2 AC + a_3 (FE10 * AC) + \sum_{i=1}^{n} b_i (FE10 * X_i) + \sum_{i=1}^{n} c_i X_i \quad (5)$$

$$AC1-2: CAR = a_0 + a_1 FE10 + a_2 AD + a_3 (FE10 * AD) + \sum_{i=1}^{n} b_i (FE10 * X_i) + \sum_{i=1}^{n} c_i X_i$$

(6)

Findings by Hayn (1995) have shown that stock returns are more sensitive to the size of positive earnings surprises than the size of negative ones. It should then be of interest to run the above regressions (regressions 3 to 6) to examine the effect of attention-competing announcements for positive and negative earnings surprises separately.

4.7 A note on transaction costs

The cost of trading has not been taken into account when calculating the abnormal returns. The transaction costs should have a limited impact on the trading results in this study since we are specifically interested in the more extreme percentiles of earnings surprises. Obviously if one is to form a trading strategy based on the findings of this paper it would be reasonable to take these costs into account, but the scope of this paper is mainly to examine whether there is an underreaction and lag effect at all. Also, transaction costs vary between different financial institutions and it would be misleading to apply a fixed cost for each transaction.

4.8 Stock Returns and Heteroscedasticity

An underlying assumption when conducting the OLS method, which we apply here as described in previous section, of estimating unknown parameters in linear regressions, is that the variance of the error term is constant. The characteristic that the variance of the error term remains equal between each time period is labeled homoscedasticity, and is preferable when performing such estimations. The data is said to show presence of heteroscedasticity should the above not be true. Heteroscedasticity invalidates the standard errors of the estimates and subsequently also the calculated t-test statistics. Stock returns is a typical set of data where heteroscedasticity is present, since the volatility of stock returns tends to depend on past stock returns (Wooldridge, 2008). Hence, we perform the regressions using robust standard errors of the estimates, i.e. adjusting the tests for heteroscedasticity.

5. Empirical findings and analysis

5.1 Descriptive statistics and graphical evidence

The data samples used are summarized below in *Table 4* and *Table 5*. We observe that there is a relative overweight of less covered companies in the more extreme earnings surprise deciles. Studying *Table 5* and illustrated in *Graph 3* we see that for analyst coverage group 1 the more extreme earnings surprise deciles (1-2 and 9-10) include 46.9% of all announcements. The corresponding value for well-covered companies in analyst coverage group 4 is 29.7%. The difference of 17.2% should not be overly surprising since one could assume that increased attention means more scrutiny which in the end would have a contrarian effect on the magnitude of the surprises. This data distribution alone is very much in line with one of the main hypothesis we are examining, namely hypothesis 1 (see methodology section). Conversely, the announcement surprise deciles 4-7 include 44.7% of the announcements within analyst coverage group 4, but only 33.4% of the announcements within the least covered firms (AC 1).

Table 4: Data sample sorted by analyst attention and forecast error decile

	Forecast Error decile (FE decile)										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
Analyst Coverage (AC)											
1	261	230	220	178	179	144	166	174	212	234	**1 998**
2	101	111	122	153	147	159	151	134	121	115	**1 314**
3	30	32	28	39	54	53	47	48	39	34	**404**
4	12	31	34	33	24	48	39	48	33	20	**322**
Total	404	404	404	403	404	404	403	404	405	403	**4 038**

Table 5: Relative amount of reports within each FE decile by coverage group

	Forecast Error decile (FE decile)										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
Analyst Coverage (AC)											
1	13.06	11.51	11.01	8.91	8.96	7.21	8.31	8.71	10.61	11.71	**1998**
2	7.69	8.45	9.28	11.64	11.19	12.10	11.49	10.20	9.21	8.75	**1314**
3	7.43	7.92	6.93	9.65	13.37	13.12	11.63	11.88	9.65	8.42	**404**
4	3.73	9.63	10.56	10.25	7.45	14.91	12.11	14.91	10.25	6.21	**322**
Total	10.00	10.00	10.00	9.98	10.00	10.00	9.98	10.00	10.03	9.98	**4038**

