Quarterly Earnings Announcements and Efficiency at the Oslo Stock Exchange

An Event Study

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Abstract

This thesis will study the stock market reaction to quarterly earnings announcements. An event study is conducted to investigate the market efficiency and the information content of quarterly earnings announcements in the Norwegian stock market, specifically the Oslo Stock Exchange. The period investigated is four years, spanning from January 1st, 2013 to 31st of December 2016, and the firms included in this thesis are those listed on the Oslo Stock Exchange Benchmark Index. The deviation of actual earnings per share from forecasted earnings per share is used to group the events into three different groups. The market model is applied to identify abnormal returns in the days and weeks surrounding the quarterly earnings announcements. Five different cases are analyzed, with a different grouping of the events, to be able to observe whether the reactions differ between the groups, and within the full sample. The main finding of this thesis is that the Oslo Stock Exchange seem to be efficient to a large extent, with some deviations from efficiency because significant abnormal returns are found at the announcement day and the day following, for several of the groups. There is information content in the quarterly earnings announcements, and the investors seem to have unrealistic expectations to the announcements. Moreover, there appear to be no large signs of a delayed stock price response to the new valuable information, which is called the post-earnings announcement drift.

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1 Introduction

The question of whether earnings announcements are informative to investors, and how the investors in the stock market react to these announcements, have been the subject of several articles and research papers. In this paper, we provide new evidence to the existing literature of the market reaction to quarterly earnings announcements using companies listed the Oslo Stock Exchange as the sample. The primary goal of this thesis is to study whether the Norwegian stock market reacts to the earnings announcements in an efficient manner consistent with Eugene Fama's semi-strong form efficient market.

An efficient market is defined as a market where all available information is always "fully" reflected in the stock prices (Fama, 1965). If a market is efficient, there would be no possibilities for investors to search for costly information in an attempt to outperform the market. When the market is efficient, any investor would be better off by just holding a portfolio of an approximation of the market. To test the efficient market hypothesis, and whether there is information content in the earnings announcements, it is necessary to explore the opportunities of earning abnormal returns in the days and weeks surrounding the quarterly earnings announcement. If the market is efficient, there should be no statistically significant abnormal returns in relation to the quarterly earnings announcements. Abnormal returns are the difference between the actual return of a stock and the normal return of the stock, and this should be zero if there was no information content and if the market has correctly priced the stock. However, if one finds presence of significant abnormal returns at the day of the announcement or the days following, this indicates that the market shows signs of inefficiency.

In an article from MacKinlay, published in 1997, he reviews and summarizes event study methods, and finish the paper with an event study on quarterly earnings announcement using the Dow Jones Industrial Index as the sample data. He hypothesizes that one would expect the impact of the announcement on the valuation of the market of the firm's equity to depend on the extent of the unexpected element of the announcement if the earnings announcements disclose information to the investors. This is based on the finding by Ball

and Brown (1968), because they found that the market typically reacts in the same direction as the difference between actual and expected earnings. That is, a positive deviation leads to a positive market reaction, and reverse for a negative deviation. Ball and Brown have further investigated this in articles in the years following the paper. Brown and Kennelly (1972) take the grouping of positive and negative deviations a step further and divide the earnings announcement into one of three categories depending on the difference between actual and forecasted earnings per share; bad news, good news and no news.

Several market anomalies have been found to exist in capital markets. The presence of market anomalies occurs because of market inefficiencies. The post-earnings announcement drift is the market anomaly that has been found to have the largest presence in capital markets, and for this reason, it is interesting to check if the anomaly is present in the Norwegian stock market. If a stock market is in general believed to be efficient, then there should be no post-earnings announcement drift following the quarterly earnings announcement. If we observe price anomalies around the earnings announcement, then the hypothesis that market is efficient, as proposed by Fama (1970), does not hold.

There exists a rich amount of literature on the subject of earnings announcements for mature markets, along with some research on emerging markets. Studies providing evidence regarding the stock price reaction to earnings announcements mostly relate to the U.S., and to some extent the UK. In the recent years, there has been conducted several studies regarding the topic of earnings announcements, and the market reaction to these announcements, in China, Spain, Denmark, and Pakistan. Still, there are several reasons why these results might not apply to Norway. First, the Norwegian stock exchange is significantly smaller than several of these exchanges both in size and significance. The market value of the Oslo Stock Exchange is 243.010 million USD, compared to the NYSE having a market value of 19.596.635 million USD (both in 2016 numbers), and accordingly, the number of stocks listed at the OSE is significantly lower. Furthermore, the Oslo Stock Exchange is widely known for its unique position for firms in the seafood, energy and shipping sectors. The

characteristics of the stock exchanges differ, and this might make it hard to compare the OSE to other exchanges, even those smaller than the NYSE.

The research and results in this thesis extend the previous literature within the area of quarterly earnings announcements in some respects. Firstly, there exists little or no literature on the market reaction to quarterly earnings announcements on the Oslo Stock Exchange. Secondly, the sample data is collected from 2013 to 2016, which is a period not covered or previously used for this type of event study on the Norwegian stock market. Our motivation is to analyze and assess the impact of quarterly earnings announcements on small capital markets, as this is not a widely studied subject.

We break down the analysis into five different cases, specifically, we look at the base case which is the full sample only divided into the three different news groups. The next case is a division of the events by the market capitalization of the firm making the announcements, followed by division into the four individual years, a division of the sample data into the four financial quarters, and lastly, we divide the sample into the different industry classifications at the OSE. We have chosen to do these divisions to get a broader perspective on the market reactions in different contexts. Altogether, we are interested in examining the presence of a trend throughout the sample data.

This paper is divided into seven chapters. The first chapter is the introduction, and it is followed by a chapter covering the background and earlier literature on the topic of market efficiency and earnings announcements. Further, chapter 3 deals with the empirical method used in this thesis. Chapter 4 contains a description of the data we use and a specification of the methodology we apply. Next, in chapter 5 we present the empirical results, and chapter 6 follows up the findings with a discussion of them. Finally, chapter 7 concludes this paper.

1.1 Research Question

In this section, we present the main research question and the sub-questions answered in this thesis. The research question leads this thesis, and function as a guideline for the methodology and empirical research. This empirical study will investigate the efficiency of the Norwegian stock market by examining the effect quarterly earnings announcements have on listed stocks, and whether it is possible for investors to earn abnormal returns. The research question needs to be specific, measurable and relevant because the main objective of this thesis is to provide a clear answer to the question proposed. Therefore, the following research question is formulated;

"Does the semi-strong form of the efficient market hypothesis hold when quarterly earnings announcements are released at the Oslo Stock Exchange?"

In addition to the main question, we have defined the following sub-questions;

- Does there exist evidence of information content in the quarterly earnings announcements?
- Is it possible to earn higher abnormal returns in the case of negative earnings announcements compared to positive?
- Are the abnormal returns significantly different for large and small firms?
- Are there differences in AAR for the different financial quarters – i.e. does the 4th have significantly different AAR than the 1st quarter announcements?
- Does the market react differently for the different industries, that is, are there differences in the abnormal returns for the different industries?
- Do stock prices always instantaneously reflect new earnings information, or is the response delayed, possibly creating a drift?
- Do the investors in the market have realistic expectations to the earnings announcements?

1.2 Limitations and Delimitations

This paper aims at investigating whether the Oslo Stock Exchange is semi-strong form efficient. In addition to the constraints we have met when writing the thesis, we should establish some limitations for the research so we can set the right focus in this study, and these limitations are explained in the following sections.

We have chosen the Oslo Stock Exchange Benchmark Index as the sample, and 62 companies are in this index. We do not choose to include all the companies listed at the OSE, due to the time constraint and a large amount of data needed to be processed. Consequently, using such an index might limit the use of the findings in this paper, because firms that are not in the benchmark index could be of different structure, size and behavior.

The period chosen, which is 2013-2016, leads to some missing observations. A firm is only included in the sample if we find the daily stock price, actual quarterly earnings per share and forecasted quarterly earnings per share, for all the four years. This has led to some missing data, as some firms were listed within the years chosen, and data for the full four-year period was not found. In addition, actual EPS or forecasted EPS is missing for some firms. Thus, for some firms, we experience a lack of data published publicly, and therefore, they are not included in the sample.

The market model is applied as the only model for measuring normal performance. This is because the market model is the model that is most widely used in the research papers on quarterly earnings announcements. We could have included, for example, the constant mean return model as a comparison and robustness check of the results of the market model. Nevertheless, we chose not to include this, or any other model, due to the time constraint, and we find few research papers that have applied two models for measuring normal performance.

We have chosen to apply the student's t-test, which is a parametric statistical test, to check for the significance of the findings. Similar research papers on (quarterly) earnings

announcements use the student's t-test as the main test, and in most of the papers, it is the only statistical test. Therefore, we do not include other parametric tests because the student's t-test is sufficient. For a robustness check of the parametric test result, we include one non-parametric test, the sign test. We do not include more than one non-parametric test, as we find almost no use of non-parametric test statistics in similar research papers. 41 days is included in the event window, and this gives us enough days to check for significance and patterns in the days surrounding the quarterly earnings announcement, both in the days leading up to and the days following. By limiting the event window to 20 days after the announcement, we limit the possibility to observe and state whether there is a post-earnings announcement drift. We limit the event window to 41 days. This is sufficient, and since the PEAD is not the focus of this thesis, but only an anomaly we want to check for.

We have limited the methodology to the approach of MacKinlay and his article "*Event Studies in Economics and Finance*" from 1997. However, we will not do any modifications of the null hypothesis or "Analysis of Power" as in MacKinlay's article.

2 Background and Literature Review

In this chapter, a review of the literature most relevant to this thesis is given, and earlier findings of relevance are presented. Specifically, we start with a brief introduction of the current state of the economy in Norway, followed by earlier literature and findings on the information content of earnings announcements. The efficient market hypothesis and its three versions are the basis for this thesis, hence, this thesis will go into depth on the available literature on this topic. Market anomalies and behavioral finance, that is, areas of research that challenge the efficient market hypothesis, is considered and briefly discussed. This chapter ends with a summary of earlier findings on studies of the effects of (quarterly) earnings announcements on stock prices conducted in different countries.

2.1 The State of the Economy

The Oslo Stock Exchange experienced an all-time high return in 2009, after a poor year in 2008 (Aase & Eikrem, 2009). During the years after the financial crisis in 2009, the state of the economy has started to slowly stabilize and rise again. The market experienced a rise in investments in the years from 2011 to 2013, but in 2015 the crude oil prices dropped to a record low level after the financial crisis (DNBMarkets, 2015). The low level has intensified the long-anticipated slowdown in the oil industry, which is a large sector at the Oslo Stock Exchange. DNB Markets announce that *"the low oil price will lead to a drop in mainland investments, more cautious households and also put a damper on growth in parts of the export sector. Currently Norway is in the middle of an economic slump and there are excess resources in the economy"* (DNBMarkets, 2015).

2.2 The Information Content of Earnings Announcements

There has been conducted several studies on the information content of earnings, both related to annual earnings and quarterly earnings. Common for these studies, either annual or quarterly, are they all provide the same conclusion; there is information content in earnings because stock prices react at the time of the announcement (Ball & Brown, 1968) (Beaver, 1968) (Brown & Kennelly, 1972). Beaver (1968) provides a definition of information as "*a change in expectations about the outcome of an event*". Furthermore, Beaver states

that this definition could be extended to include that there must, in addition to a change in expectations, also be a change in the behavior of the decision-maker.

"An impressive body of theory supports the proposition that capital markets are both efficient and unbiased, in that if information is useful in forming capital asset prices, then the market will adjust asset prices to that information quickly, and without leaving any opportunity for further abnormal gain" (Ball & Brown, 1968). Changes in the stock prices will reflect the information flow to the market if, as the evidence implies, stock prices adjust rapidly to new information when it becomes available. Ball and Brown (1968) hypothesize that if stock prices are revised following the issuance of an annual income report, this will provide evidence of useful information reflected in the income numbers.

Ball and Brown (1968) find that the market typically reacts in the same direction as the difference between actual income and expected income, and so, the annual income numbers contain useful information. However, before the release of the annual report, the market foresees most of the information content of the reported income. Furthermore, they find that 12 months before the release of the income report, the drifts downward and upward start, and these drifts continue for approximately one month after the release.

Beaver (1968) investigates to what extent the common stock investors perceive earnings to contain information of value. Specifically, he focuses on earnings announcements and investors reaction to these, reflected in the volume and stock price movements in the weeks around the date of the earnings announcement. "*A firm's earnings report is said to have information content if it leads to a change in investors' assessments of the probability distribution of future returns (or prices), such that there is a change in equilibrium value of the current market price"* (Beaver, 1968). Beaver hypothesizes that the size of the price change ought to be greater in the week of the announcement than through the non-report period if there is information in earnings reports creating a change in the equilibrium value of the present market price.

Beaver (1968) detects that the extent of the price changes in the week of the announcement is significantly larger (67 percent) than normal through the non-report period. The evidence he finds is consistent with earnings reports containing valuable information since the above normal price activity is what would be anticipated if variations in equilibrium prices are more likely to occur when earnings reports are published (Beaver, 1968). Furthermore, Beaver discovers that the price activity is largest in the announcement week, and the second largest values appear in the weeks immediately following the announcement week. In addition, the changes in the prices are above average in the week directly prior to the announcement. In the weeks following the announcement, prices were not reversed, and this indicates that the changes were permanent in nature. Therefore, his conclusion is that there is information content in earnings reports as the price movements when earnings reports are released are higher than normal.

Brown and Kennelly (1972) conducted a study on the informational content of quarterly earnings, where they compare forecasted quarterly earnings per share to actual earnings per share. They divide the events into one of three categories depending on the difference between actual and forecasted EPS; good news, no news or bad news. Their main finding is that the quarterly EPS reports contain information useful to foresee the aggregated abnormal rates of return on the stocks the EPS numbers relate to. In addition, "*the market is limited in its anticipation of the contents of a quarterly report except possibly during the announcement month itself"* (Brown & Kennelly, 1972)

The predictive ability of the series of earnings per share is improved by at least 30-40% when disaggregating the annual EPS into quarterly components. Brown and Kennelly (1972) find results like those of Ball and Brown (1968), which is that the stocks have incorporated most of the information content of the reported annual EPS, well in advance of the date of the announcement.

2.3 The Efficient Market Hypothesis

Eugene Fama (1970) define an efficient market as "*a market in which prices always "fully reflect" available information"*. The assumption behind this definition is that changes in the prices are independent and identically distributed. However, this was not the first statement from Fama on efficient markets, already in 1965 he stated what is said to be among the first definitions of an efficient capital market; *"a situation where successive price changes are independent is consistent with the existence of an "efficient" market for securities, that is, a market where, given the available information, actual prices at every point in time represent very good estimates of intrinsic value" (Fama, 1965).* In this context, intrinsic value does not necessarily correspond to the actual market prices but depend on economic and political factors affecting the earnings forecast of a specific company. Some factors affect only the specific company, and other factors affect other companies as well.

One question has been a source of continuing controversy in both academic and business circles for many years earlier: "*To what extent can past history of a common stock's price be used to make meaningful predictions concerning the future price of the stock?*" (Fama, 1965). Two different types of answers for this question have been provided, and they are split into two categories – one proposed by chartists, and, on the other hand, the random walk theory. The chartist theories are all based on the same assumption, that is, they all make the basic assumption that a stock (Fama, 1965). The last theory, the random walk hypothesis, is the basis for the efficient market hypothesis. There has been conducted several tests of market efficiency in the random walk literature, especially regarding the weak-form stock market efficiency.

There are three conditions sufficient for capital market efficiency (Fama, 1970);

1. Trading securities involve no transaction costs
2. All market participants have all available information accessible without cost
3. All participants agree on the effects of present-day information on the existing price and distributions of future prices of each stock

In a market where these three are present, all available information is fully reflected in the current stock prices (Fama, 1970). However, not all these conditions are necessary for market efficiency. If the available information is accessed by a "sufficient number" of investors, a market may be efficient (Fama, 1970).

"*Efficient market theorists seem to be aware that costless information is a sufficient condition for prices to fully reflect all available information; they are not aware that it is a necessary condition*" (Grossman & Stiglitz, 1980). Grossman and Stiglitz (1980) find that market prices will reflect most of the information of the informed traders, when the information is relatively inexpensive, or when the information the informed traders receive, is very precise. They argue that prices cannot perfectly reflect the information available, because information is costly, and thus if it did, those who spent resources to obtain the information, would receive no compensation. Based on these arguments, Grossman and Stiglitz (1980) conclude that "*there is a fundamental conflict between the efficiency with which markets spread information and the incentives to acquire information".*

There has been a high degree of skepticism towards the theory of market efficiency during the years after Fama's first papers on market efficiency (1965 and 1970). Researchers argue that there might exist market inefficiency. Long-term underreaction or overreaction to information has been found in studies (Fama, 1997). Nevertheless, the efficient market hypothesis states that anomalies are chance results, so obvious underreaction of stock prices to information is about as usual as an overreaction. That is, anomalies are consistent with market efficiency if they are divided randomly between overreaction and underreaction. In addition, Fama (1997) states that post-event continuation is equally frequent as post-event reversal when it comes to abnormal returns. With these results, he claims market efficiency should not be discarded, and thus, is still viable.

Fama (1970) divided stock market efficiency into three categories; weak form, semi-strong form, and strong form. Tests have been conducted on all three.

2.3.1 Weak Form

Weak form efficient is a capital market where all new information about a specific firm is fully and immediately reflected in the price, by a new price movement (Barnes, 2009). The question is "*How well do past returns predict future returns?*" (Fama, 1991). The information utilized to predict the future development of stock prices is the historical prices. We are unable to forecast new news, and as the old news are fully reflected in the current prices, it is not possible to predict new movements in the share price by looking at old movements.

Random walk tests have been applied to test the weak form efficient capital market hypothesis. The random walk theory states that the future path of the stock's price level is no more predictable than the path of a series of cumulated random numbers (Fama, 1965). The future cannot be predicted in any meaningful way by using the past since the series of changes in price has no memory. "*Successive price changes are independent, identically distributed random variables"* (Fama, 1965). The random walk tests strongly support the efficient market hypothesis (Fama, 1970).

In 1991, Fama wrote an updated paper on efficient capital markets where he gave the three different forms of market efficiency new terms. The first category now covers the more general area of "tests for return predictability". From only covering the forecasting power of past returns, Fama now includes the weak-form category to cover work on forecasting returns with variables like interest rates and dividend yields. This is because he finds that past returns, dividend yields, and various term-structure variables can be utilized to predict returns (Fama, 1991).

2.3.2 Semi-Strong Form

The semi-strong form of market efficiency states that stock prices adjust immediately to new information as it becomes publicly available (Fama, 1970). Information involves all obvious publicly available information, including both history of stock prices and news released by the company, like earnings announcements and stock splits. According to this, the post-earnings announcement drift should not exist. Tests of the semi-strong form of efficient

market models check whether all publicly available information is “fully reflected” in the current prices. One type of information generating event, such as stock splits or earnings announcements, and the adjustment of stock prices to this specific event, is considered in each individual test. By accumulating the evidence of each test, the validity of the model can be established (Fama, 1970).

Abnormal returns cannot be earned because no one can consistently outperform the stock market, as current market prices already reflect all information that is publicly available. However, those in possession of inside information can outperform the stock market, since the semi-strong form of the efficient market recognizes the existence of this type of information (Barnes, 2009). The available semi-strong form evidence on the common stock returns reaction to different sorts of public announcements is all in line with the efficient markets model (Fama, 1970).

In 1991, Fama proposed a new title for the semi-strong form tests of market efficiency, namely “event studies” (Fama, 1991). The amount of event studies has increased significantly after the 20 years following the article Fama wrote in 1970 on efficient capital markets. Event studies give the most direct evidence on market efficiency, and the evidence is mostly supportive (Fama, 1991).

2.3.3 Strong Form

Under the strong form efficient market hypothesis, all relevant information is reflected in the current market prices. The information includes both publicly and privately held information. Tests of the strong form efficiency are concerned with whether all the information available is reflected fully in the stock prices, in the sense that no investor has a higher expected trading profit than others due to information the investor has monopolistic access to (Fama, 1970). That is, not even insider information could give an investor an advantage, and profits exceeding normal returns, cannot be made.

It is generally believed that all large stock markets are not efficient in the strong form, but only in the weak and semi-strong form. The strong form efficiency is recognized as a benchmark against which one can judge the importance of deviations from market efficiency. The reason why the strong form is not seen as a description of the real market is because there exist insiders and others who profit from inside information on a fairly large scale (Barnes, 2009). It has been documented that corporate insiders and specialists are the two groups with monopolistic access to information (Fama, 1970).

Instead of strong-form tests, Fama proposed a change in the title to "tests for private information" (Fama, 1991). The new results following Fama's article in 1970 on efficient capital markets make clear that the prices do not fully reflect the private information corporate insiders have (Fama, 1991).

2.4 Market Anomalies

"*Anomalies are empirical patterns in stock returns that violate the efficiency of the market pricing mechanism in the context of the Capital Asset Pricing Model (CAPM)*" (Dou, Gallagher, & Schneider, 2012). Anomalies in the market occur because of market inefficiencies or defects in the underlying asset-pricing model. Anomalies challenge the theory of an efficient market, but in defense of the EMH theory, Fama argues that some of the anomalies are only seen under specific circumstances or time periods (Fama, 1997). There exist various types of anomalies, and below, some of them are outlined.

2.4.1 The Post-Earnings Announcement Drift

The post-earnings announcement drift (PEAD) theorizes that the cumulative abnormal return of a stock tends to drift in the same direction as the earnings surprise for several weeks following an earnings announcement. Ball and Brown were the first to discover the PEAD in 1968, because they found an upward drift in the estimated cumulative abnormal returns for good news firms, and similarly, a downward drift for bad news firms. This drift continued in the weeks following the earnings announcements. Ball and Brown stated that the "*Post-Earnings Announcement drift is the systematic pattern of a stock's abnormal*

return to drift in the direction of an earnings surprise for a period of time subsequent to an earnings announcement" (1968). In other words, the PEAD explains that stock prices do not always immediately reflect new earnings information. In the study by Ball and Brown (1968) of accounting income numbers, they investigate how rapidly financial markets incorporate new earnings information in the stock prices, with the New York Stock Exchange as their sample. They found the upward drift of the stock price to be longer than expected after a good news earnings announcement and a similar downward drift for a bad news earnings announcement. The results from this study were contradicting the existing theory about the efficiency in the market developed by Eugene Fama, the Efficient Market Hypothesis (1970).

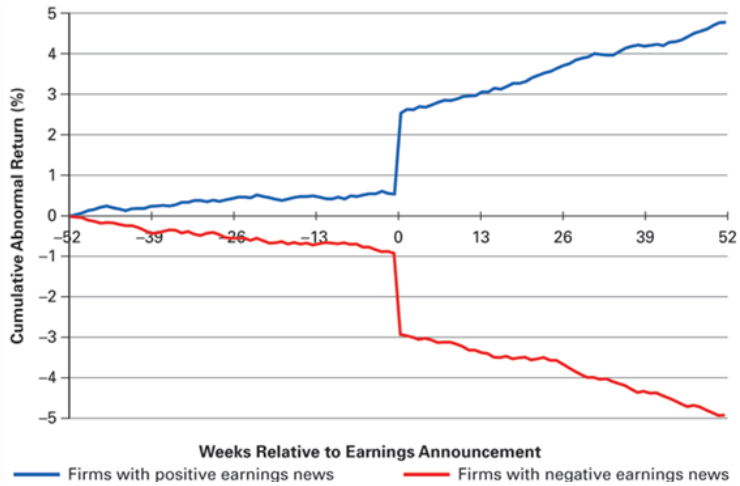


Figure 2-1; The post-earnings announcement drift

Figure 2-1 illustrates the post-earnings announcement drift, and it shows a negative (red line), and a positive (blue line), which represents the drift after an earnings announcement at t= 0. The drift is demonstrated by using the cumulative abnormal return in percentage (Smart, Gitman, & Joehnk, 2014).