Graph 3: Distribition of forecast errors in AC group 1 and 4

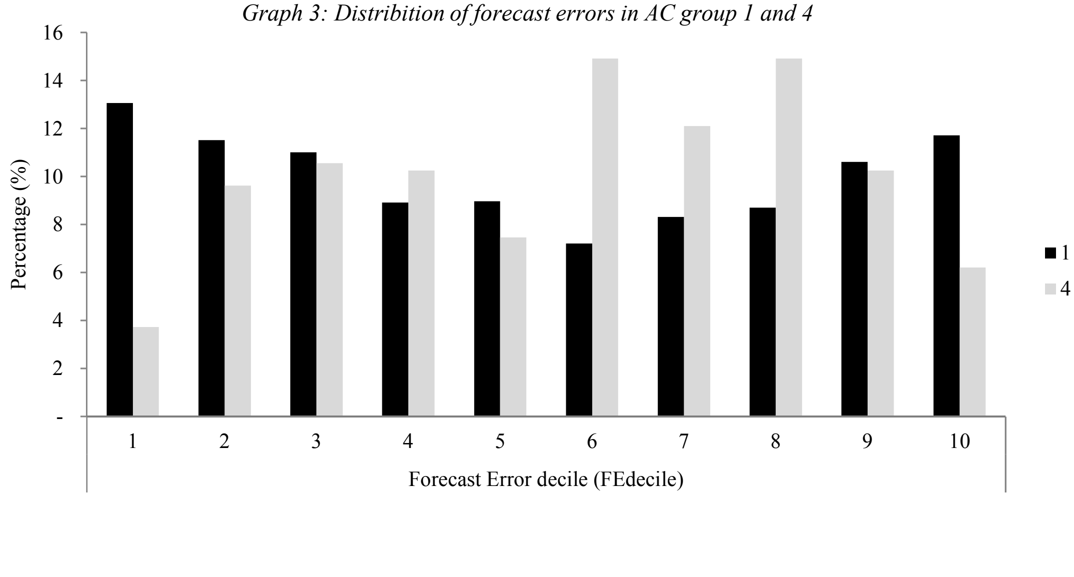


Table 6 illustrates that reactions to earnings announcements on the announcement day are less sensitive when earnings are announced by a well-covered firm (AC = 4) than by firms in the lowest group of analyst coverage (AC = 1). For the group of lowest coverage , the mean spread in 2-day

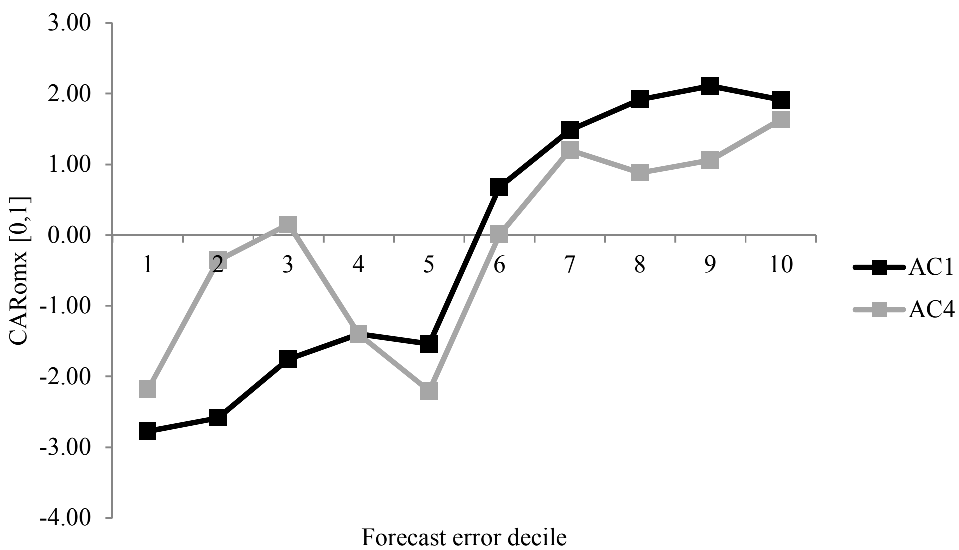
cumulative announcement returns (CAR[0,1]) between good earnings news firms (FE decile 10) and bad earnings news firms (FE decile 1) is 4.68%, whereas for the firms with the highest coverage the mean spread is not significant. This indicates that the price reactions to earnings news are stronger when earnings are announced by less covered firms which is consistent with previous reasoning since one would expect that well-covered firms generally receives more attention from investors and hence earnings announcements might not reveal anything unexpected. One could draw a parallel to the findings of Peng and Xiong (2006), stating that rate of incorporation of information is higher for larger firms; as we have mentioned several times large firms are usually also well-covered firms. This could be interpreted as if well-covered companies would then show more "violent" reactions on days of earnings announcements. However, one should instead consider that there is little information that investors would find surprising since the well-covered firms are under such a large extent of scrutiny. Furthermore, it is not unusual that larger firms issue warnings before a report is released if there are large deviations from previous signals sent to investors by that firm. This obviously is a mean to alter the expectation of investors, avoiding acts of panic and ill-willed speculation for instance. Again this is in line with the above mentioned findings by Hong (2000) with regards to momentum strategies. Extreme earnings news about less covered companies simply has a tendency to surprise investors more than for well-covered companies. The reasoning above is shown in *Graph 4* which provides a clear pattern in line with the reasoning motivating this paper. The average abnormal returns within almost all forecast error deciles is more strongly accentuated for firms with lower coverage than for well-covered firms, i.e. for less covered firms, negative abnormal returns are relatively lower for negative forecast errors compared to well-covered firms and vice versa positive abnormal returns are higher for positive forecast errors. It must be mentioned that the difference in the extreme decile means (FE10-FE1) could not be proved to be significantly different from zero but it could depend on the scarceness of data. AC4 forecast error decile 10 only includes 20 observations and the first decile only includes 12 observations. There is an evident need for further investigations of the data sample and the appropriate tests will be presented in the regression section.

Table 6: Summary of means within analyst coverage group (AC) and spread between extreme forecast error deciles

	CARomx[0,1] - AC 1		**CARomx[0,1] - AC 2**		**CARomx[0,1] - AC 3**		**CARomx[0,1] - AC 4**	
Forecast error deciles	**Mean**	**Obs**	**Mean**	**Obs**	**Mean**	**Obs**	**Mean**	**Obs**
1	-2.77	261	-4.67	101	-2.62	30	-2.18	12
2	-2.58	230	-1.35	111	-0.91	32	-0.36	31
3	-1.75	220	-0.76	122	-1.63	28	0.15	34
4	-1.40	178	-1.17	153	-0.57	39	-1.40	33
5	-1.54	179	-1.72	147	-1.42	54	-2.20	24
6	0.68	144	1.02	159	-0.01	53	0.00	48
7	1.48	166	1.28	151	2.12	47	1.20	39
8	1.92	174	1.78	134	0.81	48	0.88	48
9	2.11	212	1.93	121	1.43	39	1.06	33
10	1.91	234	2.34	115	2.02	34	1.63	20
Total	**0.00**	**1 998**	**-0.04**	**1 314**	**0.02**	**404**	**0.08**	**322**
Spread	4.68**		7.00**		4.64*		3.81	

*Significant on 5% level, **Significant on 1% level

Graph 4: CARomx[0,1] and forecast error decile



Examining the companies in AC1 and AC2 – tabulated in *Table 7* - we are observing a clear difference in the spread of CAR comparing days of intense attention diversion (i.e. several well-covered reports on that day). Surprisingly our findings contradict our hypothesis that the amount of distracting reports released on a specific day will limit the movement s in abnormal returns for less covered firms. The data actually suggests the opposite relationship. With regards to the group AD3 there could be limitations due to the low amount of reports in the sample. 122 reports divided over 10 groups could easily give biased data – a clear indication of this is the negative average CARs for the positive earnings deciles 6-8. However, the pattern is significant between the groups AD1 and AD2 as well. We will address this further after having presented the regressions; nonetheless, this data together with the distribution of forecast errors tabulated in *Table 5* above gives an indication of what to expect. The sample shows that it is highly more likely to observe large forecast errors in less covered firms than in well-covered firms. With that in mind it makes sense to perform a regression which also account for the degree of earnings surprise of the well-covered reports since an unexpected announcement would likely draw more attention than an expected one. This is also one of the reasons why we will also run regressions only using the very extreme forecast error deciles (FE 1 and FE10).

Table 7. Summary of means within attention diversion groups (AD) and spread between extreme deciles

	CARomx[0,1] - AD1		**CARomx[0,1] - AD2**		**CARomx[0,1] - AD3**	
Forecast Error decile	**Mean**	**Obs**	**Mean**	**Obs**	**Mean**	**Obs**
1	-3.04	175	-3.05	166	-7.45	21
2	-2.41	171	-1.87	149	-2.57	21
3	-1.22	198	-1.60	134	-2.18	10
4	-1.54	199	-1.00	145	-1.32	14
5	-1.63	179	-1.40	119	-4.56	8
6	0.86	173	1.02	122	-1.58	8
7	1.88	165	0.95	145	-1.26	7
8	2.29	155	1.77	144	-4.16	9
9	1.96	180	1.94	142	4.59	11
10	1.29	164	2.76	172	2.23	13
Total	**-0.23**	**1 752**	**-0.03**	**1 438**	**-2.18**	**122**
Spread	4.33**		5.81**		9.67*	

*Significant on 5% level, **Significant on 1% level

As outlined in methodology we also performed ANOVA-tests using the extreme deciles. Since none of the coefficients proved significant we have decided to leave comments for the more thorough regression presented further below.

With regards to the post-announcement drift this study has not been able to establish any clear and consistent relationship between earnings surprises and the following two-month return. The results are ambiguous and different results can be achieved through different setups of the regression model, whilst the two-day CAR regression gives similar results regardless of regression model. We will address this further below but won't elaborate too profoundly on the issue for our general analysis since it would inevitably lead to a discussion outside the scope of this study. This was to a degree expected as mentioned above with regards to Fama's (1998) paper summarizing studies on post-event returns. He concluded that the results largely differed depending on method of choice and that in the end the average findings suggested that return reversal and other anomalies in post-event returns in the long-term averaged out to an insignificant net effect.

5.2 Regressions – Abnormal return and analyst coverage

The first series of regressions aims, as explained in the methodology section, at establishing a relationship between the number of analysts covering the company and investor's reactions to earnings surprises. In *Table 8* below we tabulate some of the most relevant regression results but there will be further tests presented in the appendix. The reader should bear in mind that several regressions have been made based on the conclusions of previous papers. We have chosen to present the methods that have returned consistently in previous research.

Regression (1) and (2), in *Table 8*, use the same setup but without and with controls. The table shows the abnormal returns compared to market model prediction based on the development of the OMX index. As expected there is a strongly significant relationship between the magnitude of the forecast error (FE decile) and the cumulative abnormal return on the day of the announcement and the following trading day (CARomx[0,1]). To understand the predictions of the model one must consider the constant and within which forecast error decile to place an announcement. For instance, in regression (1) the prediction line crosses the y-axis at -4.2% (significant at a 1%-level) and then increases with 0.7% for each incremental decile, i.e. only considering the FE decile coefficient and the constant an earnings surprise in the 90thdecile would predict a CAR of: -4.193%+10*0.714% = 2.947%. The real variable of interest in this regression is the interaction of FE decile and AC (the forecast error decile and the analyst coverage group). For the announcement abnormal return (CAR[0,1]) in regression (1), the coefficient of the interaction term (FE decile*AC) is negative (-0.07) and significant at 10% when not including control variables in the regression. Running the same regression but including time period controls and a Friday-interaction dummy gives the coefficient -0.068, which is also significant at 10%. Technically those results means that sensitivity to forecast errors are negatively affected the more coverage a firm has – For firms in AC 4 the sensitivity becomes 0.714 – (0.070*4) = 0.434 and for firms in AC 1 it corresponds to 0.714 – (0.070*1) = 0.644. Eventhough these results are interesting one should not forget that they are only significant at a 10%-level and should hence be accepted with caution. Regression 3 and 4 show the same procedure but use the raw number of analysts instead of the earlier analyst coverage groups. The results give an economic hint of the same result as regression 1 and 2 but are not significant even on a 10%-level.