The post-earnings announcement drift has been widely studied after the findings of Ball and Brown, but mostly on the U.S. stock market. Jones and Litzenberger (1970) conducted a study on how quarterly earnings announcements influence a random sample of stocks in the U.S. stock market during the period of 1962-1967. They found similar evidence as Ball and Brown (1968), and concluded with "*earnings information are not fully discounted by the market at the time they become available*" (Jones & Litzenberger, 1970). In a study of the UK

stock market conducted by Hew et al. in 1996, they detected the post-earnings announcement drift for both interim and yearly earnings announcements for the smallest 2/3 of the London Stock Exchange companies. They argued that one explanation for the drift could be that stock prices fully react to earnings news, but only after a considerable lag. Specifically, it can take up to 60 days for the full effect to be compounded into the stock price (Hew, Skerratt, Strong, & Walker, 1996). Investors seem to underreact to very fundamental signals, leading to forecast errors and incomplete share price adjustments (Barnes, 2009, s. 54).

There exist several explanations of why the market is not fully considering the new earnings announcement at the time of the event. Bernard and Thomas (1989) conducted a study on the U.S. stock market in the period 1974-1986, where they investigate the existence of the post-earnings announcement drift in the stock market. They divided their sample into small, medium and large companies, and find evidence of the PEAD to be larger for small firms compared to medium and large firms. In addition, they also uncover a significant portion of the drift occurring during the first 60 trading days after the earnings announcement. In a later study by Bernard and Thomas, they argue that the evidence of the PEAD can be explained by the fact that "*investors naively assume that earnings follow a seasonal random walk, and fail to understand the implication of current earnings for future earnings*" (Bernard & Thomas, 1990).

2.4.2 The Momentum Effect

There exist two versions of momentum strategies. The first strategy, the contrarian effect, was discovered by DeBond and Thaler (1985). The contrarian effect suggests that low return stocks in the past three to five years (past losers) have higher average returns than stocks with higher returns in the past three to five years (past winners) (Bondt & Thaler, 1985). Jegadeesh and Titman (1993) identified the second strategy, named the momentum effect, which proposes that past winners outperform past losers when looking at the portfolio for the last years past returns (Jegadeesh & Titman, 1993). Fama and French (1996) applied their three-factor model to test the two strategies and found no evidence for the contrarian

effect, but they found evidence for the momentum effect. The model detected significant abnormal returns for the short-term low past returns and short-term high past returns.

2.4.3 The January Effect

Keim (1983) studied the relation between abnormal returns and market values of U.S. stocks, month by month during the years from 1963 to 1979. He found a significant pattern of a negative relation between abnormal returns and market value in January for small firms. Specifically, January accounted for almost 50% of the size-related abnormal returns throughout the year (Keim, 1983). The effect is currently still significant and positive but has decreased since Keim's publication in 1963, according to Schwert (Schwert, 2003).

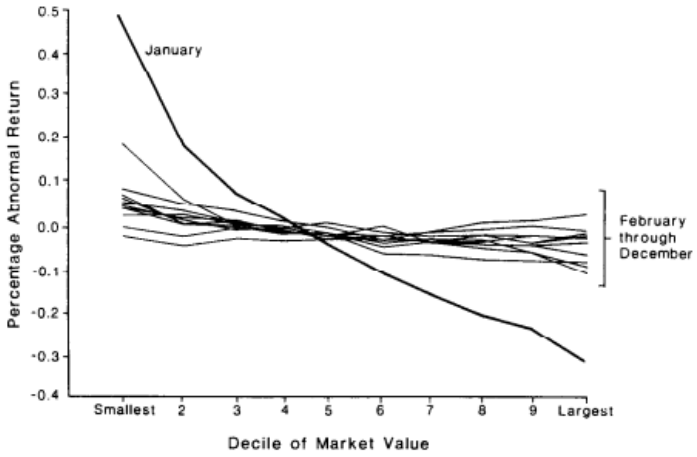


Figure 2-2; Turn-of-the-year effect

Figure 2-2 is taken from Keim's 1983 article, and it shows the "*relations between average daily abnormal return (in percent) and decile of market value for each month over the period of 1963-1979. The graph illustrates 10 market value portfolios constructed from the NYSE and AMEX*" (Keim, 1983).

2.4.4 The Monday Effect

In a study conducted by French (1980) from 1953-1977, French discovered a tendency for average returns on the Standard and Poor's multiple portfolios to be negative on Mondays, whilst the returns on other weekdays seemed to be positive (French, 1980). French proposed that the negative returns were a result of "*the weekend effect and not by general*

closed-market effect" (French, 1980). However, Steely (2001) find that the weekend effect in the UK disappeared in the 1990s (Steeley, 2001), and other studies that have explored the weekend effect argue the last findings are outdated, and the effect has disappeared.

2.4.5 The Size-Effect

The size-effect is also known as the "small-firms effect", and Banz (1981) was the first one to discover the effect. He conducted a study from 1936-1975, and he finds "*excess returns would be earned by holding stocks of low capitalization companies*" (Banz, 1981). This is one of the strongest effects researchers have encountered over a longer period, but today's theory suggests that the stocks with larger capitalization generate higher rates of return (Malkiel, 2003). Hence, it is possible that the studies of the small-firms effect have been affected by bias, as there has been no evidence of gain from holding smaller stock in later studies.

2.5 Behavioral Finance

"Behavioral finance is finance from a broader social science perspective including psychology and sociology" (Shiller, 2003). Behavioral finance covers research that abandons the traditional assumptions of expected utility maximization with rational investors in efficient markets (Ritter, 2003). In the traditional capital market theory, investors, as a group, are believed to agree on the value of information, and to use statistical methods as a basis for their decisions, hence they are rational (Peters, 2003). Rationality here implies two things; when an individual receives new information, the individual updates its beliefs correctly, and, the individual makes decisions that are normatively acceptable, given its beliefs (Barberis & Thaler, 2002). However, behavioral finance has shown that individuals do not typically behave in a way said to be "rational" by classical economists (Peters, 2003). People have a tendency of making biased decisions by using pattern recognition techniques, rather than solving problems "rationally", as assumed by traditional capital market theory (Peters, 2003). Within the behavioral finance, it is presumed that financial markets are informationally inefficient in some circumstances (Ritter, 2003).

According to the semi-strong form of the efficient market hypothesis, all publicly available information is reflected in the current prices (Fama, 1965). Stocks are priced fairly and efficiently, as the investors in the market are rational and they collectively value information in a uniform way. Thus, in an efficient market, no strategy for investment can earn, on average, returns greater than what is warranted for by its risk (Barberis & Thaler, 2002). The presence of traders who are not fully rational, which is the case in behavioral finance, is what brings about the deviations of asset prices from fundamental values.

People often fail to make decisions based on statistical reasoning, as is shown by behavioral proponents (Peters, 2003). Techniques, such as heuristics or other subjective methods, are relied on, even when the circumstances presented are objective. The results imply that market inefficiencies exist because it is anticipated that subjective methods are superior to statistical techniques (Peters, 2003).

Figure 2-3 demonstrates how behavioral finance is divided into two building blocks; cognitive psychology and the limits to arbitrage (Ritter, 2003), and the most relevant points under each of the two main blocks.

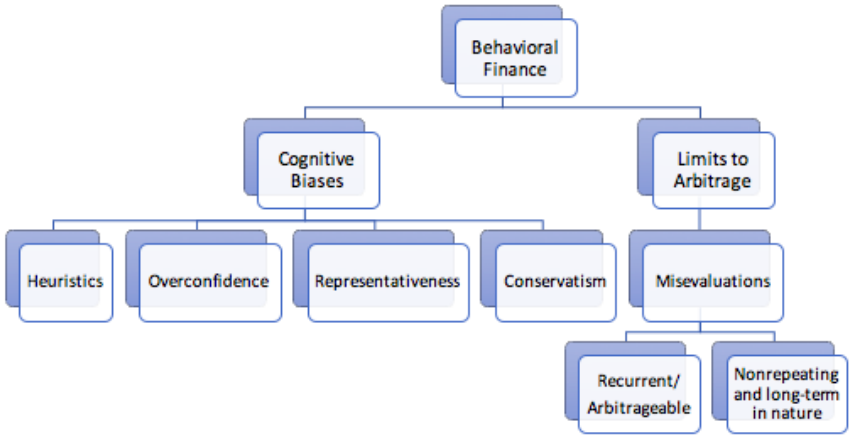


Figure 2-3; The aspects of behavioral finance

2.5.1 Cognitive Biases

The cognitive block refers to how people think and forms beliefs, and it has been documented that individuals have a tendency of making systematic errors in the way they

think (Ritter, 2003). The deviations from full rationality one might expect to see are described here (Barberis & Thaler, 2002). Examples of these systematic errors are overconfidence and putting too much weight on recent experience. In addition, an individual's preferences could also generate distortions in the way the individual thinks. Rather than ignoring this aspect, behavioral finance attempts to use this body of knowledge.

Several patterns regarding the way people behave have been documented by cognitive psychologists (Ritter, 2003). Heuristics, more known as "rules of thumbs", ease the decision making, but might also lead to biases. Particularly, biases occur when things change, and these biases could, in turn, lead to investment decisions that are suboptimal. Individuals have a tendency of being overconfident regarding their own abilities, which could lead to too little diversification. Too little diversification can be reflected in a tendency to invest too much in what one is familiar with. In addition, it is found that women tend to be less overconfident than men (Ritter, 2003).

Another behavioral pattern is known as representativeness or "the law of small numbers", that is, individuals tend to put too much weight on recent experience. Fama (1997) states that investors give too much weight to the past performance of firms and too little to the fact that performance tends to mean-revert when forming expectations. People tend to be slow to pick up the changes when things change, we are conservative, and this could lead to an underreaction when things change. On the other hand, people will adjust, and probably overreact, if the pattern is long enough (Ritter, 2003).

2.5.2 Limits to Arbitrage

Foreseeing in what situations arbitrage forces are operative, and when they are not, is the limits to arbitrage block of behavioral finance. An arbitrage can be defined as "*an investment strategy that offers riskless profits at no cost"* (Barberis & Thaler, 2002). This part of behavioral finance argues that it might be difficult for rational traders to undo the dislocations caused by less rational traders. The process of arbitrage prevents the agents that are less than fully rational from influencing stock prices for very long, as the rational

investors will see an opportunity for arbitrage (Barberis & Thaler, 2002). It is not easy to make abnormal profits off misevaluations, but misevaluations are common and are divided into two types: those recurrent or arbitrageable, and those nonrepeating and long-term in nature (Ritter, 2003).

Regarding the recurrent misevaluations, hedge funds and others zero in on these, as they can reliably make money. This prevents the misevaluations from getting too big, and so the market is relatively efficient for these assets. On the other hand, for the nonrepeating misevaluations, it is not possible to identify the peaks and troughs before they have passed. Both getting in too early, and withdraw of capital after a losing streak, is risky and could result in losses that either wipe out capital or buying and selling pressure worsening the inefficiency.

Investors who try to earn profits by identifying misevaluations are those who make markets efficient, and hedge funds are such an example (Ritter, 2003). A relative value hedge fund buys undervalued securities, finds highly correlated overvalued securities, and shorts these. Shleifer and Vishny (1997) argue that some markets are made more efficient by the efforts of arbitrageurs, while there are markets where the arbitrage has no effect. It is useful to divide events into two categories – high-frequency events and low-frequency events. The high-frequency events occur often, and the evidence of these events supports market efficiency. This is because a trading strategy that is consistently profitable is difficult to find. On the other hand, low-frequency events occur only infrequently and might take a long time to recover from, and the evidence here does not support market efficiency (Ritter, 2003).

2.6 Earlier Findings

There has been conducted several studies on the phenomena of abnormal returns in relation to earnings announcements on stock markets around the world, from China to the U.S. and Denmark. Similar to the studies are that they investigate the efficiency of stock markets both in the post- and pre-announcement period.

2.6.1 Denmark

Sponholtz conducted a study of the market reaction to annual earnings announcements in Denmark in 2008. Denmark, and specifically, the Copenhagen Stock Exchange (CSE) is her sample, and the study is conducted with data on annual earnings announcements from 1999 to 2004. She finds that Danish earnings announcements provide informational content because large price reactions appear on the day of the announcement and the day after, which indicates that they bring relevant, new information (Sponholtz, 2008). In addition, Sponholtz identifies significant movements in the stock prices on later days surrounding the event as well, indicating that the market reaction to annual earnings announcements seems to be rather slow. The abnormal returns are statistically significant and positive, but Sponholtz concludes with them not being economically significant given the size and the presence of transaction costs. The conclusion of the paper is that there are inefficiencies in the Danish stock markets reaction to annual earnings announcements, both related to the slow incorporation of new information and the significantly positive average abnormal returns.

Even though Sponholtz's (2008) earnings announcement study involves annual announcements and not quarterly, there are similarities both in the methods used in both studies, in addition to a similar theoretical foundation (ref. EMH and abnormal returns), and therefore, reason to believe that the results should not differ significantly if the study was done on a quarterly basis instead of yearly basis.

2.6.2 Spain

Pellicer et al. (1999) uncover the existence of significant stock price changes around the announcement date of earnings in Spain. They tested for the existence of anomalies in the market and found evidence that *"the earnings disclosures are accompanied by abnormal volatility"*. In this study, they also discover that both expected and unexpected changes in earnings have explanatory power for abnormal returns accompanying earnings announcements (Pellicer & Rees, 1999). The paper looked at the volatility in two groups of the sample data; annual and interim earnings. The data for the interim earnings showed a

marginally higher volatility than for the annual earnings. Hence, the findings support the earlier evidence that earnings announcements are accompanied by a significant price reaction.

2.6.3 South Africa

A study was conducted on annual earnings announcements on the Johannesburg Stock Exchange in South Africa, using the ALtX as the sample, from January 1st to December 31st 2009. The purpose of the study, conducted by Mlonzi, Kruger, and Nthoesane (2011), was to investigate whether there were any significant abnormal returns following the public earnings announcements. Furthermore, they wanted to check whether the efficient market hypothesis applies to a small market like the ALtX market, during tough economic times (a period of recession). They conclude with the cumulative average abnormal returns (CAAR) being significantly different from zero, and they prove that announcements of earnings during a recessionary period results in a negative share price reaction (Mlonzi, Kruger, & Nthoesane, 2011). There was no sign of price recovery, and thus, the conclusion was that the ALtX shows weak form market efficiency.

2.6.4 The U.S.

Several studies of the market reaction to quarterly earnings announcements have been done on the U.S. stock market. Ball and Brown (1968) conducted a study where their goal was to assess the usefulness of existing accounting income numbers by investigating their information content and timeliness. Specifically, they construct to different models of what the market expects the specific firm's income to be and then examine the reaction of the market when the expectations are proven wrong. They hypothesize that changes in stock prices reflect the flow of information to the market if as the evidence indicates, stock prices quickly adjust to new information when it is released. The period in which they conduct the study was January 1957 through December 1965, including a total of 261 firms listed on the New York Stock Exchange. The market typically reacts in the same direction as the direction of the difference between actual income and expected income (Ball & Brown, 1968). Furthermore, the market anticipates most of the information content of the reported

income before the annual report is released, specifically, the anticipation is so accurate that there is no abnormal movement related to the actual income number, in the announcement jump. Their conclusion is that the stock prices are related to the information content of the annual income numbers.

MacKinlay (1997) conducted a study on the 30 firms in the Dow Jones Industrial Index from January 1989 to December 1993, including 20 announcements per firm for a total sample of 600 announcements. The sample was divided into three groups; good news, bad news and no news, depending on the difference between actual and forecasted earnings per share. MacKinlay hypothesizes that one would expect the impact of earnings on the market's valuation of the company's equity to depend on the extent of the unexpected element of the announcement if investors find information in the earnings announcements. His null hypothesis is that the earnings announcements have no impact on the distribution of the returns. MacKinlay's conclusion is that earnings announcements provide investors with information useful for valuation of firms, and he rejects the null hypothesis on day zero for the good and bad news groups.

2.6.5 Pakistan

Professors Muhammad Azeem Qureshi, Ali Abdullah, and Muhammad Imdadullah conducted a study of the variability of stock prices around earnings announcement dates at the Karachi stock market. The sample data showed evidence of significant abnormal returns in the whole event window (11-days). Furthermore, testing of the cumulative abnormal return showed that the abnormal returns were significant, and due to the announcement of the earnings depicting a significant impact of earnings on stock prices, and unequal distribution of information in the market. In the study, they also detected that abnormal returns moved upwards in the days before the announcement, while they moved downwards just after the announcement (Qureshi, Abdullah, & Imdadullah, 2012). The study found a pattern unique to the Karachi stock exchange, namely that after a decline, the abnormal returns started moving upwards. The efficient market hypothesis does not hold at the Karachi stock market due to abnormalities. Findings from the study support previous theory that prices behave

significantly different around the earnings announcement day, confirming that these fluctuations are due to the earnings announcement. The paper argues that the efficient market hypothesis does not hold in the Karachi market, and there exist information distribution inefficiencies in the market.

3 Empirical Method

This chapter introduces the theory and methodology used for the analysis of the quarterly earnings announcements. First, this chapter provides an overview of time-series prediction of earnings estimates, and a conclusion, based on previous literature and findings, of whether time-series models or analysts' forecast of earnings are utilized in his thesis. An introduction to event study methodology is given, followed by the seven-step process provided by MacKinlay (1997) and Campbell, Lo & MacKinlay (1997). Furthermore, models for measuring normal performance, abnormal returns, cumulative abnormal returns, and tests statistics are introduced, and these are the foundation of the methodology.

3.1 Time-Series Analysis

This section examines two different methods applied to forecast the market's expectation of earnings. The first method is based on time-series models prediction of historical earnings per share numbers, and the second method is based on financial analysts' forecasts of earnings, retrieved from sources like the Bloomberg Terminal.

3.1.1 Time-Series Prediction

"Quarterly earnings may be parsimoniously described as a multiplicative combination of two processes: one reflects the adjacent quarter movement, and the other reflects the quarter-by-quarter movement over time (the seasonality component)" (Griffin, 1977). Foster (1977) presents several different models on how to estimate forecasts of quarterly earnings for a specific firm, based on quarterly accounting data on a time-series basis. Four naïve models are presented, where Model 1 and Model 2 have been examined earlier by Brown and Kennelly (1972).

$$Model\ 1: \qquad E(Q_t) = Q_{t-4} \tag{1}$$

$$Model\ 2: \qquad E(Q_t) = Q_{t-4} + \delta \tag{2}$$

Here, $E(Q_t)$ is expected earnings in quarter t, Q_t is actual earnings in quarter t for a given year, and δ is a firm-specific parameter representing the drift term. The drift term can be defined as "*the average change in that quarter which has occurred over the available history*" (Foster, 1977). The models 1 and 2 assume that there is a seasonal pattern in the

quarterly earnings data, and the main difference between these two models is the introduction of the drift term in model 2. Brown and Kennelly (1972) find Model 2 to do better than Model 1 in three out of four quarters, but the difference is minimum.

Furthermore, two more naïve models are introduced by Foster (1977);

$$Model\ 3: \qquad E(Q_t) = Q_{t-1} \tag{3}$$

$$Model\ 4: \qquad E(Q_t) = Q_{t-1} + \delta \tag{4}$$

These models ignore any seasonality and are mostly used in studies on the information content of annual earnings in earlier research. The consequences of ignoring seasonality in quarterly data can be seen when using model 3 and 4 and compare the results to models 1 and 2.

Foster (1977) extends Model 2 to correct for a misspecification problem that leads to a significant first order positive serial correlation, which implies that when forecasting future values, some of the systematic patterns in the previous series are not being exploited. Model 5 is introduced, and the main aspect of this model is the introduction of an assumption that the autocorrelation follows a first-order autoregressive process. It is an autoregressive univariate time series model with a seasonal random walk.

$$Model\ 5: \qquad E(Q_t) = Q_{t-4} + \phi_1(Q_{t-1} - Q_{t-5}) + \delta \tag{5}$$

Where ϕ_1 is the first-order autoregressive component that is a firm-specific parameter. However, the main defect of the fifth model is the strong assumption that the time-series behavior of the fourth differences in quarterly data of all companies is described by an autoregressive process. That is, the AR (1) process may not apply to all firms.

Foster (1977) refers to an alternative approach in his paper, where the Box-Jenkins methodology is utilized for recognizing the procedure generating each individual company's data. Modeling the time series for each specific company is a process consisting of three steps.

1. Model identification. In the first step, the sample autocorrelations and partial autocorrelations are compared with the theoretical patterns of a specific autoregressive-moving average model.

2. Model estimation. A nonlinear procedure for estimation is applied to estimate the parameters of the model.
3. Diagnostics checking. The model is evaluated by checking if its fits the data, and whether the parameters are significant. For example, the residuals are identified to check for serial correlation.

Each firm apply a Box-Jenkins model to identify earnings, and it can be used for forecasting quarterly earnings. However, this model is more extensive and time-consuming to conduct, as there is a more extensive analysis of each company's sample autocorrelation and partial autocorrelation functions, and thus, more firm-specific parameters are identified than in the previous models.

"A process which includes both (1) a seasonal component and (2) an adjacent quarter-to-quarter component has greater descriptive validity for each quarterly series" (Foster, 1977). Models 1 and 2, where seasonality is considered, captures the market's expectation of the next quarter's earnings better than models 3 and 4, where seasonality is disregarded. In addition, Foster states that models including a drift term are generally better at forecasting than models excluding the term. Furthermore, the results of tests conducted by Foster (1977) on these models, showed that model 5 was the model with the best fit when using past earnings to predict future earnings.

3.1.2 Time-Series Predictions versus Analysts' Forecasts

There exist various studies on the forecast accuracy of analysts' forecasts and time-series models. Studies conducted by Collins and Hopwood (1980) and Fried et al. (1982) conclude that analysts' forecasts almost always outperform the time-series models and that analysts provide a more consistent forecast. Collins and Hopwood (1980) investigated four different time-series models for predicting the quarterly earnings and compared them to the financial analyst forecasts. Their findings suggest that the financial analyst forecasts provide a more accurate forecast than the time-series models. Moreover, they claim the reason for this could be that the models utilized by the financial analysts were "*more capable of*

incorporating the effects of the economic events as the events became known" (Collins & Hopwood, 1980).

Brown and Rozeff (1978) conducted a study that explores the difference between the outcomes from the time-series models and the financial analysts' forecasts. They found "*analysts responded to earnings forecast error as if they were behaving in an adaptive manner, rising (lowering) their forecast of future quarterly earnings when they under-predicted (over-predicted) this quarter's earnings per share*" (Brown & Rozeff, 1978). Additionally, they discovered evidence supporting the importance of information outside the earnings time-series process for analysts' forecasts revision of future quarterly earnings (Brown & Rozeff, 1978).

Analysts' forecasts are more adaptive and therefore contribute to more advantages, according to Fried et al. (1982). Fried et al. discuss the quality of the forecasts done by analysts as substitutes for the market expectation of earnings, and compared the results with the time-series models. The results indicate that "*the prediction errors of analysts provide a better surrogate for market expectations than forecast generated by time-series models*" (Fried & Givoly, 1982). Fried et al. argue that a reason for this could be that analysts utilize all available information, while the time-series models only rely on past earnings. An additional argument for the superiority of analysts' forecasts over time-series models forecasts, is they are published within the forecast year, and so there is a timing advantage (Fried & Givoly, 1982). Consequently, the analysts can use more recent earnings information, which only becomes available after the end of the fiscal year, when creating the forecasts, while a time-series model is more static.

The majority of past and recent studies have applied time-series models to predict earnings in relation to the earnings announcements. Nevertheless, relatively recent papers have used analysts' forecasts. Based on the findings above, we argue that the analysts' forecasts of earnings per share collected from the Bloomberg Terminal, constructed by Bloomberg's

analysts, is a good proxy for the market's expectations. Henceforth, this paper employs the analyst forecasts of EPS available in the Bloomberg Terminal.

3.2 Event Study

An event can be defined as *"a point in time when a company make an announcement or when a significant market event occurs"* (Benninga, 2014). Event studies within the field of economics and finance are widely used to evaluate the effect of an economic event on the value of firms. The theory proposes that stock prices will immediately reflect the effects of the event because the marketplace is rational (MacKinlay, 1997). Therefore, one could measure the economic impact of an event with the stock prices realized over a moderately short period surrounding the event. In an event study, the standard null hypothesis is that "*the given event has no impact on the behavior of the returns"* (MacKinlay, 1997). MacKinlay (1997) provides a standard methodology for event studies which is applied in this thesis.