Table 8: Regression CAR [0,1] on AC, raw number of analysts, interaction terms and controls				
Regression	**(1)**	**(2)**	**(3)**	**(4)**
	CARomx[0,1]	**CARomx[0,1]**	**CARomx[0,1]**	**CARomx[0,1]**
AC	0.448	0.404		
Analysts			0.050	0.042
FEdecile	0.714***	0.702***	0.630***	0.621***
FEdecile*AC	-0.070*	-0.068*		
FEdecile*Analysts			-0.008	-0.007
Controls	No	Yes	No	Yes
Constant	-4.193***	-2.970*	-3.671***	-2.542
#Observations	4038	4038	4038	4038
Adjusted R-squared	6.67%	6.59%	6.63%	6.55%

These regressions were tested with the raw number of analysts and forecast errors as well; however, as already concluded by previous literature (See section 4.5) such data has proved to lead to few conclusions (previous research blames noise and outliers). However, we will present the same regressions run instead on the extreme forecast error deciles (FE 1 and FE 10) and also the same regressions for positive and negative surprises separately. The results are presented below in *Table 9*. The results provide some reassurance from using the full data sample but also contain contradictions. Firstly, no further light is shed on the relationship we are really trying to examine, that of the sensitivity to forecast errors and the number of analysts covering a company. None of the interaction-coefficients are statistically significant (no p-value showed a level below 0.20) and while regression 1,2,5 and 6 at least confirms a relationship between forecast errors and abnormal return the results in regression 3 and 4 show no significant relationship between positive earnings surprises and abnormal returns. This obviously goes against intuition, not to mention the strong relationship found when using the full data sample. The only conclusion we can draw is related to the data sample itself. It is not impossible that the data set of positive earnings surprises contains too much noise to become valuable on a stand-alone basis. This is important to bear in mind when proceeding to the next set of regressions, related to our main hypothesis that the release of a well-covered report should not affect investor attentiveness to the earnings surprises of less covered companies. Also, we must remark that in doing regression 3 and 4 and replacing AC with the raw number of analysts actually gives the expected results with regards to the constant (0.728, significant at 10%) and the coefficient of positive earnings surprises (0.295, significant at 5%). Hence, we observe an example of how methodology can affect the results which is actually one of Fama's (1998) main arguments against the bulk of literature aiming to disprove the efficient market hypothesis.

Table 9: Regression CAR [0,1] on AC and alternative forecast error sortings, with and without controls

Regression	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	CARomx[0,1]	**CARomx[0,1]**	**CARomx[0,1]**	**CARomx[0,1]**	**CARomx[0,1]**	**CARomx[0,1]**
			Positive only		**Negative only**	
AC	-0.314	-0.500	-0.292	-0.323	0.627	0.211
FE10	4.715***	4.292***				
FE10*AC	0.353	0.437				
FEpos			0.244	0.248		
FEpos*AC			0.033	0.046		
FEneg					0.552**	0.551**
FEneg*AC					-0.112	-0.038
Controls	No	Yes	No	Yes	No	Yes
Constant	-2.749***	-1.915	1.161	-1.229	-3.992***	-2.634
#Observations	807	807	2019	2019	2019	2019
Adjusted R-squared	10.25%	9.60%	0.59%	1.33%	0.61%	1.69%

The presented regressions was a necessary stage in this thesis to be able to examine our other main hypothesis, which if disproven would have some interesting implications.

5.3 Regressions – Abnormal return and the presence of well-covered companies

To examine if investors underreact to less covered firms' (firms within analyst coverage group 1 and 2) earnings announcement on days of announcements of well-covered reports we have chosen to only look at the full data sample of less covered firms (as opposed to examining only the extremes or positive and negative surprises separately) – following our findings in section 5.2. *Table 10* tabulates the results from the regressions. Regressions 1-3 are considering all well-covered reports, reports within analyst coverage groups 3 and 4, and regressions 4-6 will only look at the effect of the most extreme coverage group's (AC 4's) effect on investor reactions to earnings announcements of less covered companies. Within each set of regressions we have different independent variables. First we look at the above explained attention diversion variable, classifying the number of well-covered reports released on a single day into three categories (AD 1-3). We then look at the number of well-covered reports released on a specific date but only include the reports within forecast error deciles 1,2, 9 and 10; the decision to implement this regression model is a direct result of the findings in section 5.1. Finally, we use the raw number of well-covered reports announced on given dates. Hypothesis 2, with regards to the expected results, follows the same mechanism as those regressions we observed in section 5.1, meaning that we expect the interaction variables between the forecast error deciles and the amount of distracting information (i.e. the presence of well-covered reports) to be negative since investor attention would be directed at the well-covered firms in such cases. *Table*

10 shows that while the relationship between earnings surprises and abnormal returns remains significant our expectations of investor distraction are not fulfilled in a single case. While FE decile coefficients range from ≈0.50-0.60 (with high significance) and constants are significant ranging from ≈-3-4%, none of the coefficients of the interaction variables in regressions 1-6 are close to significant at an acceptable level. This indicates that our second H_0-hypothesis cannot be discarded. There is not a significant relationship between how investors react to a less covered firm's earnings surprise announcement and the amount of well-covered reports that are released on the same date. That would suggest that investors do not let themselves get to distracted with what everybody else (or at least in terms of amount of analysts) is observing and would be consistent with the efficient market hypothesis with semi-strong efficiency. There are some aspects surrounding the data that are worth considering in light of the results below. There was an obvious difference in distribution of the stronger forecast errors between analyst coverage groups. The data suggests that we seldom observe such earnings forecast deviations in relation to well-covered companies compared to less covered companies. Even studying the extreme deciles (FE 1,2,9 and 10) could not confirm a significant relationship. One could assume simply that investors do pay sufficient attention to extreme earnings surprises, regardless of the characteristics of the company; that would of course be simplifying the issue. We must consider that we have chosen a very specific proxy as measurement for distraction, mainly well-covered companies. The proxy used should be considered highly relevant though and largely coincides with other variables that could be of interest when determining what attracts investor attention, e.g. size is one variable that is highly correlated to the number of analysts covering a company. Simultaneously, there are several other aspects that will affect the attention of investors and we do not expect one factor to be solely responsible for how investors distribute their attention. The literature section 2.3 gives several good examples of situations where investors' attention span is too limited to react fully to the information received. This can also be taken a step further since it is not only about the information investors receive but also about how they actually perceive it. There are tons of factors surrounding a firm, not just the earnings numbers from a specific report. Although earnings are value-relevant it is our expectations on future earnings or future cash flow that truly determine how much we are willing to pay for a company and future earnings are in turn affected by a large amount of factors for which we also hold expectations. Such considerations might fool one to believe that this and previous studies use a simplistic methodology. However, one must consider that the analyst forecast essentially is a proxy for the above-mentioned expectations and as such we assume them to be incorporated in the firm's current price. Also an earnings surprise should have the tendency to signal something about future earnings, which is why one could expect abnormal returns upon such an announcement. On the other hand Sloan (1996) found that investors underreact to some important value drivers within earnings reports, mainly accruals and cash flow components. Sloan found that these are not considered until they are reflected in future earnings reports, which promotes the idea that current earnings will be the factor triggering action from investors and not only the expectations on future announcements.

Table 10: Regression CAR [0,1] on FE's Attention diversion groups, no. well-covered reports and no. of extreme WC-reports

Regression	(1) CARomx[0,1]	(2) CARomx[0,1]	(3) CARomx[0,1]	(4) CARomx[0,1]	(5) CARomx[0,1]	(6) CARomx[0,1]
AD group 3&4	-0.703					
AD group 4				-0.445		
# of extremes 3&4			-0.216			
# of extremes 4						0.005
# of 3&4		-0.232				
# of 4					-0.482	
FEdecile	0.505***	0.580***	0.602***	0.563***	0.598***	0.623***
FEdecile*AD3&4	0.075					
FEdecile*AD4				0.041		
FEdecile*#of extremes 3&4			0.034			
FEdecile*#of extremes 4						-0.017
FEdecile*# of 3&4		0.027				
FEdecile*# of 4					0.038	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-3.028*	-3.790***	-3.895***	-3.493**	-3.925***	-3.991***
#Observations	3312	3312	3312	3312	3312	3312
Adjusted R-squared	7.19%	8.06%	7.98%	7.98%	8.09%	7.95%

5.4 Comment on equal-weight regressions, post-event drift regressions

We have chosen not to tabulate the equal-weight regressions since they tell us nothing that we can't extract from the regressions using a value-weighted index (OMX Stockholm). However, as the regressions in terms of coefficient signs, significance levels and values hardly differ we do find the results to increase the robustness of our findings. If the results would have differed there could have been some implications to our conclusions since the main difference between using the two indices is that an equal-weighted index puts more weight on smaller and generally less covered firms. However, the two indices follow each other quite closely as graphed above in *Graph 1*.

We must certainly try to explain why we could not find a significant relationship between post-announcement drift and the effect analyst coverage has on investors' reaction to forecast errors. Intuition would give an increased drift effect when distracted investors adjust their portfolios for the information they missed with regards to a specific earnings announcement. However, we cannot find a significant relationship between the 60-day post-announcement abnormal return and the interaction term of earnings surprises and analyst coverage group. This was unexpected since previous studies on other markets have been able to establish that relationship. Hirshleifer (2009), presented quite robust results. Then again, we can refer to the literature study and summary compiled by Fama (1998), which finds very different results depending on several factor with regards to choice of market, method etc. With that in mind in the appendix we tabulate the CAR(2,61) in *Table 11* and see some interesting results – there is an indication of abnormal return reversals. The constants of the regressions are positive and the coefficients of the forecast error deciles are negative. Following the results of our regressions on CAR(0,1), which showed the opposite pattern this could be interpreted as a contrarian reaction, meaning that for the lowest forecast error decile there follows a positive abnormal return which then decreases with the decile group where the highest group (FE decile 10) has the most negative impact on CAR(2,61). Note, however that these findings are not strongly significant and should be interpreted with caution.[4] It should not be discarded that these results could very well be a function of our data sample. 60 days following an event will without a doubt be filled with noise and a more thorough data set is the preferable. Hirshleifer used 113 290 observations (earnings announcements) to study post-announcement drift compared to 4 038 in our sample.

5.5 Limitations and Potential Shortcomings

Some limitations were addressed in previous section (5.4), but we will expand on some other issues here. Our data sample could suffer from skewness due to a survivorship bias and it is difficult to foresee how this could have affected our results since it affects the robustness of the calculated expected returns. We try to address this by using equal-weighted returns as well and also maintain that we are looking at very specific events. However, a survivorship bias could be incorporated in the post-announcement estimations.