3.2.1 The 7 Steps of an Event Study

According to Campbell, Lo and MacKinlay (1997), hereby referred to as CLO, the event study analysis is seen as a seven-step process.

Event Definition. The first step is defining the event one is interested in investigating, and the event window. The event window is the time over which the stock prices of the firms included in the event of interest, are analyzed. In this thesis, the event is quarterly earnings announcements, because this thesis is interested in studying the information content of earnings announcements. The event window could be set to the day of the earnings announcement, but could also be expanded to include days before and days after the event. The days prior to and after the event day itself may also be of interest and can be used to examine price effects leading to and following the announcement itself.

Selection criteria. The second step of the event study process is to set a specific set of selection criteria, determining which firms to be included in the event study. Data availability

such as listings on the Oslo Stock Exchange, the amount of historical data available, or specific characteristics regarding size or industry, are examples of criteria.

Normal and abnormal returns. A measure of the abnormal returns is required so we can investigate the event's influence on the specific firms and market. The abnormal return is defined as the actual return of the stock over the event window less the normal return of the stock over the event window. There are two main methods for estimating the normal return, the market model (MM) and the constant-mean-return (CMR) model. The main difference between these two models is that the MM assumes a stable linear relation between the market return and the stock return, while the CMR takes the mean return of a given stock to be constant through time.

Estimation procedure. The following step is the estimation of the parameters of the normal return model, which is estimated by using data from the estimation window. The period applied in the estimation window is most commonly the period proceeding to the event window. To avoid the event to have an impact on the normal performance model parameter estimates, the event period itself is not included in the estimation period.

Testing procedure. The abnormal returns are calculated when the parameter estimates for the normal performance model are ready. The testing framework for the abnormal returns should be decided, and important aspects here are a definition of the null hypotheses and determining how to aggregate the abnormal returns for the individual firms.

Empirical results. A presentation of the empirical results should follow. The basic empirical results, in addition to a presentation of diagnostics, can be included.

Interpretation and conclusions. Hopefully, the empirical results will bring about some insights about the mechanisms by which the event affects stock prices.

3.2.2 Potential Issues when Conducting an Event Study

When conducting an event study, several issues could arise, and MacKinlay (1997) and CLO (1997) introduce several of these issues. A selection bias is introduced in many situations, as "*the event window abnormal return will be related to firm characteristic not only through the valuation effect of the event, but also through a relation between the firm characteristics and the extent to which the event is anticipated"* (Campbell, Lo & MacKinlay, 1997). This bias occurs when investors rationally try to predict the event's chance of appearing, using firm characteristics. This leads to a breakdown of the assumption that the residuals of the regression are uncorrelated with the regressors, and thus, inconsistency of the ordinary least squares (OLS) estimators.

Role of sampling interval. CLO (1997) find that reducing the event window length leads to a significant payoff in terms of increased power. If one precisely knows the timing of the event, a shorter sampling interval leads to a higher ability to statistically identify the event's effect. This is because the variance of the sampling interval is reduced without the mean being changed. That is, using daily stock return data rather than monthly stock return data leads to increased power (MacKinlay, 1997).

Inferences with event date uncertainty. The exact event date could, in some situations, be difficult to identify, as can be the case in situations where an event announcement occurs in the paper and one is not sure whether the market was informed before the market closed on the prior trading day. The issue in this situation is whether the event day is the prior day or the current day. This is not an issue in the case of the quarterly earnings announcements, since the date is announced several months before, and the date of the event is specific.

Other possible biases. Nonsynchronous trading, or non-trading, can potentially introduce a bias. The effect arises when "*prices are taken to be recorded at time intervals of one length when in fact they are recorded at time intervals of other possibly irregular lengths*" (Campbell, Lo, & MacKinlay, 1997). Closing prices are most often used in event studies, and by using the closing prices occurring at the last transaction during the trading day, and

naming them “daily prices”, an assumption that they are equally spaced at 24-hour intervals has incorrectly been made. This assumption leads to a bias in the market model beta, but CLO (1977) states that the adjustments of non-trading-adjusted betas versus unadjusted estimates are generally unimportant and small for actively traded stocks.

Departures from the assumptions of “*returns being jointly normal, temporally independent and identically distributed can lead to biases*” (MacKinlay, 1997). The assumption of normality is important, as results would be asymptotic if not present. This assumption is important for the exact finite-sample results. Furthermore, an upward bias may occur because of the method used to calculate the cumulative abnormal returns. Implicit in the estimation of the aggregated cumulative abnormal returns is the observation by observation rebalancing to equal weights, and combining this with the use of transaction prices that can represent both the offer and bid side of the market, gives rise to a bias (MacKinlay, 1997). However, this bias is mostly present in studies where low market capitalization firms are used.

3.3 Models for Measuring Normal Performance

The choice of an appropriate normal return model is an important aspect of an event study because the standard procedure is to compare the actual return realized at the day of the event with the expected or normal return (MacKinlay, 1997). The normal return is defined as the return in absence of the event, which, in this thesis, is in the absence of the quarterly earnings announcement. The approaches for measuring normal performance are divided into two loose groups – statistical and economic models. The models in the first group follow statistical assumptions regarding the behavior of stock returns and do not depend on economic arguments. Economic models, on the other hand, are not based solely on statistical assumptions and rely on assumptions concerning the investors’ behavior (MacKinlay, 1997) (Cable & Holland, 1999).

3.3.1 Statistical Models

There is a restriction imposed on statistical models, stating that stock returns should be *"jointly multivariate, normal, independently and identically distributed through time"* (Campbell, Lo, & MacKinlay, 1997). This restriction is necessary for a correct specification of the constant mean return model and the market model.

Constant Mean Return Model

The constant mean return model is

$$R_{it} = \mu_i + \xi_{it} \tag{6}$$
$$E[\xi_{it}] = 0 \quad Var[\xi_{it}] = \sigma_{\xi i}^2$$

Where μ_i is the mean return for asset *i*, R_{it} is the return in period *t* for stock *i*, and ξ_{it} is the disturbance term in period *t* for stock *i*. The disturbance term has an expected value of zero, and σ^2_ξ is its variance. This model is a simple model, and Brown and Warner (1980, 1985) find that this model often yields results like those of the more sophisticated models (MacKinlay, 1997). The variance of the abnormal return is not lowered much by selecting a more sophisticated model than the CMR model.

Market Model

The market model relates the return of a given stock to the return of the market portfolio (MacKinlay, 1997). There is an assumed joint normality of stock returns leading to the linear specification of the model. For any stock *i*, the market model is

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \tag{7}$$
$$E(\varepsilon_{it}) = 0 \quad Var(\varepsilon_{it}) = \sigma_\varepsilon^2$$

Where R_{it} is the period-*t* returns on security *i*, R_{mt} is the return on the market portfolio in period *t*, ε_{it} is the disturbance term, and α_i, β_i and σ^2_ε are parameters from the market model regression. The disturbance term has an expected value of zero and a variance of σ^2. Normally, a wide-ranging stock index is used for the market portfolio, like the S&P500 index, or the Oslo Stock Exchange All Share Index (OSEAX), which will be applied this paper. When applying the market model, the variance of the abnormal return is lowered as the model is

eliminating the part of the return linked to the deviations in the return of the market. Thus, event effects can potentially be easier detected.

The R^2 of the model is an important measure for the benefit of using this model, and the higher the R^2, the larger is the gain as the variance reduction of the abnormal return is greater. The market model generally outperforms the capital asset pricing model in a pilot study conducted by Cable & Holland (1999). The market model is the most commonly applied model when analyzing earnings announcements in previous literature (Patell, 1976) (Barber & Lyon, 1996) (Barholdy, 2007).

Other Statistical Models

The factor model is a general type of a statistical model that is widely used, as they potentially have the benefit of lowering the variance of the abnormal return by describing a higher amount of the variation in the normal return. Portfolios consisting of traded stocks are normally the factors. The market model is a one-factor model, but there exist models including various factors, multifactor models. In addition to the market, industry indexes can be included in multifactor models. The benefits from using multifactor models for event studies are limited (Campbell, Lo, & MacKinlay, 1997). The marginal extra explanatory power of added factors beyond the market factor is limited, and thus, there is only a small decrease in the variance of the abnormal returns.

3.3.2 Economic Models

In practice, it is necessary to impose statistical assumptions to use economic models. The economic models are not free of statistical assumptions, and so the potential advantage of using these models may be the opportunity to estimate more accurate measures of the normal return using economic restrictions (MacKinlay, 1997). The parameters in statistical models are restricted in economic models, to offer more constrained normal return models. The Capital Asset Pricing Model (CAPM) and the Arbitrage Pricing Theory (APT) are two models which provide such restrictions.

The Capital Asset Pricing Model

The Capital Asset Pricing Model describes the relationship between the systematic risk and expected return for assets and was first introduced by Sharpe in 1964. Sharpe constructed a market equilibrium theory of asset prices under conditions of risk (Sharpe, 1964). The expected return of a given stock is a linear function of the return of the market portfolio with its covariance (Campbell, Lo, & MacKinlay, 1997). The CAPM is illustrated with the following equation

$$E(r_i) = r_f + \beta_i\left[E(r_m) - r_f\right] \tag{8}$$

where $E(r_i)$ is the expected return of stock *i*, r_f is the risk-free rate, β_I is the beta of stock *i*, and $E(r_m)$ is the expected return of the market portfolio. $\left[E(r_m) - r_f\right]$ is known as the market risk premium. Use of the CAPM includes pricing of risk securities, generating expected returns for assets given the asset specific risk, and calculating the cost of capital. New evidence cast doubt on the CAPM because deviations from the CAPM have been discovered during the last ten years. The validity of the restrictions imposed by the CAPM on the market model has been doubted, and so the use of CAPM in event studies has almost ceased (MacKinlay, 1997) (Campbell, Lo, & MacKinlay, 1997).

The Arbitrage Pricing Theory

The Arbitrage Pricing Theory is an asset pricing theory where the return of a given asset is determined by its covariance with multiple factors, in the absence of asymptotic arbitrage (Ross, 1976). A security market line linking expected return to risk is predicted by the APT. There are three assumptions necessary for the APT, and the first is that a factor model describes the returns. The next assumptions are that all idiosyncratic risk is diversified away as there are a sufficient number of securities, and prices are set such that there exist no arbitrage opportunities (Ross, 1976). According to the APT, the expected return of security *i* is given by

$$E(r_i) = r_f + \beta_{i1} * RP_1 + \cdots + \beta_{iK} * RP_K \tag{9}$$

where r_f is the risk-free rate, β_{iK} is stock *i*'s sensitivity to factor *k*, i.e. the factor beta, and RP_k is the risk premium for bearing the "factor *k* risk". The APT is viewed as an alternative to the CAPM, but APT uses the risky asset's expected return and the risk premium of several

macroeconomic factors (Ross, 1976). According to CLO, when conducting an event study, application of the APT complicates the implementation of the study, and consequently, the practical advantage of using the APT over an unrestricted model is small (Campbell, Lo, & MacKinlay, 1997).

A statistical model is applied for the analysis in this thesis, and this is due to the strong evidence for a more robust model. The choice is based on the argument from CLO; *"there seems to be no good reason to use an economic model rather than a statistical model in an event study"* (Campbell, Lo, & MacKinlay, 1997). The constant mean return model is simpler compared to the market model, but the market model is chosen as this is the most applied model in similar, previous research papers (MacKinlay, 1997) (Sponholtz, 2008) (Pellicer & Rees, 1999). The market model is the normal performance return model in the following abnormal return and cumulative abnormal return sections.

3.4 Abnormal Returns

This paper examines the impact of quarterly earnings announcements on stock prices, which is described in the abnormal or excess return as compared to any other random day selected in the sample. The abnormal returns capture the event impact, and this is the assumption of the methodology described by MacKinlay (1997). The abnormal return (AR) is defined as the actual return of the stock over the event window minus the normal return of the firm over the same window.

$$AR_{it} = R_{it} - E(R_{it}|X_t) \tag{10}$$

Where AR_{it} denotes the abnormal return at time *t* for firm *i*, R_{it} denotes the actual return at time *t* for firm *i*, and the $E(R_{it})$ represents the expected return at time *t* for firm *i*. X_t is the conditioning information for the normal return model, and when using the market model, X_t represents the market return (MacKinlay, 1997).

The abnormal returns can be calculated and analyzed when the market model parameters are estimated. The market model predicts what the stock return should be under normal conditions, that is, no events such as earnings announcements. AR_{it}, where $t = T_1 + 1,\ldots, T_2$, is

the sample of L_2, where L_2 represents the event window, abnormal returns for firm *i*. The abnormal return at time *t* for firm *i* is calculated by using the following formula (MacKinlay, 1997)

$$AR_{it} = R_{it} - \widehat{\alpha_i} - \widehat{\beta_i} R_{mt} \quad (11)$$

The AR measure is applied because it is an applicable approach since it represents an indication of a change in the market's future expectations of a firm due to the event. Furthermore, it is the most applied measure within event studies to detect and analyze effects of the event (MacKinlay, 1997) (Pellicer & Rees, 1999) (Qureshi, Abdullah, & Imdadullah, 2012) (Sponholtz, 2008).

3.5 Cumulative Abnormal Returns

To be able to analyze the overall influence of the earnings announcements on the stock prices, the abnormal returns must be aggregated. The aggregation of abnormal returns is done both over time and across stocks. The first step is aggregation over time for an individual stock. Cumulative abnormal return (CAR) is used to accommodate a multiple period event window (MacKinlay, 1997). The sample cumulative abnormal return from t_1 to t_2 can be defined as CAR(t_1, t_2), where t_1 and t_2 both lie within the event window ($T_1 < t_1 \leq t_2 \leq T_2$).

$$CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it} \quad (12)$$

That is, the cumulative abnormal return for stock *i* from period t_1 to t_2 is the sum of the abnormal returns in that period. Under H_0 that "*the event has no impact on the distribution of return"* (MacKinlay, 1997), the null hypothesis can be tested given this null distribution of the CAR:

$$CAR_i(t_1, t_2) \sim N(0, \sigma_i^2(t_1, t_2))$$

Aggregation of abnormal returns and cumulative abnormal returns

We have more than one event observation, so it is required that the abnormal return observations are aggregated over the event window and across observations of the event. An assumption about no clustering must be made, that is, there is no overlapping of the

included stocks in the event window. This assumption of absence of overlapping implies that the abnormal returns and the cumulative abnormal returns are independent across stocks (MacKinlay, 1997). By using the AR_{it} equation (11) for each event period, $t = T_1 + 1,\ldots,T_2$ where T_1 and T_2 represent the last day of the estimation window and last day of the event window, respectively, we can aggregate the individual stocks' abnormal returns. The sample average abnormal returns (AAR), given *N* events, for period *t*, is given by

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it} \tag{13}$$

The AAR_t sample variance is calculated using the following formula;

$$var(AAR_t) = \frac{1}{N^2}\sum_{i=1}^{N} \sigma_{\varepsilon_i}^2 \tag{14}$$

Where σ^2_ε is the squared standard error of the market model regression for each stock. The abnormal returns can be analyzed for any given event period by using these estimates.

Given the average abnormal return, the next step is to calculate the cumulative average abnormal return (CAAR). For any given time, interval in the event window we have the cumulative average abnormal return (CAAR)

$$CAAR_{t1,t2} = \sum_{t=t_1}^{t_2} AAR_t \tag{15}$$

$$var\big(CAAR_{t1,t2}\big) = \sum_{t=t_1}^{t_2} var(\,AAR_t) \tag{16}$$

Likewise, the CAAR can be formed security-by-security, and then aggregate through time;

$$CAAR_{t1,t2} = \frac{1}{N}\sum_{i=1}^{N} CAR_i(t_1, t_2) \tag{17}$$

$$var\big(CAAR_{t1,t2}\big) = \frac{1}{N^2}\sum_{i=1}^{N} \sigma_i^2\,(t_1, t_2) \tag{18}$$

The covariance term is set to zero by introducing the assumption that there is no overlapping in the event windows of the *N* stocks.

3.6 Test Statistics

There exist various types of test statistics that could be used to assess the consistency of the sample data, and to confirm whether the null hypothesis should be accepted or rejected. Several test statistics have been developed for short-term event studies, and the statistical tests are divided into two groups; parametric and nonparametric tests. The main difference between these two groups of tests is that the parametric tests rely on an assumption concerning the distribution of returns, while the nonparametric tests are free of assumptions regarding the return distribution (MacKinlay, 1997). The tests are used to verify whether any abnormal returns are present in the event window, by applying both AR and CAR, in addition to the averages of these.

With the null hypotheses, AAR = 0 and CAAR = 0 being are true, implying that H_0 cannot be rejected, it shows that the quarterly earnings announcements have been realistically expected by the market. However, a rejection of the null hypotheses indicates that the market might have had expectations that were, on average, unrealistic, and the market could be inefficient. With an assumption of no transaction costs, in the case of an inefficient market, investors should be able to realize abnormal returns around the quarterly earnings announcement. According to existing literature, nonparametric tests could be used to support the results of parametric tests, and thus increase the reliability of the results (MacKinlay, 1997) (Brown & Warner, 1985).

3.6.1 Parametric

Parametric test statistics are utilized in event studies to uncover differences of means at a specified time. The means are abnormal returns (AR), which are for a specific event day, or cumulative abnormal returns (CAR), concerning the whole event window. The parametric tests assume that the sample data are cross-sectionally independent and random from a specified population and that the returns are normally distributed (Martens, Pugliese, & Recker, 2017). This paper describes and applies the student's t-test.

The student's t-test θ_1

Several researchers, such as Qureshi et al. (2012), use the student t-test to test their null hypothesis: *"Average abnormal return on any day in the event window is equal to zero*". The t-statistic is the ratio of abnormal return on security *i* on the given day *t* in the event window, to its standard deviation (Qureshi, Abdullah, & Imdadullah, 2012). The t-tests can be applied to the aggregated form of abnormal returns and the cumulative abnormal returns, as illustrated by Campbell, Lo, and MacKinlay (1997);

$$\theta_{1AAR_t} = \frac{AAR_t}{SD(AAR_t)} \sim N(0,1) \qquad (19)$$

The above t-test has a null hypothesis of AAR = 0, and the alternative hypothesis is AAR ≠ 0. If the null hypothesis is accepted, then the t-stat follows a student distribution with (n – 1) degrees of freedom. The t-value denotes the direction of the correlation, meaning that a positive t-value indicates a positive relationship between the AARs or, conversely, a negative relationship. If the t-value exceeds the critical value, then the correlation is significant.

To test the null hypothesis of CAAR = 0 versus the alternative hypothesis CAAR ≠0, we calculate the following t-statistic for the cumulative average abnormal return, which is the ratio of $CAAR_{it}$ to its standard deviation;

$$\theta_{1CAAR} = \frac{CAAR_{t1,t2}}{SD\left(CAAR_{t1,t2}\right)} \sim N(0,1) \qquad (20)$$

At the 5% significance level, the critical value is 1,96, while for the 1% significance level the critical value is 2,576, and lastly, for the 10% significance level, the critical value is 1,645. The CAAR is utilized to measure if there is any change in the AAR during the window due to the quarterly earnings announcement.

The standard deviations used to calculate the t-statistics is estimated from the average abnormal return (or CAAR) of the specific cases. For example, the standard deviations for bad news in the base case were calculated using the average abnormal return in the event window for bad news.

3.6.2 Nonparametric

Alternatives to parametric tests are the nonparametric tests. There are no specific assumptions regarding the return distribution under nonparametric approaches (Campbell, Lo, & MacKinlay, 1997). Nonparametric tests are well-defined and more robust at detecting the null hypothesis of no abnormal returns that are false (Dutta, 2014). The most common nonparametric test in event studies is the sign test.

The Sign Test

The sign test "*refers to a simple binomial test of whether the frequency of positive abnormal residuals equals 50 percent*" (Dutta, 2014). The sign of the average abnormal return is the basis for the sign test. The requirements for the sign test are that the AARs are independent across stocks and that the expected portion of AARs that are positive is 0,5 under the null hypothesis (Campbell, Lo, & MacKinlay, 1997). Under the null hypothesis, the probability of the AAR being positive or negative is equal. Accordingly, the null hypothesis is H_0: $p \leq 0{,}5$, and the alternative hypothesis is H_A: $p > 0{,}5$ (where $p = \Pr(AAR_i \geq 0.0)$) if the alternative hypothesis is that the given event leads to positive abnormal return. An event with AAR > 0 give p a value of 1, while AAR < 0 give p a value of 0. Following Campbell, Lo and MacKinlay (1997), the test statistic, θ_{2AAR}, is

$$\theta_{2AAR} = \left[\frac{N^+}{N} - 0.5\right]\frac{N^{\frac{1}{2}}}{0.5} \sim N(0,1) \qquad (21)$$

where N^+ is the number of cases with positive abnormal return, and N represents the total number of cases. A disadvantage of the sign test is that if the distribution of abnormal returns is skewed, as it can be with daily data, the test may not be well specified (Campbell, Lo, & MacKinlay, 1997).

There exist other nonparametric tests, such as the generalized sign test, which is a modified approach of the sign test where the p is adjusted and allowed to be other than 0,5, and the rank test, were the abnormal returns are ranked according to size. See Cowan (Nonparametric Event Study Tests, 1992) for the generalized sign test, and Corrado (A

Nonparametric Test for Abnormal Security-Price Performance in Event Studies, 1989) for further information on the rank test.

3.6.3 Parametric versus Nonparametric

Both parametric and nonparametric tests are employed in event studies. Several comparisons of parametric and nonparametric tests have been made, where the primary goal has been to reveal which of the tests that provide the most robust results. Dutta (2014) review existing literature on statistical tests in short-run event studies, and his conclusion is "*the nonparametric sign and rank tests provide better specification and power than standard parametric approaches in detecting abnormal performance"* (Dutta, 2014). Cowan conducted a study in 1992 where he found that the specification and power are better when using the sign and rank test than with parametric tests (Cowan, 1992). However, the nonparametric test should be used as a robustness test of the parametric test, rather than as a stand-alone test (MacKinlay, 1997). Research papers on event studies involving earnings announcements mainly use parametric tests, and specifically the student's t-test, as the statistical test (MacKinlay, 1997) (Mlonzi, Kruger, & Nthoesane, 2011) (Qureshi, Abdullah, & Imdadullah, 2012) (Sponholtz, 2008) (Pellicer & Rees, 1999). For that reason, a parametric test, the student's t-test, is the main test, and the nonparametric sign test is used as a robustness check.

4 Data Description

This chapter starts with a description of the main characteristics of the Oslo Stock Exchange (OSE), in addition to a comparison of the OSE with other stock exchanges. Further, the event is defined, and a description of the data selection and collection is provided.

4.1 The Oslo Stock Exchange

The Christiania Exchange (Christiania Børs) opened in 1819 for currency trading and the purchase and sale of bills of exchange. First, in 1881, the Oslo Stock Exchange opened for trading of financial instruments on a limited scale, as only 30 bonds and shares were listed. Today, the OSE is the only regulated market for trading securities in Norway. The OSE offers trading of stocks, derivatives and fixed income products, and the main role of the stock exchange is to allocate capital in Norway. There is a total of 182 companies listed at the OSE distributed over 10 sectors, with a total market capitalization of 243.010 million USD per January 2017[1]. Today, the OSE is internationally recognized for being in a unique position within the sectors of energy, shipping, and seafood.

There are several indices on the OSE, whereas the OSEAX is the Oslo Stock Exchange All Share Index and contains all companies listed on the stock exchange. The OSEBX is the Oslo Stock Exchange Benchmark Index, and the OBX is an index consisting of the 25 most liquid stocks. At the end of 2016, the stocks listed in the OBX represented 84,34% of the total market capitalization at the OSE. Those stocks not listed in the OBX index are either listed in the "OB Match" category, which is for those stocks that have at least 10 trades per day (excluding those listed in the OBX) or the "OB Standard" category, for the remaining stocks.

Previous research on market efficiency in general and event studies have been conducted on data from the U.S. stock exchanges. The Norwegian stock exchange is quite different from the U.S. stock exchanges in terms of the industry characterization. Additionally, another factor separating the OSE from the U.S. exchanges is that the OSE is the only stock exchange

[1] https://www.oslobors.no/ob_eng/Oslo-Boers/About-Oslo-Boers , visited February 2017

in Norway, whereas there are several stock exchanges in the U.S. The World Federation of Exchanges have a statistics database that enables a comparison of the OSE to the New York Stock Exchange (NYSE), the London Stock Exchange (LSE) and NASDAQ Nordic Exchanges (eight stock exchanges in the Nordic and Baltic countries). The main finding is that the number of stocks listed at the OSE is significantly lower. Moreover, the total market capitalization of the NYSE is 80 times larger than the OSE, while LSE is approximately 15 times larger, and the NASDAQ Nordic is more than 5 times larger than the OSE. This shows that the OSE is significantly smaller stock exchange than the NYSE and the LSE, while the NASDAQ Nordic is more comparable to the OSE as it consists of stock exchanges of several countries. The average market capitalization (that is, dividing total market capitalization with number of listed companies for each stock exchange) for companies listed at the OSE is 1.146 million USD, while it is 8.517 m/USD for NYSE, 1.354 m/USD for LSE and 1.381 m/USD for NASDAQ Nordic. The numbers imply that the OSE is not only a considerably smaller stock exchange but also that the companies listed are smaller.

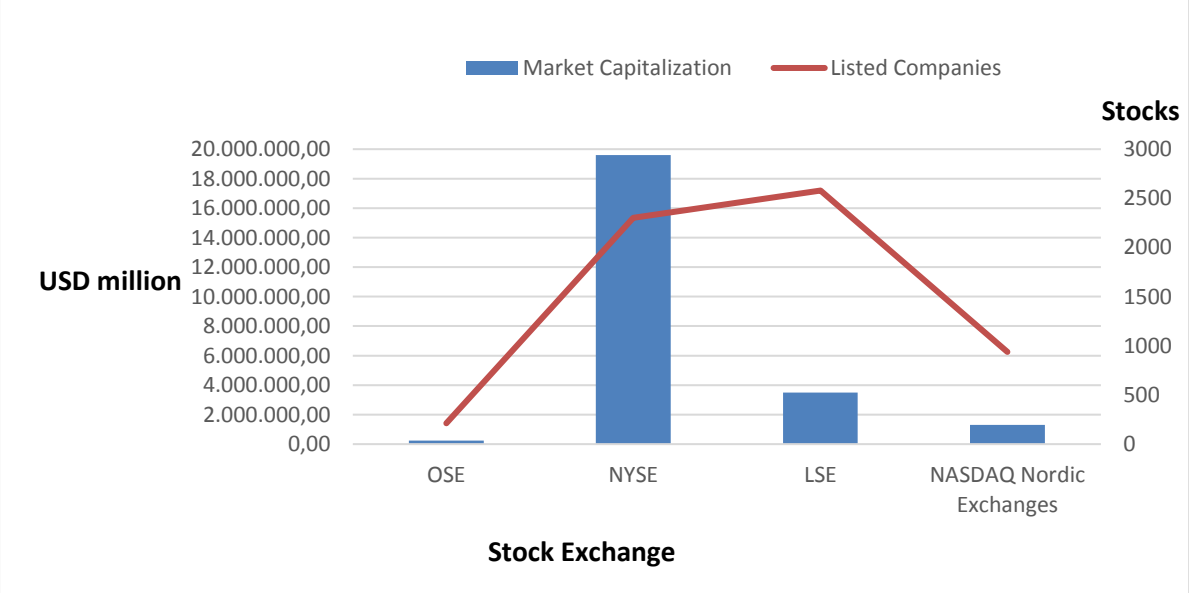


Figure 4-1; Comparing the OSE to the NYSE, LSE and NASDAQ Nordic Exchanges

Figure 4-2 provides a comparison of the trading volume between the different stock exchanges, which can be used for liquidity comparisons, and there are large differences between the OSE and the other exchanges.

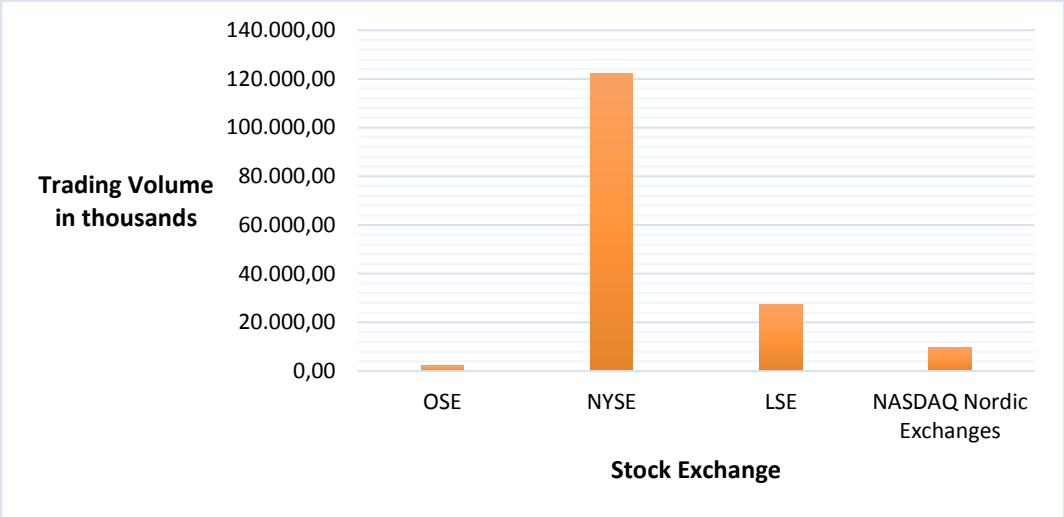


Figure 4-2; Comparison of trading volume of the OSE to the NYSE, LSE and NASDAQ Nordic Exchanges

A small number of companies dominate the OSE, and the largest companies are Statoil with a 25,61% share, DNB with 10,42% and Telenor make up 9,65% of the total registered market capitalization. In total, these companies account for 45,7% of the market capitalization at the OSE at the end of the year 2016, according to statistics provided by the OSE. Furthermore, the 25 largest companies (listed in the OBX) accounted for 74% of the total transactions on the OSE during 2016. The average number of trading days for all stocks listed at the OSE is 219, of a total of 253 possible trading days. Thus, trading volume is concentrated in the larger listings, and several stocks suffer from thin trading.

There are obvious differences between the OSE and the larger stock exchanges. There exists limited research on the informational content of earnings announcements at the OSE, and the OSE is not very comparable to the larger stock exchanges, so there is a reason to expect that the outcome could be somewhat different from previous research papers.

4.1.1 The Oslo Stock Exchange Benchmark Index

The Oslo Stock Exchange Benchmark Index (OSEBX) is the main index for the Oslo Stock Exchange, and contains the 62 most traded companies (see Appendix A.1 for a full list of the companies listed in the Index), and is adjusted for dividend payments[2]. The index consists of

[2] http://oslobors.no/ob_eng/markedsaktivitet/#/details/OSEBX.OSE/overview , visited February 2017

listed companies from different industries and is supposed to be representative for all the listings at the OSE at all times. The OSEBX is semiannually revised, free float adjusted, and any changes to the index are made on the 1st of June or the 1st of December.

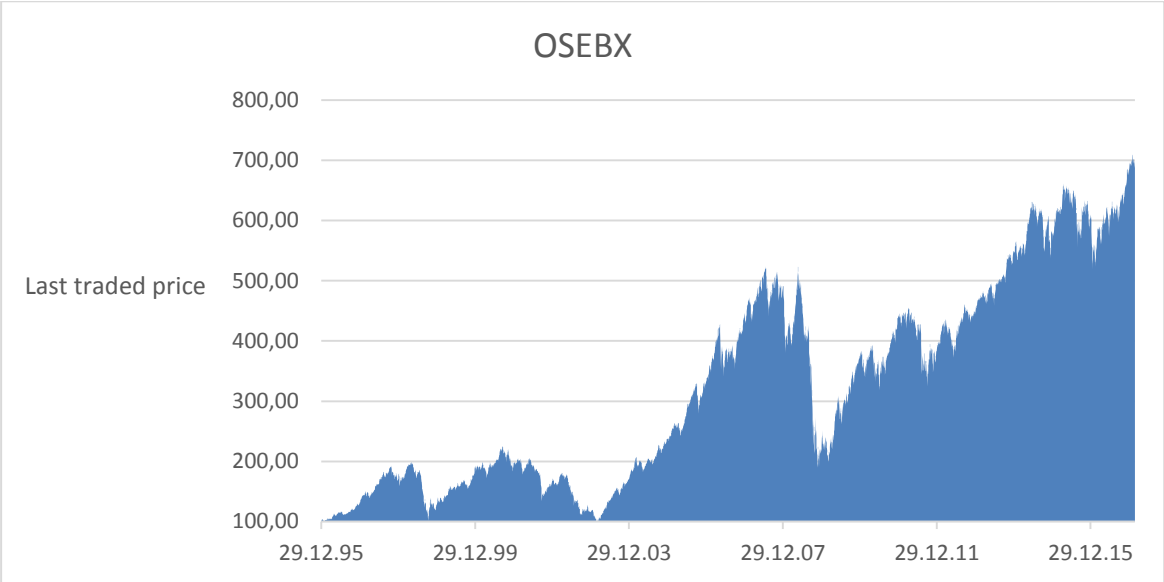


Figure 4-3; The price development of the OSEBX

Figure 4-3 shows the last official traded price intraday over the period from the launch of the index up until today (February 2017). As can be seen from the graph, all over, there has been a positive development since the launch of the index. However, around the year of the financial crisis (2007-2008), there was a large drawback in the development. Over the last 5 years, the development has been positive and rather steady for the Benchmark Index.

4.2 Definition of the Event Study

An event study methodology is implemented for the analysis, like that of MacKinlay (1997) and Campbell et al. (1997). This methodology is applied to evaluate the economic impact of a specific event, which in this thesis is the quarterly earnings announcements. There are four earnings announcements each year for all companies, where quarters one to three are reported within the same year, and quarter four is reported at the beginning of the following year. The years included in this study is 2013 to 2016, and this gives a total of 16 quarters. The date of the earnings announcement is used as the day of the event and hereafter referred to as t = 0.

A 41-day event window is chosen, as in MacKinlay's (1997) example of a standard event study. The event window consists of the 20 trading days before the event, the date of the quarterly earnings announcement, and 20 post-event trading days. That is, t = -20, …, 0,…,20. This is to be able to capture any potential effects in the days leading up to the event, such as the expectations of investors, as well as to capture potential anomalies, like signs of a post-earnings announcement drift, in the days following the announcement. This should be sufficient to check for the information content of the earnings announcements and the expectations of the market.

The estimation window is set to be 126 days before the event window, and thus, 126 days are used for calculation of the market models. In research papers on quarterly earnings announcement, there are examples of a 250-day estimation window (MacKinlay, 1997), a 120-day estimation window (Bijoy & Sehgal, 2015), and a 90-day estimation window (Qureshi, Abdullah, & Imdadullah, 2012). According to Benninga (2014), there should be a minimum of 126 days in the estimation window, for enough days for the market model estimation. There is a risk that the market model will not reflect the true stock price movements if less than 126 observations are used, as the relationship between the stock returns and market returns may not be completely reflected (Benninga, 2014). The stock exchange is open, on average, 250 days per year, so 126 days is approximately half a year, and this should be sufficient. Therefore, the expected returns in absence of the event are calculated with t = -146, -145, …., -21. Figure 4-4 demonstrates the relationship between the estimation window, the event window and the date of the event.

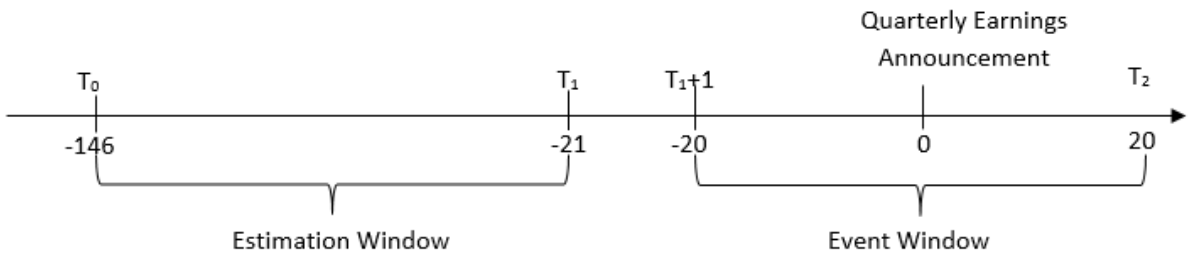


Figure 4-4; Timeline for the event study

4.3 Data Selection and Collection

The main objective of this thesis is to study the movements in the stock prices at, and in the days surrounding, the time of the quarterly earnings announcements for different companies listed in Norway. To do this, the Oslo Stock Exchange is chosen, and the Oslo Stock Exchange Benchmark Index (OSEBX) is the target sample. The sample data collected are recently updated, and a good representative of the Norwegian market performance. Using an index like the OSEBX is legitimate, as one may assume to get different results for small and large firms, so the index provides a suitable and independent classification concerning these two groups. In addition, it may be challenging to calculate abnormal returns for less liquid stocks lacking prices due to thin trading, and the index ensures a certain level of trading of the stocks. The Oslo Stock Exchange All Share Index (OSEAX) is used as the market portfolio and applied when regressing the market models for the individual events.

The dates of the quarterly earnings announcements at the OSE are found on the Oslo Stock Exchange NewsWeb. NewsWeb offers a financial calendar that provides the announcement dates of the quarterly earnings for all companies. Stock prices are collected from DataStream, which is a database containing Financial and Economic research data from Thomson Reuters. The prices collected from DataStream are already adjusted for stock splits and similar corporate actions, but not adjusted for dividends, hence they must be adjusted for dividends. The adjusted closing prices are calculated by deducting the value of the dividend, collected from DataStream, from the stock price at the date of the dividend announcement. The market capitalizations used to separate the firms into small and large firms categories are collected from the Oslo Stock Exchange Statistics page[3]. Forecasted and actual earnings per share for all quarters are collected from the Bloomberg Terminal.

The sampling interval is set to one day; that is, daily stock returns are applied. For a level ground comparison of stock prices, logarithmic returns are calculated. Strong (1992) argues

[3] https://www.oslobors.no/ob_eng/Oslo-Boers/Statistics/Annual-statistics, visited february 2017

that "*logarithmic returns are preferred because they are theoretically better when linking together sub-period returns to form returns over a long time*". The following formula for calculating log-returns is applied;

$$R_t = \ln\left(\frac{P_t}{P_{t-1}}\right) \tag{22}$$

where R_t is the log-return, P_t is the stock price at day t, and P_{t-1} is the stock price at day $t-1$.

The current financial theory proposes that expected levels of future earnings are an important determinant in the formation of cash flow forecasts which provide the cornerstone for stock price estimates. It appears that market reactions can be used to assess the degree to which investors feel unexpected earnings to provide information on future cash flow distribution (Bathke & Lorek, 1984).

There is a total of 62 companies in the OSEBX, and with four quarters each year in the period 2013-2016, this should give a total of 992 events. After collecting the data, only 40 companies are left as there are late listings of a few companies and missing data in relation to the forecasted EPS for some firms, and this gives us a total of 640 events. Each of the quarterly earnings announcements is assigned to one of three categories, in line with the grouping of Campbell, Lo & MacKinlay (1997); good news, no news, and bad news. The announcements are grouped according to the deviation of the actual EPS from the forecasted EPS. Good news is those announcements where actual EPS exceeds forecasted EPS by more than 2,5%, and the news is bad if the actual forecast is -2,5% less than forecast. No news are those announcements where the actual earnings are in the range of 5% centered about the forecasted earnings. Nevertheless, after categorizing the news using the 2,5% upper and lower limit, we find that there are very few no news events. So, the limit is increased to 5% to make the data estimations more robust. Good news is those announcements where actual EPS exceeds forecast by 5%, the bad news is those announcements where actual EPS is more than -5% below the forecast, and the no news are the differences between actual EPS and forecasted EPS that lie within the {5%, -5%} interval.

4.3.1 The Ordinary Least Square Procedure

Time series data have certain characteristics that can require special attention when applying the ordinary least squares (OLS) regression. In this paper, the OLS estimation technique is applied to minimize the difference between the observed responses in the dataset and the predicted responses by the approximation of the data. Six key assumptions should be considered when applying the OLS (Woolridge, 2014),

1. The time series process follows a model that is linear in its parameters;
   $Y_t = \beta_0 + \beta_1 x_{t1} + \ldots + \beta_k x_{tk} + \mu_t$, where: $\mu_t = 1,2,\ldots,n$ is the sequence of errors of disturbances.
2. No independent variable is constant or a perfect linear combination of the other in the sample data, hence no perfect collinearity.
3. There should be a zero conditional mean, meaning that the explanatory variables are strictly exogenous; $E(\mu_t|x) = 0$, $t=1,2,\ldots,n$
4. Conditional on X, the variance of u_t stays the same for all, homoscedastic errors; $VAR(\mu_t|X) = \sigma^2$.
5. The errors in two different time periods are uncorrelated;
   $Corr(\mu_t,\mu_s|X) = 0$ for $t \neq s$.
6. The errors u_t are independent of X and normally distributed.

The OLS is the best linear unbiased estimator (BLUE) when these assumptions hold. There are various problems that may occur in this regression procedure which could lead to biased estimators or lack of efficiency. If one of the six assumptions are violated, then the OLS estimates will no longer be BLUE. OLS regression is applied when estimating the market models.

4.3.2 Market Model Estimates

The average estimates from the market model regressions are found in the following table, and they are estimated using a 126-day estimation window. See Appendix B for estimation of the OLS parameters. Table 4-1 displays the mean, standard deviation, minimum and maximum values of alpha and beta.

	α	β
Mean	0,000005	0,866609
Standard deviation	0,002205	0,568909
Maximum	0,007188	3,474613
Minimum	-0,017983	-1,914877
Number of observations	640	640

Table 4-1; Market model estimates

The mean of alpha is very close to zero, while the beta lies right under one. A conventional t-test shows that alpha is not statistically significant, and neither is the beta, thus neither are statistically different from zero. This is also displayed in the minimum and maximum values for both, which contain 0 (Munk, 2015). The minimum and maximum values of the alpha are not unreasonable, while for the beta, the range is larger. Alpha is a measure of excess expected return of a stock that "*cannot be attributed to the sensitivity to general stock market movements"* (Munk, 2015). Accordingly, when the return of the market portfolio is zero, the average return of the sample is equal to the alpha.

The beta is a measure of how sensitive an asset is to the return on of the market portfolio (Munk, 2015). An average beta less than one for stocks in the OSEBX denotes that these stocks are theoretically less volatile than the market, which is the OSEAX. A beta of 0,866 implies that the sample average is theoretically 13,4% less volatile than the market. If the excess market return increases by one percentage point, the excess return increases on average by 0,866 percentage points (Munk, 2015). We have chosen to use 126 days as the estimation period of the market model, compared to 250 days which is also a common estimation period in event studies. Even though it can be argued that long-term period beta estimates could be more accurate, they may be a poor representation of future expectations, especially if major changes in an asset have occurred, hence, we believe that a short-term beta will provide a beta closer to a stock's current level of systematic risk.

5 Empirical Results

In this section, the results of the data analysis are provided. This paper considers five different cases. In the first case, referred to as the base case, the full event sample is divided into the three different news groups; good, bad, and no news. Further, the grouping in the base case is used as the foundation for the next four cases. The events are sorted by market capitalization at the end of the year 2016 in the second case, and the sample is divided into two groups; small and large firms. We are interested in studying the different time periods of the sample, so in the third case, the sample is divided into each of the four years included in this thesis. In the fourth case, the sample data is split by financial quarter into four groups; first quarter, second quarter, third quarter and fourth quarter. The events are sorted by industry in the final case, and the industry categorization used by the Oslo Stock Exchange is applied.

For each of these cases, a table showing the distribution of the events is provided. Furthermore, tables with AAR and CAAR and the relevant test statistics, in addition to graphs of CAAR, are presented. Parametric tests and a nonparametric test are conducted to find the validity of the AAR and CAAR in the days of the event window estimated under each of the cases.

5.1 The Base Case

In this section, the full sample of quarterly earnings announcements is investigated by looking at the average abnormal returns and the cumulative average abnormal return during the event window. Of the 640 events, 268 earnings announcements are in the good news category, 318 are bad news, and the remaining 54 earnings announcements are no news. As discussed in part 4.3, the deviation of actual EPS from forecasted EPS was increased from lying within the ±2,5% to being within the ±5% range for the no news category. The range was changed to include more events in the no news category, and this will make the test results more robust. Intuitively, we want to look at the sample divided into the tree news categories to get an overview of the different group reactions to the quarterly earnings

announcements. The average abnormal return and cumulative average abnormal return for the full sample are presented in Table 5-1.

	Bad news		No news		Good news	
days	AAR	CAAR	AAR	CAAR	AAR	CAAR
-20	-0,09%	-0,09%	-0,24%	-0,24%	0,06%	0,06%
-19	-0,20%	-0,29%	-0,23%	-0,48%	-0,08%	-0,02%
-18	-0,07%	-0,37%	0,15%	-0,33%	0,01%	0,00%
-17	-0,48%	-0,84%	0,36%	0,04%	-0,24%	-0,24%
-16	0,01%	-0,83%	-0,72%	-0,68%	0,04%	-0,20%
-15	0,06%	-0,76%	-0,25%	-0,93%	0,06%	-0,14%
-14	-0,02%	-0,78%	-0,07%	-1,00%	0,01%	-0,13%
-13	-0,06%	-0,83%	-0,39%	-1,39%	-0,05%	-0,19%
-12	0,13%	-0,71%	0,49%	-0,90%	-0,18%	-0,37%
-11	-0,05%	-0,76%	0,12%	-0,78%	0,22%	-0,15%
-10	0,08%	-0,68%	0,13%	-0,65%	0,10%	-0,05%
-9	-0,21%	-0,89%	-0,05%	-0,71%	0,09%	0,05%
-8	0,09%	-0,80%	0,07%	-0,63%	-0,23%	-0,18%
-7	-0,09%	-0,89%	-0,20%	-0,84%	0,13%	-0,05%
-6	0,02%	-0,87%	-0,25%	-1,08%	0,00%	-0,05%
-5	0,04%	-0,83%	-0,06%	-1,14%	0,09%	0,04%
-4	-0,08%	-0,90%	-0,50%	-1,64%	0,04%	0,07%
-3	0,12%	-0,78%	-0,04%	-1,68%	0,10%	0,18%
-2	-0,06%	-0,84%	-0,02%	-1,70%	0,26%	0,44%
-1	0,06%	-0,79%	-0,28%	-1,98%	0,25%	0,69%
0	-1,29%	-2,08%	0,69%	-1,29%	0,11%	0,80%
1	-0,02%	-2,10%	0,87%	-0,41%	0,95%	1,75%
2	0,06%	-2,04%	0,02%	-0,39%	0,38%	2,14%
3	-0,09%	-2,13%	0,03%	-0,36%	0,33%	2,46%
4	-0,14%	-2,27%	0,06%	-0,30%	-0,04%	2,43%
5	0,08%	-2,19%	0,19%	-0,11%	0,00%	2,43%
6	-0,08%	-2,27%	-0,06%	-0,16%	0,10%	2,53%
7	-0,03%	-2,30%	-0,04%	-0,21%	0,28%	2,81%
8	-0,01%	-2,32%	0,18%	-0,03%	-0,18%	2,63%
9	-0,06%	-2,38%	0,11%	0,08%	-0,09%	2,54%
10	0,02%	-2,35%	-0,13%	-0,05%	-0,16%	2,37%
11	0,09%	-2,26%	0,35%	0,30%	0,18%	2,55%
12	-0,09%	-2,35%	0,16%	0,46%	0,23%	2,79%
13	0,12%	-2,23%	-0,21%	0,25%	-0,09%	2,69%
14	-0,02%	-2,25%	-0,40%	-0,15%	-0,08%	2,62%
15	0,03%	-2,23%	-0,12%	-0,27%	0,10%	2,72%
16	0,14%	-2,09%	0,10%	-0,18%	-0,02%	2,70%
17	-0,10%	-2,19%	-0,11%	-0,28%	-0,27%	2,43%
18	0,19%	-2,00%	-0,21%	-0,49%	0,00%	2,42%
19	-0,04%	-2,04%	-0,26%	-0,75%	0,26%	2,68%
20	0,12%	-1,92%	0,13%	-0,61%	0,00%	2,69%
std.dev	0,0023	0,0076	0,0030	0,0057	0,0021	0,0129

Table 5-1; Full sample AAR and CAAR for the three groups

As expected, the AAR and CAAR for the bad news events are both negative at day 0 and the day following the announcement. Similarly, for the good news events, the AAR and CAAR are positive at the announcement day and the following days. The no news AAR is positive on the day of the announcement and the days following, but the CAAR is negative because the AARs leading up to the announcement are negative. An important notice is that the daily standard deviation for AAR is higher for the no news events than for good and bad news, implying that the sign and size of abnormal returns are more volatile for the no news announcements. For each of the news groups, figures presenting AAR and CAAR, with the relevant tests of significance, are presented in the following sections.