Furthermore, we have had to eliminate certain companies since the IBES data base does suffer from some limitations with regards to collecting the data for Swedish firms. This becomes especially evident when studying observations from more than 10 years ago; however, we do believe that we have included the most relevant and significant time period, without too disperse data. Since this is an event study it is of high importance that the reported date of the day of the announcement is correct. Even though this is generally the case in our data sample we did find some discrepancies, which were either adjusted or eliminated. We addressed the problem by comparing what information we could retrieve from COMPUTAT to that of IBES but there is still the possibility that some discrepancies prevailed and it is hard to predict what effect that would have on the results. Finally there were some slight elimination of data that had to be made to calculate the cumulative abnormal return since expected returns were calculated with betas and alphas estimated over 120 days from the start of the sample and the post-event CAR needed to include returns 60 days ahead. This should have a minimal impact on our results but should be mentioned.

[4] Again, see Fama (1998)

There is also the possibility that we did not choose the best proxy for measuring attention. While we believe our choice was logical, size could have been a good alternative. The fact is that including size dummies in the above regressions kill much of the explanatory power of the other variables.

6. Conclusion

6.1 Concluding Remarks

This thesis set out to examine two effects related to investors' ability to process public market information. The investor distraction hypothesis suggests that the limited cognitive abilities investors possess hinder them from acting in the manner suggested by the efficient market hypothesis. Investor attention will be diverted by several factors as have been concluded in previous literature. However, we set out to examine a specific type of stock market – with few dominant firms that we expected to attract investor attention at the expense of other firms. Using the amount of analysts covering a company as a proxy for how much attention a firm generally received we studied the dynamics of attention in such a market place.

Studying cumulative abnormal returns on days of earnings announcements we made two general conclusions:

1. Controlling for time-clustering effects and the previously found Friday-effect, we find that the amount of coverage that a firm receives has a negative effect on the magnitude of abnormal returns on the day of the announcement.
2. The data does not support that the reports of well-covered firms would cause investors to be less attentive to earnings surprises of less covered firms on the day of the announcement, i.e. they do not affect abnormal return.

Both of these conclusions are the result of several regressions applying a range of methods to ensure a consistent result. It should be mentioned that the first conclusion holds true only at a 10% significance-level; however, it is in line with previous findings by Hong (2000), which developed a momentum model based on the amount of analysts following specific firms. The first conclusion of this thesis implicitly confirms the findings by Hong. The second conclusion is difficult to compare to previous literature but it goes against the idea presented by Hirshleifer, Lim and Teoh (2004) that a firm could gain from hiding a bad report in the shadow of a salient one. Hirshleifer (2009) found that investors react more slowly on an earnings announcement should there be a large amount of reports being released on the same day. While that might hold true on the U.S. market the Swedish stock market has different characteristics. Our intuition said that investors in general followed firms with much analyst attention more closely – a behavioral trait that we do not consider to be unrealistic. Our data sample did not support this idea.

Regarding post-announcement drift our result differed from the likes of Hirshleifer and DellaVigna; however this was not entirely unexpected considering Fama's literature review on pre- and post-event abnormal returns.

6.2 Suggestions for Further Research

Given the mixed results we obtain with the different regressions there is certainly room for expansion on our conclusions. The study could gain value if it were conducted on other similar market places. The difficulty is finding a market of suitable size. The post-event estimation results should be studied further – the findings were somewhat weak and might be curated by additional data. There is also room for use of other attention proxies to see what impact they could have on results – size would be one interesting factor. Furthermore, there are obviously several factors affecting our attention as investors on a day of an earnings announcement. We would like to call for a juxtaposition of what the literature has concluded so far and then evaluate the different models. If we were able to predict investor inattention and also how they would react in the longer term, several interesting momentum trading strategies could be developed.

Taking a more general approach considering investor distraction it would be interesting to examine the effect of modern technology. Information travels quickly today and markets are not slow to respond; this is already on the verge of going even further with the vast increases in automated trading that has been observed in later years.

7. References

7.1 Research papers

Bagnoli, M., M. B. Clement, and S. G. Watts, 2006, Around-the-Clock Media Coverage and the Timing of Earnings Announcements, McCombs Research Paper Series No. ACC-02-06

Bernard, V. L. and J. K. Thomas, 1989, Post-earnings-announcement drift: Delayed price response or risk premium?, *Journal of Accounting Research, Supplement* 27, 1-48.

Damodaran, A., 1989, The weekend effect in information: A study of earnings and dividend announcements, *Review of Financial Studies* 4, 607-623.

DellaVigna, S. and J. Pollet, 2005a, Investor inattention, firm reaction, and Friday earnings announcements, *Journal of Finance 64*: 709-749.

DellaVigna, S. and J. M. Pollet, 2005b, Attention, demographics, and the stock market, NBER Working Paper No. 11211.

Fama, E.F., 1970, Efficient capital markets: a review of theory and empirical work, *Journal of Finance 25*, 383-417.

Fama, E.F., 1998, Market efficiency, long-term returns and behavioral finance, *Journal of Finance 49*, 283-306.

Francis, J., D. Pagach, and J. Stephan, 1992, The stock market response to earnings announcements released during trading versus nontrading periods, *Journal of Accounting Research* 30, 165-184.

Hirshleifer, D., 2001, Investor psychology and asset pricing, *Journal of Finance* 64, 1533-1597.

Hirshleifer, D., S. S. Lim, and S. H. Teoh, 2004, Disclosure to an audience with limited attention, Fisher College of Business, Ohio State University, working paper.

Hirshleifer, D., J. Myers, L. A. Myers, and S. H. Teoh, 2008, Do Individual Investors Cause Post-Earnings Announcement Drift? Direct Evidence from Personal Trades, The Paul Merage School of Business, University of California, Irvine and Mays Business School, Texas A&M University.