5.1.1 Bad News

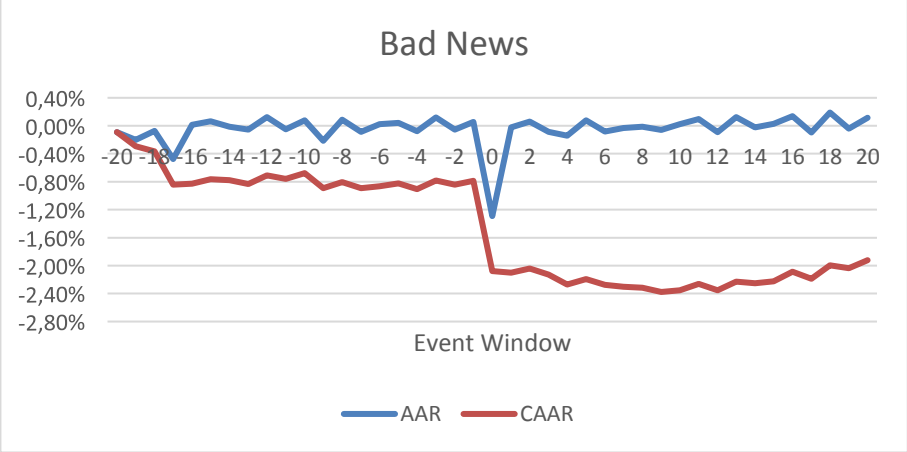


Figure 5-1; AAR and CAAR plot for full sample bad news

Figure 5-1 displays the AAR and CAAR graphs for the bad news announcements. The AAR is volatile in the days leading up to, and the days following the quarterly announcement. There is a major drop in AAR at the day of the announcement, day 0. This is in line with theory and the expectations of a negative stock price reaction on the day of a bad news announcement. This drop leads CAAR down to a new level, where it continues to fluctuate. The following table, Table 5-2, illustrates the full sample AAR and CAAR, with the relevant test statistics, for the bad news, and the remaining are found in Appendix C.1.

Days	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR}	θ_{1CAAR_t}
-20	-0,001	-0,001	-0,392	0,000	-0,119
-10	0,001	-0,007	0,343	0,112	-0,892
-4	-0,001	-0,009	-0,344	0,112	-1,188
-3	0,001	-0,008	0,520	-0,112	-1,030
-2	-0,001	-0,008	-0,245	-0,785	-1,105
-1	0,001	-0,008	0,238	0,000	-1,032
0	-0,013	-0,021	-5,580*	-3,589*	-2,729*
1	0,000	-0,021	-0,099	-0,449	-2,759*
2	0,001	-0,020	0,250	-0,561	-2,683**
3	-0,001	-0,021	-0,373	-0,785	-2,797*
4	-0,001	-0,023	-0,616	-0,897	-2,984*
10	0,000	-0,024	0,095	-0,449	-3,093*
20	0,001	-0,019	0,498	0,224	-2,525**
Std.dev.	**0,002**	**0,008**			

Note: *, ** and *** represents the statistical significance at the 1%, 5% and 10% level.

Table 5-2; Test statistics for full sample bad news

There is a significant negative abnormal return at the day of the announcement. The test statistics for AAR display that day zero is statistically significant at a 1% level, so the H0 is rejected, and the quarterly earnings announcements have an impact on stock prices. This is the only day from the student's t-test for AAR that is statistically significant. The nonparametric sign test statistics is considered for a robustness check of the significance of AAR. The test results from the sign test support the parametric test result; hence, the rejection of the H0 at day zero is kept. The t-stat for CAAR illustrates a clear significant trend after the day of the announcement. This implies that the changes in AAR are because the earnings announcements have a significant impact on stock prices.

5.1.2 Good News

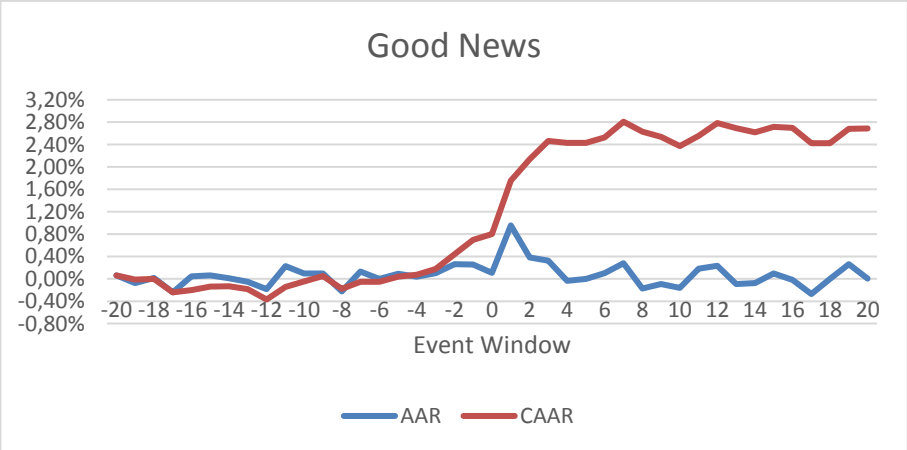


Figure 5-2; AAR and CAAR plot for full sample good news

Figure 5-2 illustrates the AAR and CAAR of the good news category in the full sample. AAR fluctuates randomly around 0%, except for at the announcement day and the day after, where it peaks to its highest level during the event window. The CAAR line is unstable until the day of the announcement, but from day -4, a positive drift starts. At the day of the announcement, the CAAR jumps up and continues to be positive and drift upwards. The CAAR pattern in the graph is consistent with the theory, where one expects a positive pattern of CAAR following a positive earnings announcement. The following table presents the AAR and CAAR values, in addition to the test statistics, for the good news announcements.

Days	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR}	θ_{1CAAR_t}
-20	0,001	0,001	0,284	-0,855	0,047
-10	0,001	0,000	0,461	-1,344	-0,037
-4	0,000	0,001	0,174	-0,733	0,057
-3	0,001	0,002	0,486	0,489	0,137
-2	0,003	0,004	1,239	0,855	0,342
-1	0,003	0,007	1,189	1,710***	0,538
0	0,001	0,008	0,503	0,977	0,621
1	0,010	0,018	4,490*	3,787*	1,361
2	0,004	0,021	1,806***	1,466	1,659***
3	0,003	0,025	1,533	1,100	1,912***
4	0,000	0,024	-0,167	-0,244	1,884***
10	-0,002	0,024	-0,768	-1,588	1,841***
20	0,000	0,027	0,011	-0,855	2,084*
Std.dev	**0,002**	**0,013**			

Note: *, ** and *** represents the statistical significance at the 1%, 5% and 10% level.

Table 5-3; Test statistics for full sample good news

Test values for the whole window are presented in Appendix C.2. The AAR is positive on the announcement day, but not statistically significant. Day 1 and day 2 provide significant AARs at the 1% and 10% level, respectively, and the sign test shows significance at the 10% level at day -1 and at the 1% level at day 1. The t-stat for CAAR at day 20 is highly significant at a 1% level, and this implies that there is a significant change in the abnormal returns during the event window. So, the earnings announcements have an impact on stock prices in the case of the good news events.

5.1.3 No News

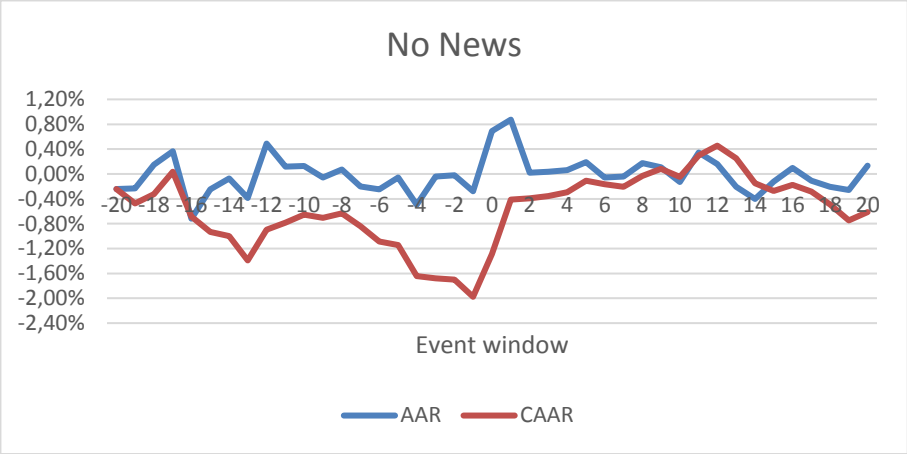


Figure 5-3; AAR and CAAR plot for full sample no news

Figure 5-3 illustrates the AAR and CAAR for the full sample of no news events. There are fluctuations in the AAR, leading to an unstable development of CAAR. At the day of the announcement, the abnormal return jumps up, as a reaction to the earnings announcements, in line with the theory.

Days	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR}	θ_{1CAAR_t}
-20	-0,002	-0,002	-0,817	-1,633	-0,424
-10	0,001	0,435	0,435	0,000	-1,134
-4	-0,005	-0,016	-1,666***	-0,544	-2,854*
-3	0,000	-0,017	-0,133	0,272	-2,924*
-2	0,000	-0,017	-0,064	-1,089	-2,957*
-1	-0,003	-0,020	-0,926	-1,633	-3,437*
0	0,007	-0,013	2,310**	1,633	-2,239*
1	0,009	-0,004	2,931*	1,089	-0,718
2	0,000	-0,004	0,072	0,000	-0,681
3	0,000	-0,004	0,113	-0,272	-0,622
4	0,001	-0,003	0,208	0,272	-0,514
10	-0,001	0,000	-0,432	-0,272	-0,086
20	0,001	-0,006	0,449	-0,544	-1,069
Std.dev.	**0,003**	**0,006**			

Note: *, ** and *** represents the statistical significance at the 1%, 5% and 10% level.

Table 5-4; Test statistics for full sample no news

The test statistics from the parametric and nonparametric tests are listed in Table 5-4, and the remaining are presented in Appendix C.3. AAR is statistically significant at a 5% level at the day of the announcement, and the day 1 AAR is statistically significant at a 1% level. Thus, the null hypothesis is rejected, and so the event has an impact on stock prices, and the

effect is positive. When looking at the t-stat for $CAAR_{-20,20}$, which takes the whole event window into account, one can see that there is no significant change in the abnormal return during the event window. Nevertheless, $CAAR_{-20,0}$ is statistically significant.

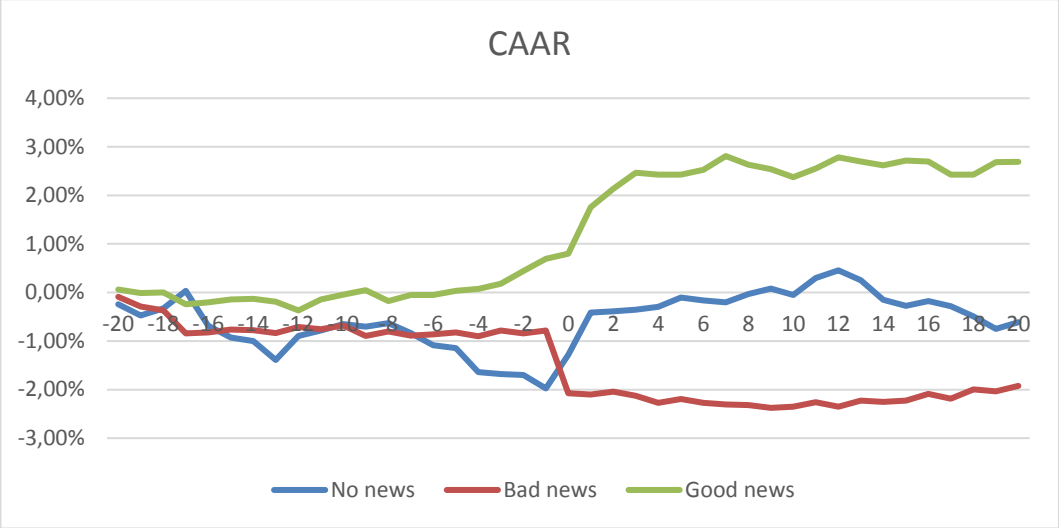


Figure 5-4; Comparison of CAAR

Figure 5-4 illustrates and compares the CAAR graphs of the three news groups. The CAAR plots for all the three groups fluctuate at the same levels up until day -6 where the no news drops, and the good news plot start a small positive drift upward. What is interesting is there seems to be no clear fluctuation in the bad news CAAR before at day 0, while the no news and good news CAAR plots fluctuate in the days leading up to the announcement. From day 0, they are completely separated and non-comparable, which is in line with the expectations that the different earnings announcements lead to different market reactions.

5.2 Market Capitalization

In this section, we explore whether there are any differences in the abnormal returns for firms of different size, hence the sample data is split into two groups; small firms and large firms. Small are those companies with a market capitalization of less than 15 million NOK at year end 2016, while large companies are those with a market capitalization higher than 15 million NOK. The grouping can be found in Appendix D. The two groups are further divided into bad, good and no news, to investigate whether there is a difference in the reactions to the quarterly earnings announcements.

	Small Firms	Large Firms	Sum
Bad News	182 54,2%	136 44,7%	*318*
Good News	127 37,8%	141 46,4%	*268*
No News	27 8,0%	27 8,9%	*54*
Sum	*336*	*304*	*640*

Table 5-5; Distribution of good, bad and no news within the market capitalization case

Table 5-5 shows the distribution of the events for the two market capitalization groups. Large firms are dominated by good news, while small firms are dominated by bad news. This is an interesting finding because, in the full sample, the bad news seems to dominate throughout the findings.

5.2.1 Small Firms

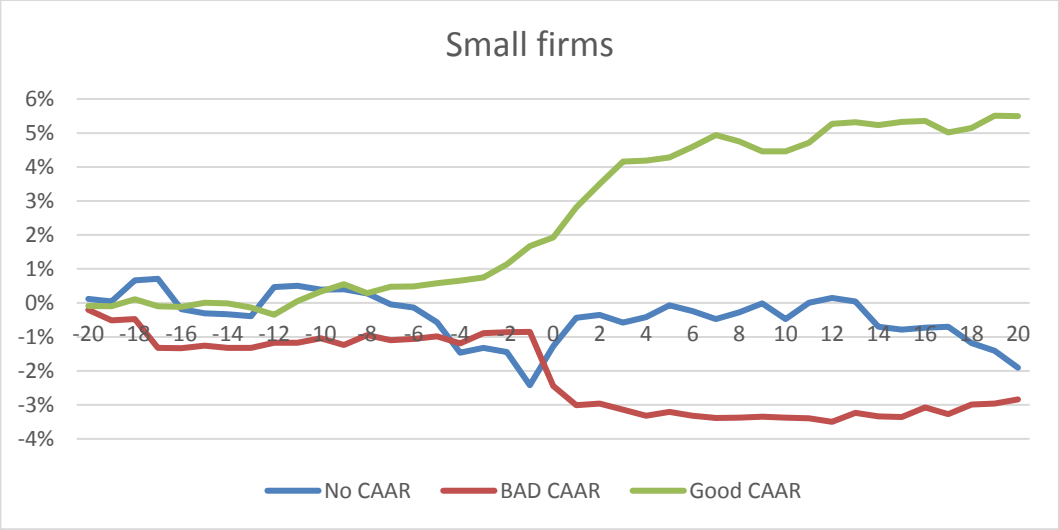


Figure 5-5; CAAR for small firms

Figure 5-5 illustrates the CAAR of the three news categories in the small firm section. The good news CAAR drifts upward already from day -12 before the announcement, continuing to increase up to day 6 where it drops slightly at day 10 and then stabilizes with a minor increase. The no news line fluctuates in the pre-announcement period but experiences a drop right before the announcement, and then CAAR starts to drift upwards after day -1 and stabilizes around 0%. The bad news CAAR drops considerably on day 0 and continues to stay at a negative level throughout the event window.

5.2.2 Large Firms

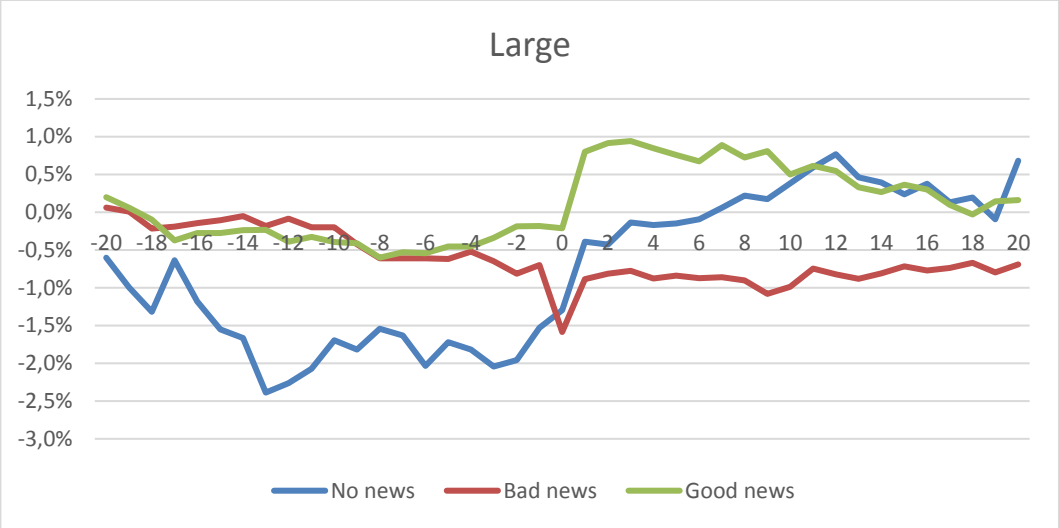


Figure 5-6; CAAR for large firms

Figure 5-6 illustrates the CAAR of the largest companies in the sample. For the good news, there is no change in CAAR before day 0, while on day 0 it immediately shifts up, and peaks at day 3. In the days following, the CAAR starts to fluctuate downwards and reaches 0% at day 18. The blue line representing the no news CAAR fluctuation starts at a negative level, but increases towards day 0, and continues to drift upward until it reaches a peak at day 12. The bad news plot starts to drift down already from day -10 and continues until it experiences a large drop at day 0. CAAR quickly recovers and continue to lie on a more stable negative level.

	Small firms			Large firms		
	Bad News	**Good News**	**No News**	**Bad News**	**Good News**	**No News**
-2	0,075	1,398	-0,276	-0,802	0,741	0,244
-1	0,030	1,921**	-2,193**	0,560	0,010	1,224
0	-4,880*	0,925	2,563**	-4,301*	-0,132	0,670
1	-1,720***	3,220*	1,883***	3,388*	4,918*	2,601*
2	0,145	2,482**	0,179	0,349	0,542	-0,106
$CAAR_{-1,2}$	-9,264%	9,902%	-0,045%	-3,645%	1,321%	-3,987%
t-stat	-8,422*	4,305*	-6,416*	-9,967*	2,642*	-3,645*

Note: *, ** and *** represents the statistical significance at the 1%, 5% and 10% level.

Table 5-6; Test statistics for small and large firms

Table 5-6 present the θ_{1AAR_t} test statistics at different days in the event window, and the full data sample is found in Appendix E. Starting with the small firms, the bad news AAR is

significant at day 0 (1%) and day 1 (10%), both indicating negative abnormal returns. The sign test backs up the rejection of the null hypothesis. The t-stat for $CAAR_{-1,2}$ present significant numbers, indicating that there is a statistically significant change in AAR over days closest to the announcement.

For the small firms' good news category, the null hypothesis of AAR = 0 is rejected at day 1 to 3, with significant and positive abnormal returns. This is supported by the sign test, which rejects the null hypothesis for these days. The $CAAR_{-1,2}$ t-stat is significant at a 1% level. The no news events have positive significant abnormal returns on the day before the event, the event day and the day after, consequently, the event has an impact on the stock returns. The sign test is in line with the t-test for AAR at day 0. The t-stat for $CAAR_{-1,2}$ rejects the null hypothesis at the 1% significance level.

For large firms, all news categories present average abnormal returns are significant at a 1% level at the day after the announcement (day 1), consequently, the earnings announcements generate significant abnormal returns. An interesting observation is that the AAR is statistically significant and negative at day 0 for bad news, as expected, but significant and positive on the day after the announcement, which is opposite of what to expect for a bad news announcement. The t-test for $CAAR_{-1,2}$ confirms that there is a significant change in AAR over the period for bad news announcements.

5.3 Individual Years

It is interesting to look at the different time periods in the sample to see whether there are differences between the years included in the sample of earnings announcements. The data is sorted by the year of the announcement, and for each of the years, the earnings announcements are grouped into the different news categories. Table 5-7 illustrates the full sample broken down into yearly samples.

	2013	2014	2015	2016	Sum
Bad News	82 51%	79 49%	86 54%	71 44%	318
Good News	69 43%	64 40%	58 36%	77 48%	268
No News	9 6%	17 11%	16 10%	12 8%	54
Sum	160	160	160	160	640

Table 5-7; The division of events between the individual years

The bad news is the dominating category in three of the four years. 2013 and 2014 stand out as the two years with the largest amount of bad news, as over 50% of the news is in the bad news category. 2016 is an exception since most of the news is good. There are relatively few events in the no news category, so we should keep this in mind, and be cautious when interpreting the results.

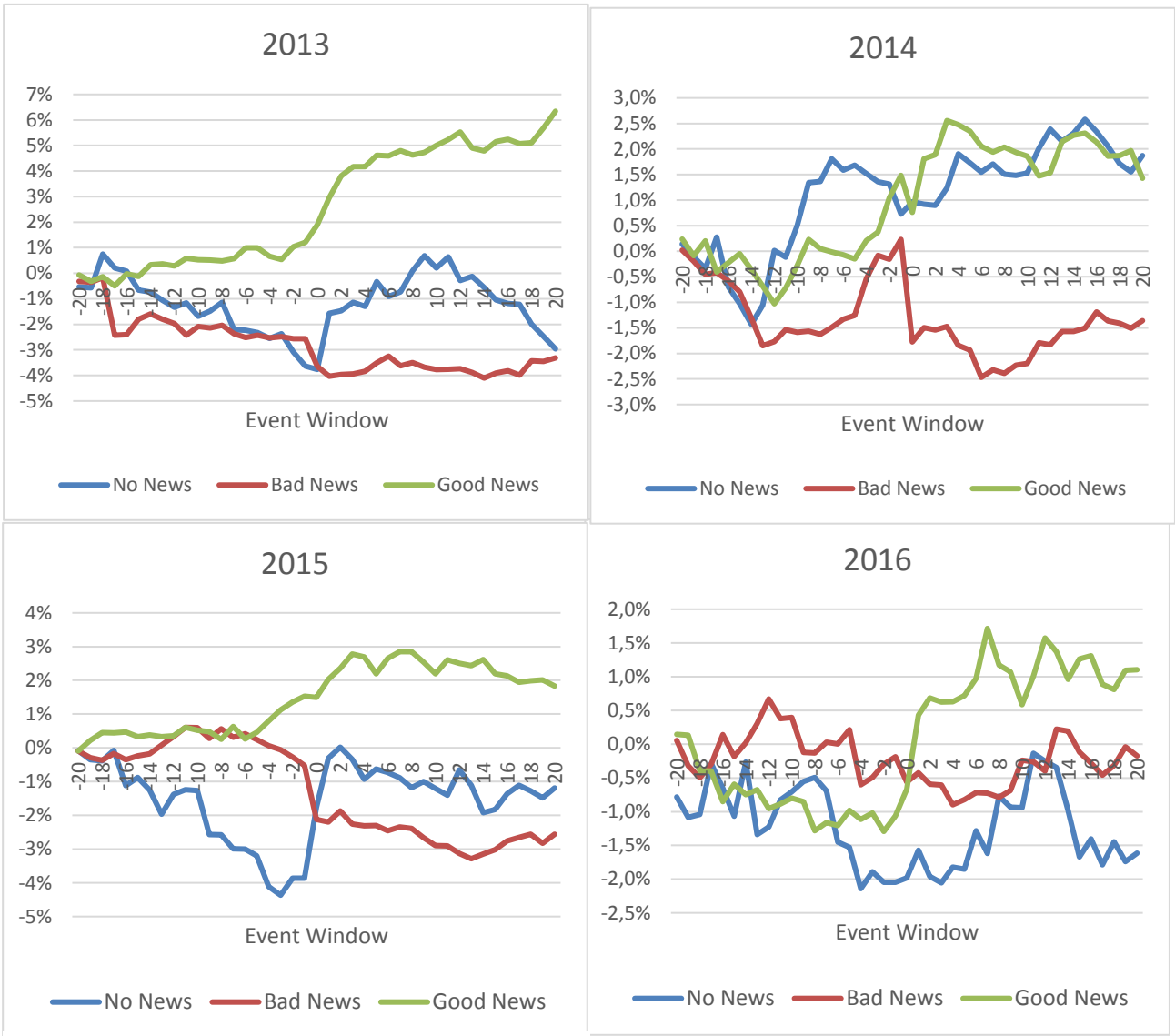


Figure 5-7; CAAR plots for each of the years

Figure 5-7 displays the CAAR graphs for all the four years, including CAAR plots for bad, good and no news for all years. There are different patterns each year, so it is difficult to draw a conclusion for the full sample. Common for all years is that on, and from day 0, the CAAR for the good news announcements drift in a positive direction. Similarly, from day 0, the bad news CAAR is below zero and stays there for all years except for 2016. There is a tendency for the CAAR to move in the same direction as the earnings announcement – CAAR moves up for positive announcements, and down for negative announcements. The no news CAAR has a more unstable tendency, and there is no clear pattern other than the fact that reaction tends to be volatile in all years.

	2013			2014		
	Bad News	**Good News**	**No News**	**Bad News**	**Good News**	**No News**
-2	-0,192	1,481	-1,147	-0,179	1,802***	-0,111
-1	0,013	0,502	-0,892	0,941	1,190	-1,465
0	-2,412**	1,983**	-0,205	-4,903*	-1,949***	0,595
1	-0,852	3,109*	3,522*	0,673	2,823*	-0,115
2	0,149	2,513**	0,180	-0,107	0,218	-0,051
$CAAR_{-1,2}$	-1,40%	2,76%	-1,62%	-1,38%	0,84%	-0,41%
t-stat	-1,321	1,204	1,429	-2,021**	0,771	-0,405
	2015			**2016**		
	Bad News	**Good News**	**No News**	**Bad News**	**Good News**	**No News**
-2	-0,693	0,925	0,830	0,688	-0,790	-0,350
-1	-0,791	0,669	0,001	0,407	0,669	0,002
0	-5,063*	-0,159	3,463*	-1,344	1,163	0,145
1	-0,269	2,109**	2,414**	0,495	3,183*	0,903
2	1,051	1,277	0,534	-0,610	0,740	-0,862
$CAAR_{-1,2}$	-1,59%	1,00%	-3,88%	-0,29%	1,97%	0,086%
t-stat	-1,148	1,023	3,387*	-0,788	2,018*	0,144

Note: *, ** and *** represents the statistical significance at the 1%, 5% and 10% level.

Table 5-8; The θ_{1AAR} t-test statistic for specific days and $CAAR_{-1,2}$ for the individual years

Table 5-8 presents a summary of the θ_{1AAR_t} test statistic for the two days before the announcement, the announcement day, and the two days following the announcement. The remainder of the test statistics is found in Appendix F. The numbers in Appendix F display no pattern in the significance of the AARs in the days leading up to, or following the earnings announcement, for neither of the categories bad, good or no news. The days containing the most significant abnormal returns are days -2 to 2, and the significant abnormal returns are unevenly distributed among the days in the event window for the remainder of the event window. At a 5% significance level, with rejection of the null hypothesis AAR = 0 when $\theta_{1\mathrm{AAR_t}} > 1{,}96$, there is no clear rejection tendency at day 0 for neither of the categories. In three out of four years, the bad news AAR is statistically significant at the 5% level (2013) and 1% level (2014 and 2015), so for these years the null hypothesis of no average abnormal return is rejected, and the event has an impact on the behavior of returns. For the good news events, there is statistical significance at day 0 in 2013 and 2014, and statistical significance at day 1 in all years, so at the day after the earnings announcement (day 1), the AAR is significantly different from zero. In 2014, for the good news announcements, there

are significant negative abnormal returns on day 0, which is contrary to the theory, followed by a significant positive AAR on day 1.

There is no trend for the no news case, so these announcements seem to lead to more unstable market reactions, however, the only significant abnormal returns are those that are positive (day 1 in 2013, and day 0 and 1 in 2015). In Appendix F, the result of the nonparametric testing of AAR is found, and the test statistics for the sign test are more cautious, and often ambivalent to the respective parametric t-statistic. The sign test supports the significance of day 1 for good news in 2013, bad news 2014 at the announcement day, no news 2015 day 0 and day 1 good news in 2016, so for these days, the abnormal returns are different from zero, and the event has an impact.

For the bad news cases, $CAAR_{-1,2}$ is statistically significant only in 2014. Thus, the null hypothesis of $CAAR_{-1,2} = 0$ is rejected, and there is a change in the abnormal returns in the days surrounding the announcement date due to the announcements this year. Regarding the good news announcements, there is a statistically significant change in the abnormal returns in 2016. This implies there is a significant change in the abnormal returns from day 1 to 2, which is due to the announcements. There is only one no news $CAAR_{-1,2}$ that is statistically significant, and that is in the year 2015. The $CAAR_{-20,\,t}$ test statistics, which takes the entire event window into account, are found in Appendix F. When considering the $CAAR_{-20,20}$ we can look for a significant change in the abnormal returns during the entire event window. $CAAR_{-20,20}$ is statistically significant for all announcements in 2013, the bad news in 2014 and no news in 2016.

5.4 Financial Quarter

The fourth grouping of the data is done by sorting the announcements into the four financial quarters. Financial quarter (FQ) 1 announcements take place in April-June, FQ2 announcements in July-September, FQ3 announcements are in October-December, and FQ4 announcements are made in the year after the earnings are made, from January-March. Those announcements representing earnings for the first quarter are in the FQ1 group,

those announcements representing earnings for the second quarter are in the FQ2 group, etc. The motivation between behind this grouping is to see whether there are differences in reactions, and significance, to the earnings announcements in the different quarters.

	FQ1	FQ2	FQ3	FQ4	*Sum*
Bad News	77 48%	74 46%	85 53%	82 51%	*318*
Good News	74 46%	69 43%	57 36%	68 43%	*268*
No News	9 6%	17 11%	18 11%	10 6%	*54*
Sum	*160*	*160*	*160*	*160*	*640*

Table 5-9; Distribution of the events for the financial quarters

Table 5-9 displays the distribution of bad, good and no news announcements for the different financial quarters, including the percentage share in the relevant quarter. There are significantly more good news earnings announcements among the first quarter announcements than the third quarter announcements (46% vs. 36%). Financial quarter 3 is the most negative quarter with the largest amount of bad news and fewest good news announcements. Furthermore, good news is not dominant in none of the four financial quarters, because bad news announcements dominate, which are the case for the full sample. FQ1 and FQ4 are the periods with the least no news. The following graphs illustrate the CAAR plots for the four financial quarters.

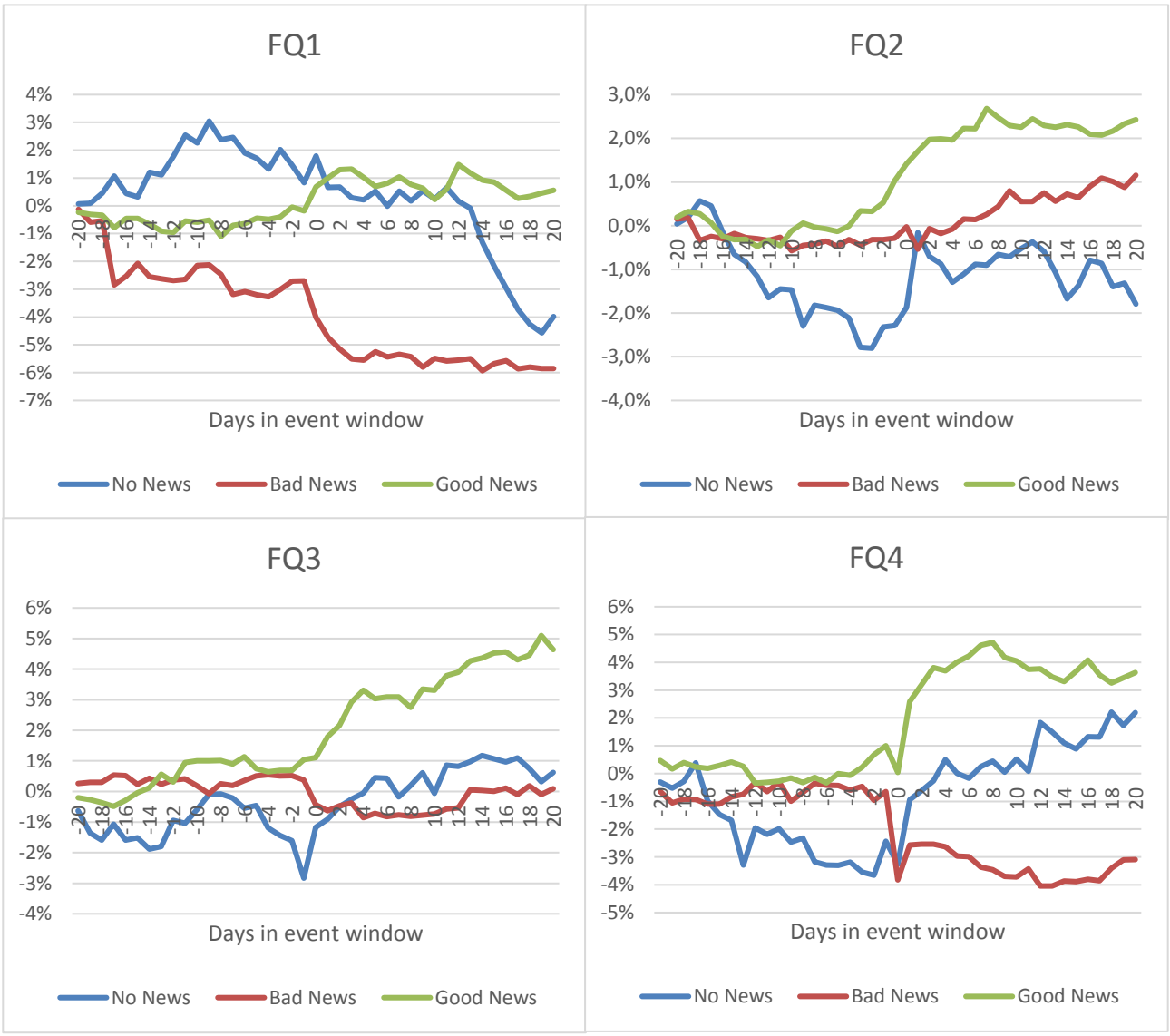


Figure 5-8; CAAR plots for the four financial quarters

The good news CAAR displays a clear trend in all the financial quarters. At the time of the announcement (day 0), the good news CAAR drift in a positive direction. Additionally, in FQ2, FQ3, and FQ4 it is possible to see a positive trend starting before the announcement day. For FQ1 and FQ2 there is a clear tendency for CAAR to drop on the day of the announcement for the bad news announcements, and it continues to drift in a negative direction in the days post the announcement. For FQ1 there is a negative drift starting before the announcement day. FQ2 is a rather odd case, contradicting the theory and expectations since CAAR drifts in a positive direction after the bad news earnings announcements. FQ3 has a very small

negative effect that fades out and reverts to 0% a few days after the announcement. Regarding the no news announcements, there is no clear trend, other than a very volatile market reaction in the days leading up to, and following the announcements. Table 5-10 displays the θ_{1AAR} test statistics for the days surrounding the announcement day, in addition to the $CAAR_{-1,2}$ and the relevant test statistic.

	FQ1			FQ2		
	Bad News	**Good News**	**No News**	**Bad News**	**Good News**	**No News**
-2	0,601	1,120	-0,980	-0,021	1,013	1,067
-1	0,026	-0,408	-1,087	0,178	2,627*	0,071
0	-2,670*	2,681*	1,658***	1,251	1,939***	0,914
1	-1,454	0,998	-1,951***	-2,500**	1,483	3,789*
2	-0,879	0,920	0,005	2,332**	1,396	-1,206
$CAAR_{-1,2}$	-2,442%	1,344%	-0,792%	0,258%	1,455%	1,615%
t-stat	-1,418*	1,811***	-0,421	0,497	1,282	1,960**
	FQ3			**FQ4**		
	Bad News	**Good News**	**No News**	**Bad News**	**Good News**	**No News**
-2	0,039	-0,014	-0,322	-0,826	0,865	-0,150
-1	-0,604	1,156	-2,339**	0,520	0,620	1,625
0	-3,394*	0,237	3,169*	-5,229*	-1,843***	-1,102
1	-0,874	2,236**	0,519	2,066**	4,898*	3,097*
2	0,704	1,222	0,767	0,044	1,160	0,423
$CAAR_{-1,2}$	-0,983%	1,7478%	1,108%	-1,581%	2,516%	3,038%
t-stat	-2,094*	0,843	1,105	-1,121	1,332	1,696***

Note: *, ** and *** represents the statistical significance at the 1%, 5% and 10% level.

Table 5-10; The θ_{1AAR} t-test statistic for specific days and $CAAR_{-1,2}$ for the FQs.

For FQ1, all type of news shows significant abnormal returns at the day of the earnings announcements. The only t-statistic for the bad news that is significant is at day 0 at a 1% significance level, so the null hypothesis of the event having no impact on returns is rejected, and there are changes in the abnormal returns when there is a bad news earnings announcement. The t-stat for $CAAR_{-1,2}$ is also significant. The t-statistics for AAR in the good news are significant at a 1% level at day 0, consequently, the null hypothesis that investors cannot earn abnormal returns on the day of the announcement is rejected. Considering the $CAAR_{-1,2}$ for the good news, the number is significant at a 10% level. Appendix G contains the remaining test statistics for the individual days and for the AARs and CAARs in the 41-day event window.

For FQ2, the abnormal returns are significant at day 1 for bad news and no news, while at day 0 for the good news. The $CAAR_{-1,2}$ is only significant for the no news announcements. For FQ3, both bad and no news are both statistically significant at day 0 at a 1% level, while the good news that is statistically significant at day 1. Only $CAAR_{-1,2}$ for bad news is statistically significant, and this implies that only in the bad news are the changes in abnormal returns due to the earnings announcement impacting stock prices. Finally, in the last quarter, FQ4, there are significant abnormal returns at day 0 for bad news (1%) and good news (10%). Day 1 shows significant abnormal returns for all the news categories, implying the event has an impact on returns on the day following the announcement. Neither of the $CAAR_{-1,2}$ are statistically significant in FQ4 the 5% or 1% level.

Overall, there is a trend for the significance of the AAR t-stat surrounding day 0 and 1 for the good news. The bad news shows a trend in the significance of the AARs surrounding day 0 and 1. However, the no news displays no clear trend at the days surrounding the earnings announcement, but the only significant AARs (at a 5% or 1% level) are the ones that are positive.

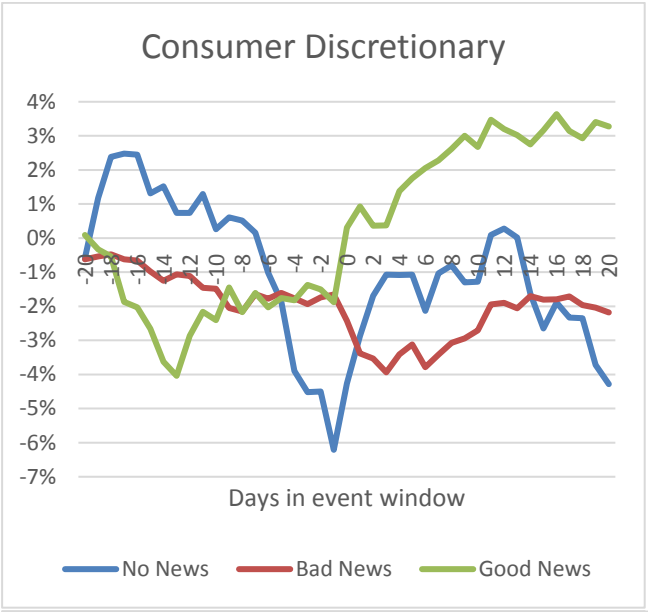
5.5 Industry

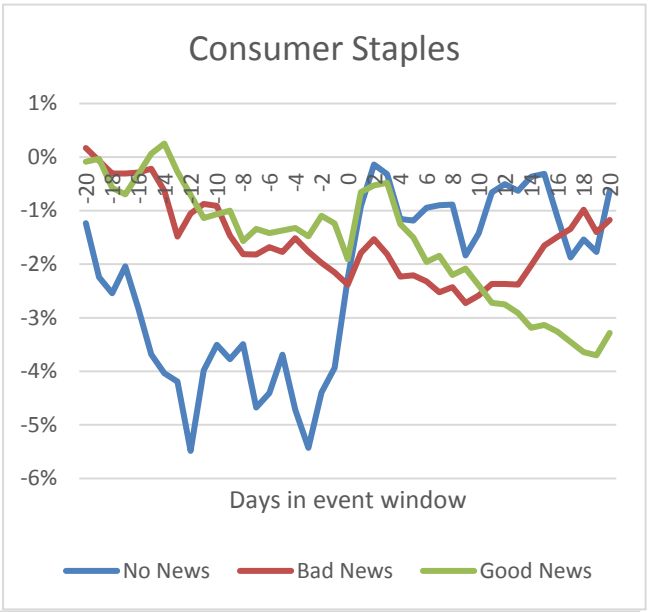
The firms listed at the OSE are divided into 10 different industry categories. It is interesting to check for differences in the reactions to the quarterly earnings announcements between the different industry sectors, so this will be examined. The OSE is known for the energy, seafood and shipping sectors, so one could maybe expect there to be differences between the industries. Seafood companies are in the Consumer Staples industry (BAKKA, LSG, SALM), and shipping companies are found within the Energy industry (FRO) or Industrials (WWI, WWIB, WWASA, SNI). The following table illustrates the full sample divided into the different industry categories at the OSE, and the bad, good and no news events within each of the industries.

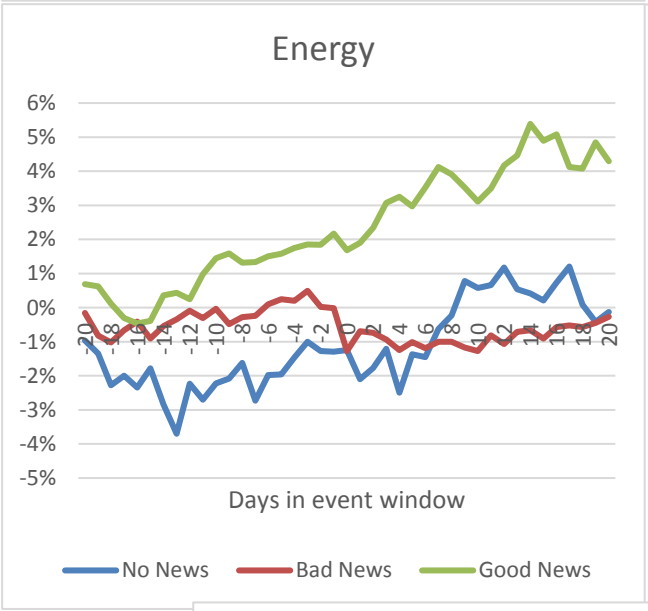
Industry	Bad News	Good News	No News	*Sum*
Consumer Discretionary	34	9	5	***48***
Consumer Staples	39	35	6	***80***
Energy	69	52	7	***128***
Financials	20	36	8	***64***
Health Care	8	6	2	***16***
Industrials	71	74	15	***160***
Information Technology	41	17	6	***64***
Materials	18	12	2	***32***
Real Estate	6	25	1	***32***
Telecommunication Services	12	2	2	***16***
Sum	***318***	***268***	***54***	***640***

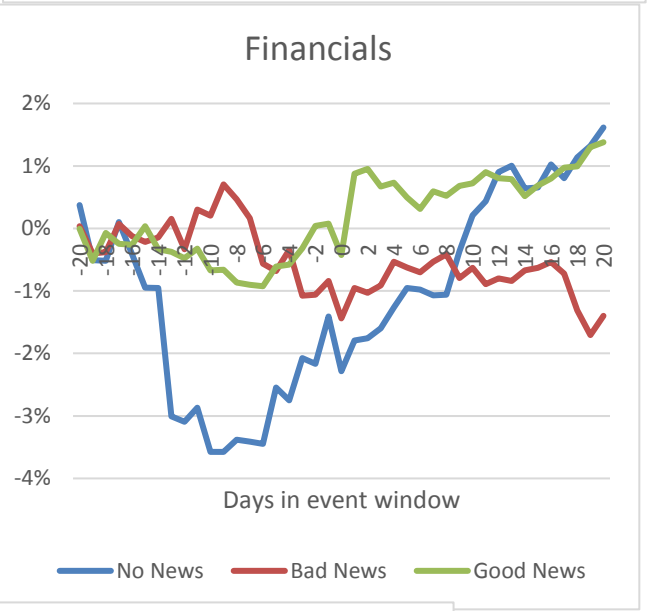
Table 5-11; The division of events for the different industries

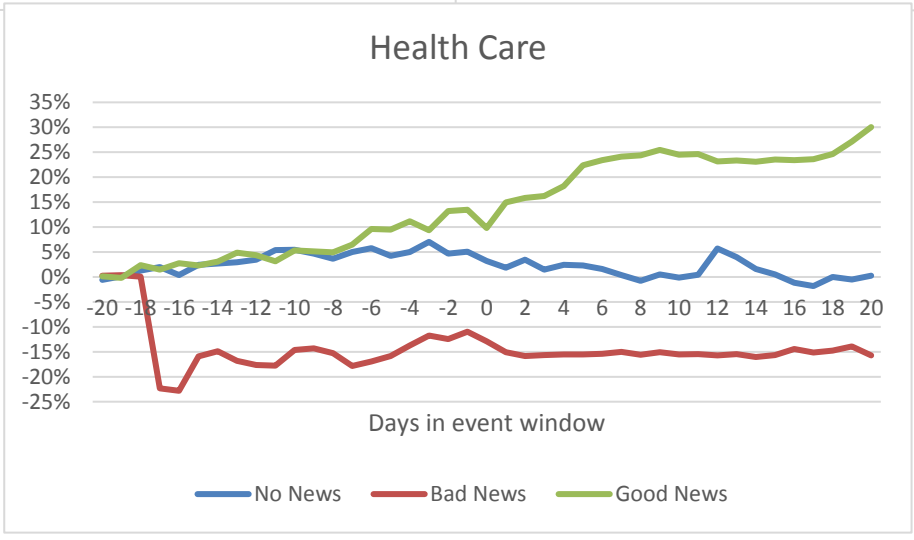
Some industries are dominated by the good news; Financials, Industrials and Real Estate, which is opposite of the trend of the sample where bad news dominate. Moreover, two industry categories only contain one firm; Health Care and Telecommunication Services. These two industries, in addition to Real Estate and Materials, contain two or fewer in the no news category, therefore the results presented should be interpreted cautiously for these industries. The following figure presents the CAAR plots for all the industries, with graphs for good news, bad news, and no news CAAR.