Hirshleifer, D. and S. H. Teoh, 2003, Limited attention, information disclosure, and Financial reporting, *Journal of Accounting & Economics* 36, 337-386.

Hirshleifer, D., S. S. Lim, S. H. Teoh, 2010, Limited investor attention and stock market misreactions to accounting information, The Paul Merage School of Business, University of California, Irvine And DePaul University, Chicago, working paper.

Hirshleifer, D., S. S. Lim, S. H. Teoh, 2009, Driven to Distraction: Extraneous Events and Underreaction to Earnings News, *Journal of Finance 64(5,)*, 2289-2325.

Hong, H., T. Lim, and J. Stein, 2000, Bad news travels slowly: Size, analyst coverage and the profitability of momentum strategies, *Journal of Finance* 55, 265-295.

Hou, K., L. Peng, and W. Xiong, 2009, A tale of two anomalies: The implication of investor attention for price and earnings momentum, working paper.

Skinner, D. J. and R. G. Sloan, 2002, Earnings surprises, growth expectations, and stock returns *or* don't let an earnings torpedo sink your portfolio, *Review of Accounting Studies* 7, 289-312.

Sloan, R., 1996, Do stock prices fully reflect information in accruals and cash flows about future earnings?, *Accounting Review* 71, 289-315.

Stroop, J., 1935, Studies of interference in serial verbal reactions, *Journal of Experimental Psychology* 28, 643-662.

7.2 Literature

Wooldridge, J. M., 2008, “Introductory Econometrics: A Modern Approach”, Fourth International Edition, South-Western College Publishing, Boston.

8. Appendix

Table 1: Summary statistics

	CARomx[0,1] Mean	CAReqw[0,1] Mean	# of obs.
Forecast Error decile (FE decile)			
1	-3.22	-3.15	404
2	-1.94	-1.89	404
3	-1.28	-1.24	404
4	-1.23	-1.12	403
5	-1.63	-1.52	404
6	0.64	0.68	404
7	1.45	1.57	403
8	1.62	1.70	404
9	1.90	1.95	405
10	2.03	2.08	403
Total	**-0.17**	**-0.10**	**4038**

Table 2: Analyst coverage groups overview

	Criteria	# of obs.	% of obs.
Analyst Coverage (AC)	# of analysts covering report		
1	1-2	1 998	49%
2	3-7	1 314	33%
3	8-13	404	10%
4	>13	322	8%
		4 038	**100%**

Table 3: Attention diversion groups overview

	Criteria	# of obs.	% of obs.
Attention diversion (AD)	# of well-covered reports released at same date		
1	no reports	1 752	53%
2	><	1 438	43%
3	top decile	122	4%
AC1-2		**3 312**	**100%**
AC3-4		726	
Total		4 038	

Table 11: Regression CAR [2,61] on AC, raw number of analysts, interaction terms and controls

Regression	**(1)**	**(2)**	**(3)**	**(4)**
	CARomx[2,61]	**CARomx[2,61]**	**CARomx[2,61]**	**CARomx[2,61]**
AC	0.933	0.996		
Analysts			0.112	0.124
FEdecile	-0.598***	-0.581***	-0.660***	-0.657***
FEdecile*AC	-0.037	-0.050		
FEdecile*Analysts			0.000	-0.001
Controls	No	Yes	No	Yes
Constant	1.186	13.467*	2.246**	14.520**
#Observations	4038	4038	4038	4038
Adjusted R-squared	1.20%	6.10%	1.20%	6.11%