Consumer Discretionary
4%
3%
2%
1%
0%
-1%
-2%
-3%
-4%
-5%
-6%
-7%
-20 -18 -16 -14 -12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12 14 16 18 20
Days in event window
No News
Bad News
Good News


Consumer Staples
1%
0%
-1%
-2%
-3%
-4%
-5%
-6%
-20 -18 -16 -14 -12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12 14 16 18 20
Days in event window
No News
Bad News
Good News


Energy
6%
5%
4%
3%
2%
1%
0%
-1%
-2%
-3%
-4%
-5%
-20 -18 -16 -14 -12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12 14 16 18 20
Days in event window
No News
Bad News
Good News


Financials
2%
1%
0%
-1%
-2%
-3%
-4%
-20 -18 -16 -14 -12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12 14 16 18 20
Days in event window
No News
Bad News
Good News


Health Care
35%
30%
25%
20%
15%
10%
5%
0%
-5%
-10%
-15%
-20%
-25%
-20 -18 -16 -14 -12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12 14 16 18 20
Days in event window
No News
Bad News
Good News

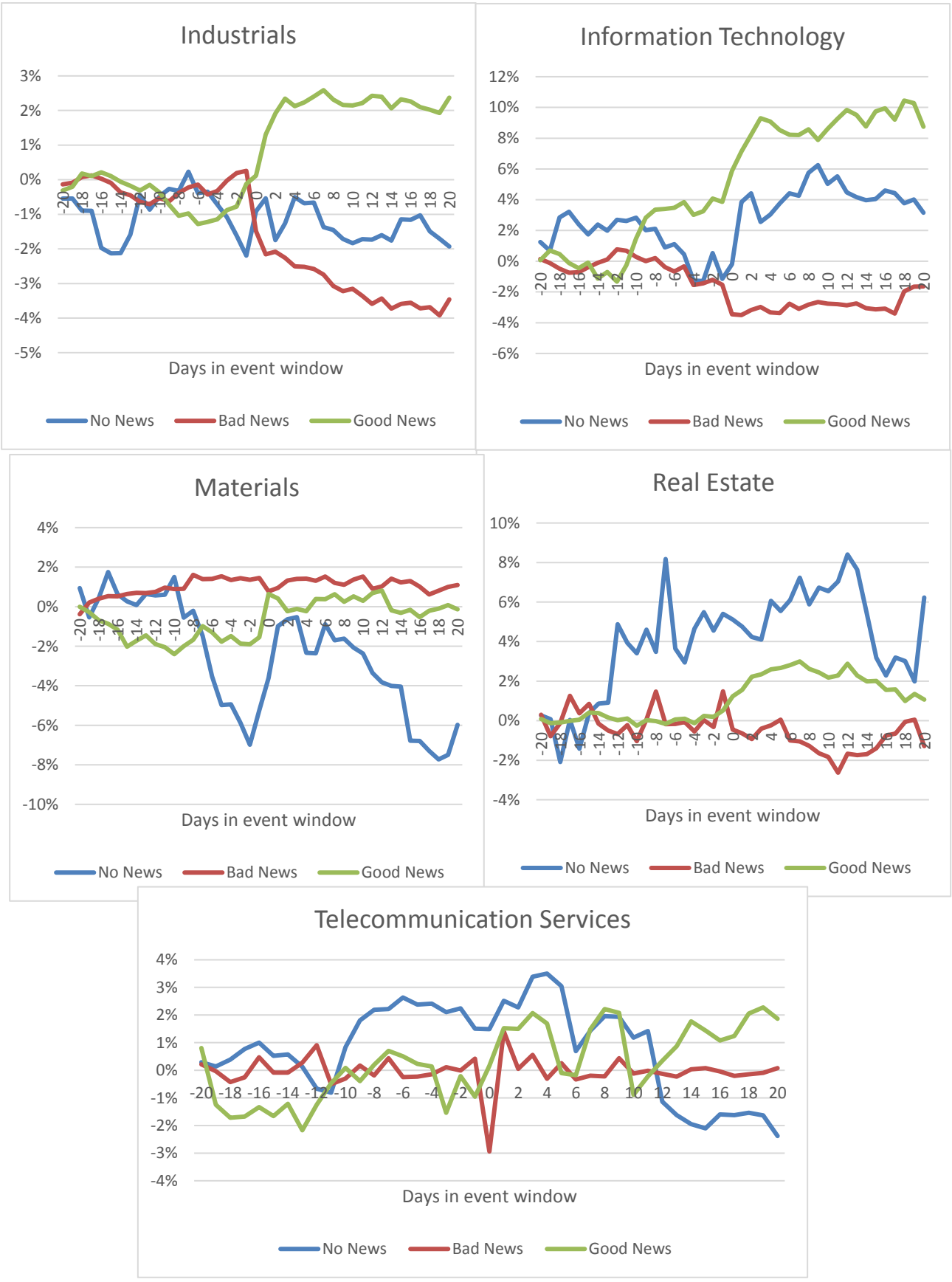


Figure 5-9; CAAR plots for the different industries

There is no clear pattern across the different industries for neither of the news groups. It appears that the industries Consumer Discretionary, Energy, Financials, Health Care, Industrials, Information Technology and Real Estate, represent the majority of the good news CAAR that can be seen in the full sample results. Consumer Staples, Materials, Real Estate and Telecommunication Services display an unstable return pattern in the event window surrounding the quarterly earnings announcements. Similar for all the industries is that the no news CAARs are very volatile in the days surrounding the earnings announcements. Consumer Discretionary, Energy, Health Care, Industrials and Information Technology all experienced a negative drop in the bad news CAAR at the time of the announcement, while the bad news CAAR experience smaller drops or no drop at all (Materials). Overall, there is a small tendency for the CAAR graph to go in the same direction as the sign of the earnings announcement – up for the good news and down for the bad news.

	Consumer Discretionary			**Consumer Staples**		
	Bad News	**Good News**	**No News**	**Bad News**	**Good News**	**No News**
-2	0,557	-0,199	0,016	-0,694	1,049	1,333
-1	0,246	-0,595	-1,793***	-0,611	-0,396	0,594
0	-2,165**	3,420*	2,038**	-0,772	-1,845***	2,166**
1	-2,685*	0,954	1,468	1,995**	3,468*	1,736***
2	-0,432	-0,873	1,233	0,872	0,342	1,003
$CAAR_{-1,2}$	-1,78%	1,86%	2,81%	0,43%	0,569%	4,25%
t-stat	-1,941***	0,779	1,333	0,571	0,507	2,638*
	Energy			**Financials**		
	Bad News	**Good News**	**No News**	**Bad News**	**Good News**	**No News**
-2	-1,354	-0,008	-0,407	0,056	1,176	-0,178
-1	-0,118	0,738	-0,026	0,652	0,125	1,425
0	-3,612*	-1,109	0,074	-1,786***	-1,650***	-1,646***
1	1,669***	0,486	-1,266	1,447***	4,279*	0,926
2	-0,118	0,991	0,483	-0,229	0,254	0,065
$CAAR_{-1,2}$	-0,75%	0,49%	-0,49%	-0,02%	0,91%	0,411%
t-stat	-1,654***	0,293	-0,398	0,053	1,376	0,261
	Health Care			**Industrials**		
	Bad News	**Good News**	**No News**	**Bad News**	**Good News**	**No News**
-2	-0,188	2,254**	-1,527	0,636	0,346	-1,029
-1	0,379	0,174	0,261	0,189	2,118**	-1,133
0	-0,502	-2,182**	-1,243	-5,174*	0,767	2,500**
1	-0,557	3,039*	-0,879	-1,986**	3,831*	0,735
2	-0,210	0,531	1,041	0,236	1,964**	-2,364**
$CAAR_{-1,2}$	-3,43%	2,64%	-1,25%	-2,270%	2,69%	-0,13%
t-stat	-0,734	0,279	-0,552	-1,498	1,947***	-0,214

	Information Technology			Materials		
	Bad News	**Good News**	**No News**	**Bad News**	**Good News**	**No News**
-2	0,455	1,031	1,628	-0,286	-0,054	-0,973
-1	-0,654	-0,267	-1,504	0,310	0,692	1,525
0	-3,770*	2,538**	0,860	-2,479**	4,248*	1,422
1	-0,098	1,586	3,634*	0,689	-0,431	2,296**
2	0,633	1,369	0,502	1,350	-1,255	0,303
$CAAR_{-1,2}$	-1,97%	4,15%	3,88%	-0,036%	1,67%	6,35%
t-stat	-1,411	1,033	2,051**	-0,084	1,752***	2,245**
	Real Estate			**Telecommunication Services**		
	Bad News	**Good News**	**No News**	**Bad News**	**Good News**	**No News**
-2	-0,417	-0,165	-0,528	-0,011	1,393	0,176
-1	2,220**	1,066	0,482	0,713	-0,788	-0,961
0	-2,386**	2,293**	-0,161	-4,976*	1,183	-0,021
1	-0,243	1,048	-0,204	2,388**	1,429	1,341
2	-0,350	2,164**	-0,298	0,092	-0,025	-0,312
$CAAR_{-1,2}$	-0,61%	2,03%	-0,31%	-1,05%	1,70%	0,03%
t-stat	-0,691	1,833***	-0,123	-1,783***	1,315	0,021

Note: *, ** and *** represents the statistical significance at the 1%, 5% and 10% level.

Table 5-12; The θ_{1AAR} test statistic and $CAAR_{-1,2}$ for the different industries.

Table 5-12 present the θ_{1AAR} statistic for the days surrounding the earnings announcement for all the different industries, in addition to the $CAAR_{-1,2}$ and the relevant test statistic. For the bad news announcements, the null hypothesis of no abnormal returns is rejected at day 0 or at day 1 at the 1%, 5% or 10% level for all industries, except for the Health Care industry. This means there are significant abnormal returns at the event date or the following day for almost all sectors, and the event has a significant impact (except for in the Health Care industry). An unexpected observation is that some of the industries (Consumer Staples, Energy, Financials and Telecommunication Services) have significant negative abnormal returns on the announcement day, as expected, but significant and positive AARs on the day following the announcement (day 1), which is contrary to the expectations and theory.

The good news announcements display significant abnormal returns at day 0 or day 1 for all industries, except for the Energy and Telecommunication industries. Furthermore, the abnormal returns are negative (and significant) at day 0 for some industries (Consumer Staples, Financials and Health Care), which is contrary to the expectations about positive AAR on the announcement day for good news events, and positive (and significant) at day 1.

Thus, the good news earnings announcements have a significant effect in eight out of ten industries. For the no news announcements, there is a clear trend, as the majority of the abnormal returns that are significant at day 0 or day 1 (Consumer Discretionary, Consumer Staples, Industrials, Information Technology and Materials), are those that are positive, while those negative are not significant (at 1% or 5% level).

The cumulative average abnormal returns for the event window, with the relevant test statistics, are found in Appendix G. There is no clear significance pattern among the $CAAR_{-1,2}$, for the different industries or event groups. From Appendix G, we observe that the cumulative average abnormal returns for the bad news are statistically significant (at the 5% level) either at $CAAR_{-20,1}$ or in the days following for all the industries, except for Financials and Telecommunication Services. Thus, in eight out of ten industries, the changes in the abnormal return in the event window, are significant and due to the earnings announcement. For good news, the CAARs are significant at the 5% level, either at $CAAR_{-20,1}$ or in the days following within the event window, in the following industries; Consumer Discretionary, Energy, Financials, Health Care, Information Technology and Real Estate. Regarding the no news announcements, the sign and significance of the CAAR vary, and there seems to be no clear trend.

6 Empirical Analysis and Discussion

The following chapter presents the descriptive analysis of the study, with the statistical tests and analysis undertaken to answer the research questions. This chapter contains a discussion of the empirical results from the previous section, along with an in-depth analysis of the sub-questions, to include a broader view of the findings. The empirical findings are related to our expectations, which are based on the literature review. Furthermore, in the second part of this chapter, a very short discussion of how the findings can be used, and its relevance, is provided.

6.1 Empirical Discussion

In the beginning of this thesis, seven sub-questions were introduced. These sub-questions are included in this thesis to back up the main research question, and to give a more in-depth picture of the quarterly earnings announcements at the Oslo Stock Exchange. Answering these sub-questions will lead to an answer to the main research question. We answer and discuss the sub-questions in this section.

The sub-question that it is natural to start with, is regarding the information content in the quarterly earnings announcement, as this sets the foundation for a discussion of the efficiency at the Oslo Stock Exchange.

Does there exist evidence of information content in the quarterly earnings announcements?

According to Beaver (1968), movements in the prices of stocks when earnings announcements are released provides evidence that the earnings announcements contain information. Additionally, Ball and Brown (1968) state that the stock prices will adjust to information if the information is useful in forming the prices, and in consequence, there will be no opportunity for abnormal gains. If stock prices adjust fast to new information, the changes in stock prices will reflect this information flow to the market. There are movements in the AAR for the base case, for all three groups. The AAR is statistically significant at day 0 for bad news, day 1 for good news and day 0 for no news, and this shows

there are changes in the stock prices at the day of the announcement and the day following the announcement. The reaction of the good news is statistically significant first at day 1, so this could be a sign that it takes some time for the market to react to the good news, but the significance is still of the same importance as significance at day 0. There is clearly information content in the quarterly earnings announcements due to the statically significant abnormal returns at the day of the announcement, or the day following the announcement.

Ball and Brown (1968) find the difference between the actual income and the expected income to influence the direction of the market reaction. When actual income is higher than forecast, the market reaction is positive, while the market reaction is negative when the expected income is higher than the actual. This is in line with the findings, as observed from the base case good news, the AAR is positive, while the AAR is negative for the bad news case. Thus, the Oslo Stock Exchange seems to react in line with the findings of Ball and Brown, and there is information content in the announcements.

The Base case.

To identify and analyze the impact of the quarterly earnings announcement on stock prices, the sample was divided into bad, good and no news. First, it is interesting to analyze the sample performance. The results from the t-test of the AAR in the good news do not show significant numbers at day 0, and therefore, the null hypothesis of evidence for abnormal returns at the day of the announcement cannot be rejected. Table 5-3 presented significant AARs at day one and two. This result suggests that, on average, investors may underreact to good news earnings announcements, which leads to a slower reaction to the announcement. The slow reaction to the announcement could indicate market inefficiency. The results from the empirical findings imply that, with good news earnings announcements, investors can possibly outperform the market, because significant abnormal returns are found at day 1.

The bad news contains highly significant AAR at the announcement day at a 1% level, so the results imply that there is strong evidence to reject the null hypothesis. The result is backed up by the sign test at a 1% significance level. The no news test statistics are significantly different from zero on day 0, hence the null hypothesis is rejected. Additionally, day 1 provides significant numbers at a 1% level, this finding may indicate that there is a lag in response to the earnings announcements. Thus, for these days, the market shows sign of inefficiency since there are possibilities for earning abnormal returns.

Bad $CAAR_{0,2}$	-1,257%
t-stat	-5,428
Good $CAAR_{0,2}$	1,445%
t-stat	6,799

Table 6-1; $CAAR_{0,2}$ for bad and good news in the base case

Table 6-1 displays the scenario of the base case, and the $CAAR_{0,2}$ for the bad news is -1,257% with a t-stat of -5,428, indicating this is highly significant. While the $CAAR_{0,2}$ for good news is 1,445% with a t-stat of 6,799. For this reason, the change in AAR is highly significant for both good and bad news on the event day and the two days following.

These results, in addition to our interest in comparing the good and bad news case, have given an incentive to look deeper into the differences between the good and bad news. The focus will not be on the no news because they are highly volatile and even though some of the numbers are significant, there is no specific trend, and furthermore, earlier literature does not focus on this category. The next section will look specifically into the differences between the good and bad news, and try to compare the two of them. Specifically, the following sub-question has been formulated:

Is it possible to earn higher abnormal returns in the case of negative earnings announcements compared to positive?

A two-sample two-tailed t-test and a two-sample one-tailed t-test, assuming unequal variances, have been conducted to test if there is a difference between the good and bad news reactions. The possibility of being able to earn higher abnormal returns in the bad than

for the good quarterly earnings announcements is considered. The null hypothesis for the two-tailed t-test is H_0: $AAR_{good} = AAR_{Bad}$ and the alternative is that they are unequal. The null hypothesis for the one-tailed t-test is H_0: $AAR_{Bad} > AAR_{good}$, and the alternative hypothesis is H_1: $AAR_{Bad} \leq AAR_{good}$. The one-tailed t-test is conducted using the absolute values for both the good and bad news.

	Two-tailed	One-tailed
t-stat	-2,2904	-0,7541
p-value	0,0247	0,2266

Table 6-2; Two sample t-test for the full sample

Table 6-2 demonstrates the full sample of the base case, and the two-tailed test provides significant numbers at a 5% level. This indicates that the null hypothesis of no differences in AAR_{good} and AAR_{Bad} is rejected, so there are significant differences between the good and bad news AARs. The null hypothesis in the one-tailed test cannot be rejected, implying that AAR_{Bad} is not significantly larger than AAR_{good} during the event window.

The two-tailed and one-tailed t-tests are applied on the days surrounding the announcement day, day -1 up to 2, because these are the days with the most significant numbers.

	Two-tailed t-test		One-tailed t-test	
Day	**t-stat**	**p-value**	**t-stat**	**p-value**
-1	-1,2565	0,2094	0,5370	0,2957
0	-3,0171	0,0027	2,7153	0,0034
1	-2,9661	0,0031	0,8562	1,1961
2	-1,7207	0,0858	1,5560	0,0601

Table 6-3; Two-sample t-test of the days surrounding the announcement

The two-sample two-tailed t-test is applied to check if there is a difference between the abnormal returns in the good and bad news announcements. The results from the t-test show that day 0 and 1 are significant in the two-tailed test, hence, the null hypothesis of AAR_{good} being equal to AAR_{Bad} are rejected for these days. It is natural to look more into the differences, therefore, the one-tailed t-test is employed to check if the abnormal returns for bad news exceed the good news. For the two-sample one-tailed t-test, the absolute values for both the good and bad news are applied. The t-stat value for day 0 is larger than the

critical value, hence, the null hypothesis is rejected and the results are statistically significant. It is 95% sure that the abnormal returns for the bad news are greater than the abnormal returns of good news at the day of the announcement. With this information, it can be said that at Oslo Stock Exchange in general, bad news abnormal returns have a larger magnitude than the abnormal returns for the good news. This finding suggests that investors can use a trading strategy, namely shorting of those stocks expected to deliver bad news, to earn highest possible profits in the market.

Market Capitalization.

The incentive behind the market capitalization division was to check for differences in the market reaction for the two groups large and small firm. From chapter 5.2, the empirical results from market capitalization, statistically significant AARs at day 0 and 1 were found for the bad news for both small and large firms. An interesting finding is that the AARs that are significant for small firms are negative at day 0 and 1, while for the large firms, it is negative on the day of the announcement (day 0), but then positive (and significant) at day 1. Accordingly, for the small firm there is only a negative reaction when a bad news earnings announcement is made, while for the large firms, there seems to be a positive correction at day 1 of the negative market reaction at the time of the announcement.

For the good news, the AAR was statistically significant at day 1 and 2 for small firms, and day 1 for large firms. So, for the small firms, the good news reaction seems to be rather slow. It may be the case that investor's reaction to small firm announcements is lagged because the smaller firms may not be as much "discussed" in the media like the larger firms. The information seems to be quicker incorporated into the larger firms, and as is seen from the CAAR graphs of small and large firms, the good news CAAR has a higher level for the small firms (almost 6%), while it is around 1% for the large firms. The reason for this could be that there is more focus on research and speculate on larger companies, as they are potentially more frequently exposed in the media, which is natural due to the fact that more investors have invested in these firms. There are significant abnormal returns for the no news announcements at day -1, 0 and 1 for the small firms, while only at day 1 for the large

firms. An interesting observation is that on day -1 AAR is negative, while the other ones that are significant are positive.

Overall, there are significant abnormal returns at day 1 for all type of news in both groups. Thus, the quarterly earnings announcements have an impact on stock prices. There seems to be the case that small firms are more sensitive to the quarterly earnings announcements, and they respond slower to the news. These results gave an incentive to consider the small versus large firm case, and specifically, to test whether there are statistically significant differences between the average abnormal return of the two groups.

Are the abnormal returns significantly different for large and small firms?

A two-sample t-test, assuming unequal variances, is conducted to check whether the AARs are significantly different for small and large firms. Two different tests are completed, one where the first variable is bad news small firms and the second variable is bad news large firms, and in the second test, good news small firms is the first variable, and good news large firms is the second variable. The null hypotheses are $AAR_{good,small} = AAR_{good,large}$ and $AAR_{bad,small} = AAR_{bad,large}$, and the alternative hypotheses are that they are different. The following table presents the results of the tests.

	Bad_{small} versus Bad_{large}	**$Good_{small}$ versus $Good_{large}$**
t-stat	-0,8701	2,4148
P-value	0,3872	0,0182

Table 6-4; Two-sample t-test small versus large firms

The null hypothesis of equal average abnormal returns is rejected for the good news, and the alternative hypothesis that there are differences is accepted. The t-stat for the bad news test is not higher than the critical value of 1,96, and the p-value is larger than 5%, therefore, the AARs are not statically significantly different for small and large firms for bad news. This implies there are differences in the market reaction for the two firm groups when the quarterly earnings announcements contain good news.

Additionally, the tests are conducted on the day's -1 to 2, since these are the days where the statistically significant average abnormal returns were observed. The same two-sample t-test applied for the full event window is conducted, however, the tests are now run on single days. The day -1 bad news small firms AARs are the first variable, and the day -1 bad news large firms AARs are the second variable. Table 6-5 presents the results.

	Bad_{small} versus Bad_{large}		$Good_{small}$ versus $Good_{large}$	
	t-stat	**p-value**	**t-stat**	**p-value**
-1	-0,5108	0,6098	2,3145	0,0214
0	-1,0212	0,3079	0,4903	0,6243
1	-2,9298	0,0036	-0,2518	0,8014
2	-0,0942	0,9250	2,1532	0,0324

Table 6-5; Two-sample t-test small versus large firms for specific days

There is statistical significance at the 5% level at day 1 for the bad versus bad t-test, and at day -1 and 2 for the good versus good t-test, and the p-values support these results. So, the null hypotheses at these days are rejected, and there is a difference in the average abnormal returns for small and large market capitalization firms.

Individual Years.

The incentive behind investigating the sample divided into the four different years the data is collected from was to check whether there were differences between the significance of the AARs over the years. Furthermore, this gives a better overview of the full sample.

For the bad news announcements, the empirical results showed negative and significant AARs at day 0 in all years except for 2016. From the CAAR graphs, there was a negative drift starting at day 0 for all years, except for 2013, where the drift downward starts already on day -18. Thus, all years except for 2016 are in line with the base case bad news. Good news announcements AARs are significant at day 0 for 2013 and 2014, and day 1 for 2015 and 2016. Positive abnormal returns were discovered in 2013, 2015 and 2016. Nonetheless, in 2014 there is a significant and negative AAR at day 0 (10% level), followed by highly significant and positive AAR at day 1. Thus, the day 1 AAR may be a correction of the reaction at the day of the earnings announcement or just a slow market response. Regarding

the CAAR graphs, the drift upward seems to start days before the announcement in all years except for 2016, which could be a sign of insider trading resulting from insider information/asymmetric information. However, neither of the AARs in the days leading up to the announcement are significant. The only no news announcements that are significant, are those positive. Specifically, 2013 day 1 and 2015 day 0 and day 1, are those significant. This is what was found in the base case no news, which was significant and positive AAR at day 0 and day 1. Accordingly, these two years account for the significance found in the base case.

The impact of earnings announcements was largest in 2013 and 2015, as all the three news groups were significant at day 0 or day 1 in these two years. For 2016 only good news was significant. The CAAR is significant for all good and bad news during the 41-day event window (following the announcement), except for good news in 2016. This implies that there is, all over, a statistically significant change in abnormal returns during the event window, which comes from the quarterly earnings announcements.

Financial Quarter.

The reason for the division of the data into the different financial quarters was to investigate if seasonality exists at the Oslo Stock Exchange. This means that, if there is seasonality, the market reacts in a different way to the earnings announcement based on what quarter (time of the year) they represent. Seasonality was introduced in the time-series prediction section of this thesis. Although we may not be able to state that there is seasonality, we should be able to find an indication or sign of seasonality.