Table 12 - 1: Firms included in dataset

A-COM	BERGS TIMBER 'B'	DGC ONE	GEVEKO 'B'	KINNEVIK 'B'
AARHUSKARLSHAMN	BETSSON 'B'	DIAMYD MEDICAL 'B'	GLOBAL HEALTH PARTNERS	KLOVERN
ABB (OME)	BILIA 'A'	DIGITAL VISION	GUNNEBO	KNOW IT
ACANDO 'B'	BILLERUD	DIOS FASTIGHETER	HAKON INVEST	KUNGSLEDEN
ACAP INVEST	BIOGAIA 'B'	DORO	HALDEX	LAGERCRANTZ 'B'
ACTIVE BIOTECH	BIOINVENT INTL.	DUNI	HAVSFRUN INVESTMENT 'B'	LAMMHULTS DESIGN GROUP
ADDNODE 'B'	BIOPHAUSIA 'A'	DUROC 'B'	HEBA 'B'	LATOUR INVESTMENT 'B'
ADDTECH 'B'	BIOTAGE	EAST CAPITAL EXPLORER	HEMTEX	LINDAB INTERNATIONAL
AEROCRINE 'B'	BJORN BORG	ELANDERS 'B'	HENNES & MAURITZ 'B'	LINKMED
AF 'B'	BLACK EARTH FARMING SDB	ELECTRA GRUPPEN	HEXAGON 'B'	LOOMIS 'B'
ALFA LAVAL	BOLIDEN	ELECTROLUX 'B'	HEXPOL 'B'	LUNDBERGFORETAGEN 'B'
ALLIANCE OIL COMPANY SDB	BONG LJUNGDAHL	ELEKTA 'B'	HIQ INTERNATIONAL	LUNDIN MINING SDB
ALLTELE ALLM.SVEN.TELAB	BRINOVA FASTIGHETER	ELEKTRONIKGRUPPEN BK 'B'	HMS NETWORKS	LUNDIN PETROLEUM
ANOTO GROUP	BTS GROUP	ELOS 'B'	HOGANAS 'B'	LUXONEN SDB
ARISE WINDPOWER	BURE EQUITY	ENEA	HOLMEN 'B'	MALMBERGS ELEKTRISKA
ARTIMPLANT	BYGGMAX GROUP	ENIRO	HUFVUDSTADEN 'A'	MEDA 'A'
ASPIRO	CASTELLUM	ENQUEST (OME)	HUSQVARNA 'B'	MEDIVIR 'B'
ASSA ABLOY 'B'	CATENA	EPICEPT CORP. (OME)	INDL.& FINL.SYS.'B'	MEKONOMEN
ASTRAZENECA (OME)	CDON GROUP	ERICSSON 'B'	INDUSTRIVARDEN 'A'	MELKER SCHORLING
ATLAS COPCO 'A'	CELLAVISION	ETRION (OME)	INDUTRADE	METRO INTL.SDB 'A'
ATRIUM LJUNGBERG 'B'	CISION	FABEGE	INTELLECTA 'B'	METRO INTL.SDB 'B'
AUTOLIV SDB	CLAS OHLSON 'B'	FAGERHULT	INTOI	MICRONIC MYDATA
AVANZA BANK HOLDING	COASTAL CONTACTS (OME)	FAST PARTNER	INTRUM JUSTITIA	MIDSONA 'A'
AVEGA GROUP 'B'	CONCORDIA MARITIME 'B'	FASTIGHETS BALDER 'B'	INVESTOR 'B'	MIDWAY HOLDINGS 'B'
AXFOOD	CONNECTA	FEELGOOD SVENSKA	ITAB SHOP CONCEPT 'B'	MILLICOM INTL.CELU.SDB
AXIS	CONSILIUM 'B'	FENIX OUTDOOR	JEEVES INFO.SYSTEMS	MOBYSON
B&B TOOLS 'B'	COREM PROPERTY GROUP	FINGERPRINT CARDS 'B'	JM	MODERN TIMES GP.MTG 'B'
BE GROUP	CTT SYSTEMS	FORMPIPE SOFTWARE	KABE HUSVAGNAR 'B'	MORPHIC TECHNOLOGIES 'B'
BEIJER ALMA 'B'	CYBERCOM GROUP EUROPE	G & L BEIJER	KAPPAHL HOLDING	MQ HOLDING
BEIJER ELECTRONICS	DAGON	GETINGE	KARO BIO	MSC KONSULT 'B'

Table 12 - 2: Firms included in dataset

MULTIQ INTERNATIONAL	PHONERA	SEMCON	UNIFLEX 'B'
NCC 'B'	POOLIA 'B'	SENSYS TRAFFIC	VBG GROUP
NEDERMAN HOLDING	PRECISE BIOMETRICS	SIGMA B	VENUE RETAIL GROUP 'B'
NET ENTERTAINMENT NE 'B'	PREVAS 'B'	SINTERCAST	VITROLIFE
NET INSIGHT 'B'	PRICER 'B'	SKANSKA 'B'	VOLVO 'B'
NEW WAVE GROUP 'B'	PROACT IT GROUP	SKF 'B'	VOSTOK NAFTA INV.SDB
NIBE INDUSTRIER 'B'	PROBI	SKISTAR 'B'	WALLENSTAM 'B'
NISCAYAH GROUP 'B'	PROFFICE 'B'	SOFTRONIC 'B'	WIHLBORGS FASTIGHETER
NOBIA	PROFILGRUPPEN 'B'	SSAB 'A'	XANO INDUSTRI 'B'
NOKIA (OME)	PSI GROUP (OME)	STORA ENSO 'A'	
NOLATO 'B'	RATOS 'B'	STUDSVIK	
NORDEA BANK	RAYSEARCH LABORATORIES	SVEDBERGS 'B'	
NORDIC ACS.BUYOUT FUND	READSOFT 'B'	SVENSKA HANDBKN.'A'	
NORDIC MINES	REDERI AB TNSAT.'B'	SVENSKA HANDBKN.'B'	
NORDIC SER.PTNS.HDG.'B'	REJLERKONCERNEN 'B'	SVOLDER 'B'	
NORDNET 'B'	REZIDOR HOTEL GROUP	SWECO 'B'	
NOTE	RNB RETAIL AND BRANDS	SWEDBANK 'A'	
NOVOTEK 'B'	RORVIK TIMBER	SWEDISH MATCH	
OASMIA PHARMACEUTICAL	ROTTNEROS	SWEDISH ORPHAN BIOVITRUM	
ODD MOLLY INTL.	SAAB 'B'	SWEDOL 'B'	
OEM INTERNATIONAL 'B'	SAGAX	SYSTEMAIR	
OPCON	SAK I	TELE2 'B'	
ORC SOFTWARE	SANDVIK	TELIASONERA	
ORESUND INVESTMENT	SAS	TIETO CORPORATION (OME)	
OREXO	SCA 'B'	TRACTION 'B'	
ORIFLAME COSMETICS SDB	SCANIA 'B'	TRADEDOUBLER	
ORTIVUS 'B'	SEB 'A'	TRANSCOM WWD.SDB.B	
PA RESOURCES 'B'	SECO TOOLS 'B'	TRELLEBORG 'B'	
PARTNERTECH	SECTRA 'B'	TRIGON AGRI	
PEAB 'B'	SECURITAS 'B'	UNIBET GROUP SDB	

Graph 2.Fitted line of CAR[0,1] to FE deciles 1-10