For the first financial quarter (FQ1), all the news categories are significant at day 0, which implies that there are abnormal returns at the day of the announcement. When looking at the $CAAR_{-1,2}$ both the bad and good news represent significant numbers, this indicates that there is a significant change in the AARs. The second financial quarter (FQ2) present significant numbers at day 0 only in the good news category. Additionally, both the bad and no news show significant numbers at day 1. Whilst, in the third financial quarter the AARs are significant at a 1% level at day 0 for bad news along with a significant $CAAR_{-1,2}$. Finally,

the last financial quarter shows negative AARs in both the bad and good news, and they are both significant at day zero. However, the AAR on day 1 is positive and significant for both. This is an interesting finding as this may be an evidence of a correction of an overreaction of the investors in the market. For the bad news, the negative reaction at day 0 may have been too large, while for the good news, the day 0 reaction might have been mistaken, and the positive AAR at day 1 is a correction of this. Day one in all type of news categories is significant, which is an interesting finding because it may give an indication that the investors in the market react slower, overall, in the last financial quarter.

Overall, the fourth financial quarter has a somewhat higher CAAR-level for the good news, compared to the first financial quarter, and the CAAR-level for the bad news is clearly lower for the first quarter compared to the last quarter. We are interested in going deeper into the differences between the financial quarters, and therefore, the differences between the first and fourth financial quarter are investigated. These two specific quarters are chosen because going into detail checking for differences between all the quarters takes more time, and it could be interesting since these two groups represent the start and the end of a year.

Are there differences in AAR for the different financial quarters – i.e. does the 4th have significantly different AAR than the 1st quarter announcements?

The null hypotheses are $AAR_{good,FQ1} = AAR_{good,FQ4}$ and $AAR_{bad,FQ1} = AAR_{bad,FQ4}$, whereas the alternative hypotheses are $AAR_{good,FQ1} \neq AAR_{good,FQ4}$ and $AAR_{bad,FQ1} \neq AAR_{bad,FQ4}$. First, a two-tailed t-test is conducted to look at whole sample performance, and the results are presented in the following table.

	Bad_{FQ1} versus Bad_{FQ4}	**$Good_{FQ1}$ versus $Good_{FQ4}$**
t-stat	-0,5510	-0,7852
P-value	0,5832	0,4351

Table 6-6; Two-tailed t-test FQ1 vs. FQ4

The results do not indicate that there are differences between the two means for neither the bad nor the good news in the first financial quarter versus the fourth quarter. Hence, the null hypothesis for the sample cannot be rejected. Like in the earlier sections, the days surrounding the day of the announcement are considered, and so a two-sample two-tailed t-

test is executed to test whether there is a difference between the two means for the days -1 to 2.

	Bad_{FQ1} versus Bad_{FQ4}		$Good_{FQ1}$ versus $Good_{FQ4}$	
	t-stat	**p-value**	**t-stat**	**p-value**
-1	-0,9111	0,3636	-1,4004	0,1636
0	1,6684	0,0979	2,2083	0,0290
1	-2,5619	0,0114	-3,0309	0,0031
2	-1,1582	0,2486	-0,7825	0,4354

Table 6-7; Two-tailed t-test FQ1 vs. FQ4 for specific days

Table 6-7 displays significant numbers for the bad news at day 1, and this implies that there are differences between the first and the fourth financial quarters for the bad news. The same goes for the good news, which is significant at day 0 and 1. The results suggest that there are differences between the average abnormal returns in the first and last financial quarter for these specific days. The following table illustrates the last day's CAARs for good and bad news for the two financial quarters.

	Good news	**Bad news**
FQ1	0,556%	-5,852%
FQ4	3,629%	-3,094%

Table 6-8; $CAAR_{-20,20}$ for FQ1 and FQ4

The good news CAAR for the fourth financial quarter are higher than the CAAR for the first quarter over the sample period. While for the bad news, the financial quarter 1 has a higher CAAR (in absolute values). These findings may be an indication that there could be seasonality in the Norwegian stock market, as the reactions differ. This result can be linked up to Jordan's (1973) research finding that the market evaluates different quarterly results differently.

Industry.

The division of the full sample into the ten different industry categories at the Oslo Stock Exchange was motivated by getting a better overview of the sample data and to check whether any specific industries affect the significance of the base case. Also to investigate whether some industries may show results other than those of the base case. However, this

division led to very few events in the Health Care and Telecommunication Services industries, and one should be very careful when interpreting the results and drawing conclusions for these industries. A comparison and interpretation of the empirical results for the different industries will be provided, but no further statistical testing will be conducted when answering the following sub-question.

Does the market react differently for the different industries, that is, are there differences in the abnormal returns for the different industries?

For the bad news announcements, there are negative and significant AARs for all industries, except for Health Care. The AARs are positive, and significant, at day 1 for Consumer Staples, Energy and Financials. Nine of the different industries react negatively to a bad news announcement, and there seems to be an overreaction followed by a correction for three of the industries. Since the base case for bad news is a negative, and significant, AAR at day 0 and no significance at day 1, four out of the ten industries differ from the base case, and the remaining six are in line with the base case, and the theory and earlier empirical findings on earnings announcements in the literature.

There is no clear significance trend among the industries regarding the good news announcements. Two industries, Energy and Telecommunication Services, show no significance at day 0 or 1. Four industries; Consumer Discretionary, Information Technology, Materials and Real Estate, provide positive and significant AARs at day 0, which is not in line with the base case, where the significance is at day 1. Three industries; Consumer Staples, Financials and Health Care, show negative and significant AAR at day 0, contrary to the theory and earlier findings. The findings suggest that the reaction should be positive in the case of a good news announcement. On the other hand, these three industries, in addition to Industrials, have positive and significant AARs at day 1, in line with the base case. So, there seems to be a correction of the reaction at day 0 for three industries. It may be that the investors had other expectations to the firm than what the firm delivers, maybe given their own beliefs and calculations, they expected a bad announcement rather than good. It could be the case that the investors react automatically without considering the actual

income release, and when given time to reflect and read the statement, the reaction changes.

The base case no news AAR are positive and significant only at day 0. No significance for Energy, Health Care, Real Estate and Telecommunication Services were found. The six industries showing significant AARs at day 0 (at the 1% or 5% level), were all positive. Thus, no negative AARs are significant at day 0, only those positive, and this is in line with the base case, so there are six industries that contribute to the significance of the base case no news.

In total, all AARs are statistically significant at day 0 for Consumer Discretionary and Financials. Moreover, day 1 is significant for Consumer Discretionary, Consumer Staples, Financials (10%), Industrials, Information Technology, and Materials. That is, 6 out of 10 industries show significance for both bad, good and no news at day 0 or day 1. Energy and Telecommunication Services are only significant for bad news, while for Health Care, only good news significant. All over, differences in the market reactions of the different industries are observed, both in sign and significance. However, for the bad news, the findings are in line with the theory and earlier findings on earnings announcements, while for the good news, some industries are in line with the theory.

The post-earnings announcement drift.

The post-earnings announcement drift theorizes that a stock's cumulative abnormal return drift in the same direction as the earnings surprise for several weeks following the earnings announcement. Therefore, it should be possible to spot an indication of the drift with the data and days included in the event window. In the case of good news, the drift in the CAAR should be positive, while in the case of bad news, the drift in CAAR should be negative. The PEAD is an anomaly that, if present, is a sign of market inefficiency. To check if any indication of the PEAD is observed, the following sub-question have been formulated:

Do stock prices always instantaneously reflect new earnings information, or is the response delayed, possibly creating a drift?

Bernard and Thomas (1989) find that a significant portion of the drift occurs during the first 60 trading days after the earnings announcement. So, to be able to observe an upward or downward drift, an event window consisting of approximately eight weeks need to be included. Since there are only 20 days after the announcement in the event window applied in this thesis, we can only state there are signs of an indication of a drift after the quarterly earnings announcement. To state there is a drift, the CAAR needs to constantly obtain an upward or downward drift, and for this reason, the CAAR cannot have any types of drops, neither up or down, during the post-event weeks. In the data, small drops up or down after the earnings announcement are observed, implying we cannot state for sure that evidence of post-earning announcement drift is found. However, if there were signs of the post-earnings announcement drift, this would imply that the market is inefficient, as in an efficient market there should be no PEAD in the stock prices, according to theory. For example, looking at the good news CAAR for 2013, a continuing upward drift is observed, and similar with the small firms' good news CAAR. The last finding is in line with the findings of Bernard and Thomas from 1989, where they find that the PEAD appears to be larger for small firms compared to large firms. Furthermore, early signs of a positive drift are observed in the good news CAAR for FQ2, FQ3, Consumer Discretionary, Financials, Health Care and Industrials. The only indication of a negative PEAD is encountered in Financial Quarter 1 bad news.

The post-earnings announcement drift makes the investors able to profit from positive surprises by buying immediately after the announcement or selling short immediately after a negative earnings surprise (Chambers, Anson, & Black, 2015, s. 556). Thus, there could be possibilities for trading on the earnings announcements and earning abnormal returns due to a PEAD. Nevertheless, to be more certain about the existence of the PEAD, at least three more weeks should be included in the analysis.

Behavioral finance.

The actual market reactions are considered, so a natural closing question summarizing the findings, is to consider whether the investors have realistic expectations to the quarterly

earnings announcements. The basis for the following question is an assumption that if the market's expectations are realistic, there will be no abnormal returns following the quarterly earnings announcements. This is because market efficiency exists when prices reflect all available information, and under the semi-strong form of the hypothesis, the market incorporates all publicly available information in addition to the historical data, hence there should not exist abnormal returns.

Do the investors in the market have realistic expectations to the earnings announcements?
When the null hypotheses AAR = 0 and CAAR = 0 are true, that is, H_0 cannot be rejected, it means that the quarterly earnings announcements have been realistically expected by the market. This is because if the investors have realistic expectations, the stock should be priced correctly, and there should be no possibility for earning abnormal returns. Statistically significant AARs at day 0 and day 1 (or just one of them) are found in the base case for all news groups, and the null hypothesis of the event having no impact is rejected, so it may seem like the investors had unrealistic expectations regarding the earnings announcements. Furthermore, since significant CAARs are found for several of the cases, the changes in AAR were significant, and so this supports the finding of unrealistic expectations from the investors.

The significant changes in the AARs is a result of the large deviations between the actual EPS and the forecasted EPS, and since there exist abnormal returns, this indicates that the investors in the market have underestimated or overestimated the earnings announcements. When looking at the base case Appendix C, there was only significantly negative average abnormal returns in the event period for the bad news, demonstrating that the stock market on average had too optimistic expectations of the companies´ earnings in the bad news categories. While for the good news, no evidence for significant negative numbers was found. Average abnormal returns close to zero indicates that investors in the market, on average, have more realistic expectations. But, for the good news announcements, positive average abnormal returns were found, and this could be a signal of the investors being too little optimistic regarding the earnings. It could be interesting to look

further into the question of what drives the expectations as they seem to be too optimistic or too little optimistic, but this will not be looked further into in this thesis.

6.2 Personal Discussion

The Oslo Stock Exchange is a small stock exchange, and the findings in this thesis are not necessarily in line with the findings from the larger stock exchanges like the NYSE and LSE. A small stock exchange, may not be very comparable to those that are larger, therefore, earlier findings may not apply to the OSE. Similarly, one should be careful with applying these findings to the larger exchange, but rather, the findings should be applied to similar, smaller stock exchanges. More research is done on the larger and more sophisticated stock exchanges, and therefore, the findings in this thesis contribute to expanding the research on smaller exchanges.

The findings in this thesis can be used to form trading strategies or to potentially predict the future market reaction to quarterly earnings announcements. More specifically, trading strategies can be made by using the significant abnormal returns found as an indication of where to buy or sell short. For example, the highly significant and negative AAR for the bad news announcement could be exploited by forming portfolios of stocks that investors expect to deliver bad news. Expectations about news may be wrong, but profits could be made by taking a long position on the day of the quarterly earnings announcement, in a portfolio of firms that deliver good news. We identified significant abnormal returns at day 1 for good news, both for small and large market capitalization firms, so the portfolio can be formed across stocks from firms of different size. Such a trading strategy would be interesting to test, using the event study findings, if the pattern continues to be the same in the coming years. However, the presence of transaction costs should be kept in mind when dealing with trading strategies. The transaction costs could alter the profitability of investment strategies; hence, investors need to constantly weigh the expected benefit of trading against its cost and risk.

While the Oslo Stock Exchange is widely known for having a unique position for firms within energy, shipping and seafood sectors, other small stock exchanges that one would think is comparable, may not be. This unique position of the OSE makes the stock exchange less comparable to other small exchanges that would be assumed to be similar based on size. The composition of the firms, along with the size, and specifically that a few companies dominate the OSE, need to be considered before using these results to form trading strategies or make predictions, on other exchanges.

7 Conclusion

This thesis estimates and explores the presence of abnormal stock returns in the days surrounding the quarterly earnings announcements of Norwegian firms in the period 2013 to 2016. The purpose of this thesis was to test for market efficiency in the semi-strong form at the Oslo Stock Exchange, and additionally, to check if the market anomaly called the post-earnings announcement drift could be observed. The Oslo Stock Exchange Benchmark Index, consisting of 62 companies, was used as the sample data. Following the data collection, we were left with a total of 40 firms in the sample, which gave 640 events.

The methodology of MacKinlay (1997) was applied in this thesis, daily stock prices, forecasted earnings per share and actual earnings per share were the variables. Both actual and forecasted EPS were found in the Bloomberg Terminal, and these were applied for grouping the announcements into one of three groups. The grouping of the different news categories was done based on the deviation of actual EPS from forecasted EPS, according to actual earnings per share above, below or around the forecasted earnings per share, giving us three different groups: good news, bad news, and no news. Abnormal returns associated with the earnings announcement were calculated using a market model for estimating the normal returns. Further, the abnormal returns were cumulated so the overall influence of the earnings announcements on stock prices could be analyzed. Next, to get the numbers on a full sample basis, the daily average abnormal return and cumulative average abnormal return were calculated. The full sample was divided into various sub-categories, so we could

be able to identify whether the market reaction to the event depended on specific characteristics or groups.

The null hypothesis that the quarterly earnings announcements have no effect on stock returns is rejected in several of the cases. Statistically significant abnormal returns on the event day or day 1 (or both) were found for all the news categories. The main trend is that a good news announcement shows no significant abnormal returns on the day of the announcement, but positive and significant at day 1, while for the bad news there were negative and significant abnormal returns on the announcement day. For the no news announcements, the abnormal returns are positive and significant at the announcement day and day 1. Thus, there is informational value in the quarterly earnings announcements, and the investors have unrealistic expectations to the earnings announcements, which is proven by the presence of abnormal returns.

The reaction to the bad news announcements is faster incorporated into the stock prices than what is the case with the good news announcements, where the investors' response seems to be delayed. The evidence supporting this statement is that the abnormal returns are significant at day 0 for bad news, while for the good news, the significance occurs at day 1, and in addition, for small firms, there were significant abnormal returns at day 2. Furthermore, for the large firms' bad news announcements, positive and significant abnormal returns at day 1 were found, which suggests that the market overreacts to the negative earnings announcements at the day of the announcement, and thus, the overreaction is corrected the following day.

The post-earnings announcement drift was first documented by Ball and Brown (1968), and since their finding, it is the capital market anomaly most widely found and studied. For some of the cases examined, there are signs of a possible post-earnings announcement drift for some of the good news groups within the specific cases. Since the presence of the drift is small, this indicates that there is no delay in the market's incorporation of new earnings information.

The presence of abnormal returns can be exploited by the investors. It is possible to profit on the release of the quarterly earnings announcements by taking a short position in a portfolio of stocks expected to deliver bad news or a long position in a portfolio of stocks expected to deliver good news. The short position in the bad news portfolio should be taken so that you hold the portfolio on the day of the announcement, while for the good news portfolio, the long position can be taken on the day of the announcement, such that the abnormal returns on day 1 are captured. In theory, the presence of abnormal returns can help form profitable trading strategies that could be used to "beat the market". However, in real life, trading strategies are often associated with high transaction costs because of high-frequency trading.

Finally, the overall finding is that the Oslo Stock Exchange is semi-strong form efficient to some extent. The efficient market hypothesis proposes that there should be no significant changes in stock prices around such an event like an earnings announcement, and prices should react in a normal way, not generating abnormal returns. The presence of significant abnormal returns around the earnings announcements suggests that the market does not fully hold in the semi-strong form, and this indicates that the market is, to some extent, inefficient.

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9 Appendix

A. List of Companies in the OSEBX

A.1 Companies listed in the OSEBX

SEGMENT	INDUSTRY CATEGORY	COMPANY NAME	TICKER
OB MATCH	Industrials	AF Gruppen	AFG
OB MATCH	Financials	Aker	AKER
OBX	Energy	Aker BP	AKERBP
OBX	Energy	Aker Solutions	AKSO
OB MATCH	Industrials	American Shipping Company	AMSC
OB MATCH	Information Technology	Asetek	ASETEK
OB MATCH	Information Technology	Atea	ATEA
OB MATCH	Financials	Axactor	AXA
OB MATCH	Financials	B2Holding	B2H
OBX	Consumer Staples	Bakkafrost	BAKKA
OB MATCH	Health care	Biotec Pharmacon	BIOTEC
OBX	Financials	DNB	DNB
OBX	Energy	DNO	DNO
OB MATCH	Consumer discretionary	Ekornes	EKO
OB MATCH	Real Estate	Entra	ENTRA
OB MATCH	Consumer discretionary	Europris	EPR
OBX	Energy	Frontline	FRO
OBX	Financials	Gjensidige Forsikring	GJF
OB MATCH	Industrials	Golden Ocean Group	GOGL
OB MATCH	Utilities	Hafslund ser. B	HNB
OB MATCH	Industrials	Hexagon Composites	HEX
OB MATCH	Information Technology	IDEX	IDEX
OB MATCH	Information Technology	Kitron	KIT
OB MATCH	Consumer discretionary	Kongsberg Automotive	KOA
OB MATCH	Industrials	Kongsberg Gruppen	KOG
OBX	Consumer Staples	Lerøy Seafood Group	LSG
OBX	Consumer Staples	Marine Harvest	MHG
OB MATCH	Industrials	Multiconsult	MULTI
OB MATCH	Information Technology	NEXT Biometrics Group	NEXT
OB MATCH	Health care	Nordic Nanovector	NANO
OB MATCH	Information Technology	Nordic Semiconductor	NOD
OBX	Materials	Norsk Hydro	NHY
OBX	Industrials	Norwegian Air Shuttle	NAS
OB MATCH	Financials	Norwegian Finans Holding	NOFI
OB MATCH	Real Estate	Norwegian Property	NPRO
OB MATCH	Real Estate	Olav Thon Eiendomsselskap	OLT
OB MATCH	Information Technology	Opera Software	OPERA
OBX	Consumer Staples	Orkla	ORK
OBX	Energy	Petroleum Geo-Services	PGS
OB MATCH	Health care	Photocure	PHO
OBX	Information Technology	REC Silicon	REC
OBX	Consumer Staples	SalMar	SALM
OB MATCH	Utilities	Scatec Solar	SSO
OBX	Consumer discretionary	Schibsted ser. A	SCHA
OB MATCH	Consumer discretionary	Schibsted ser. B	SCHB
OBX	Energy	Seadrill	SDRL
OBX	Energy	Statoil	STL
OB MATCH	Industrials	Stolt-Nielsen	SNI

OBX	Financials	Storebrand	STB
OBX	Energy	Subsea 7	SUBC
OBX	Telecommunication services	Telenor	TEL
OBX	Energy	TGS-NOPEC Geophysical Company	TGS
OB MATCH	Information Technology	Thin Film Electronics	THIN
OB MATCH	Industrials	Tomra Systems	TOM
OB MATCH	Industrials	Treasure	TRE
OB MATCH	Industrials	Veidekke	VEI
OB MATCH	Health care	Weifa	WEIFA
OB MATCH	Industrials	Wilh. Wilhelmsen	WWASA
OB MATCH	Industrials	Wilh. Wilhelmsen Holding ser. A	WWI
OB MATCH	Industrials	Wilh. Wilhelmsen Holding ser. B	WWIB
OB MATCH	Consumer discretionary	XXL	XXL
OBX	Materials	Yara International	YAR

A.2 Companies removed from sample due to missing data

COMPANY NAME	NOT INCLUDED DUE TO
AKER SOLUTIONS	Listed 2014
AMERICAN SHIPPING COMPANY	Missing EPS
AXACTOR	Missing EPS
B2HOLDING	Listed 2016
BIOTEC PHARMACON	Missing EPS
ENTRA	Listed 2014
EUROPRIS	Listed 2015
GOLDEN OCEAN GROUP	Listed 2015
HAFSLUND SER. B	Missing EPS
IDEX	Listed 2015
KITRON	Missing EPS
MULTICONSULT	Listed 2015
NEXT BIOMETRICS GROUP	Listed 2015
NORDIC NANOVECTOR	Listed 2015
NORWEGIAN FINANS HOLDING	Listed 2016
PHOTOCURE	Missing EPS
SCATEC SOLAR	Listed 2014
SCHIBSTED SER. B	Listed 2015
TREASURE	Listed 2016
XXL	Listed 2014
THIN FILM ELECTRONICS	Listed 2015

B. Estimation of the OLS Parameters

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

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

$$\hat{\sigma}_{\varepsilon i}^2 = \frac{1}{L_1 - 2} \sum_{\tau=T_0+1}^{T_1} \left(R_{i\tau} - \hat{\alpha}_i - \hat{\beta}_i R_{m\tau}\right)^2$$

Where $\hat{\mu}_i = \frac{1}{L_1}\sum_{\tau=T_0+1}^{T_1} R_{i\tau}$ and $\hat{\mu}_m = \frac{1}{L_1}\sum_{\tau=T_0+1}^{T_1} R_{m\tau}$

C. The Base Case

C.1 Bad news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR}	θ_{1CAAR_t}
-20	-0,001	-0,001	-0,392	-0,119	0,000
-19	-0,002	-0,003	-0,867	-0,383	-2,131
-18	-0,001	-0,004	-0,323	-0,481	-0,449
-17	-0,005	-0,008	-2,052	-1,105	0,000
-16	0,000	-0,008	0,064	-1,085	-0,112
-15	0,001	-0,008	0,268	-1,004	-0,897
-14	0,000	-0,008	-0,067	-1,024	-1,234
-13	-0,001	-0,008	-0,238	-1,097	0,000
-12	0,001	-0,007	0,542	-0,932	2,131
-11	0,000	-0,008	-0,213	-0,997	0,561
-10	0,001	-0,007	0,343	-0,892	0,112
-9	-0,002	-0,009	-0,922	-1,173	-1,570
-8	0,001	-0,008	0,385	-1,056	0,336
-7	-0,001	-0,009	-0,374	-1,170	0,336
-6	0,000	-0,009	0,106	-1,137	-0,224
-5	0,000	-0,008	0,176	-1,084	0,785
-4	-0,001	-0,009	-0,344	-1,188	0,112
-3	0,001	-0,008	0,520	-1,030	-0,112
-2	-0,001	-0,008	-0,245	-1,105	-0,785
-1	0,001	-0,008	0,238	-1,032	0,000
0	**-0,013**	**-0,021**	**-5,580**	**-2,729**	**-3,589**
1	0,000	-0,021	-0,099	-2,759	-0,449
2	0,001	-0,020	0,250	-2,683	-0,561
3	-0,001	-0,021	-0,373	-2,797	-0,785
4	-0,001	-0,023	-0,616	-2,984	-0,897
5	0,001	-0,022	0,345	-2,879	-0,673
6	-0,001	-0,023	-0,354	-2,986	-0,112
7	0,000	-0,023	-0,132	-3,027	-1,682
8	0,000	-0,023	-0,058	-3,044	0,449
9	-0,001	-0,024	-0,256	-3,122	-1,794
10	0,000	-0,024	0,095	-3,093	-0,449
11	0,001	-0,023	0,406	-2,970	-0,224
12	-0,001	-0,024	-0,402	-3,092	-1,346
13	0,001	-0,022	0,536	-2,929	-0,673
14	0,000	-0,023	-0,105	-2,961	-0,449
15	0,000	-0,022	0,124	-2,923	1,234
16	0,001	-0,021	0,593	-2,743	1,570
17	-0,001	-0,022	-0,424	-2,872	-1,009
18	0,002	-0,020	0,818	-2,623	0,785
19	0,000	-0,020	-0,175	-2,677	-2,131
20	0,001	-0,019	0,498	-2,525	0,224
STD.DEV	0,002	0,008			

C.2 Good news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR}	θ_{1CAAR_t}
-20	0,001	-0,006	0,284	-0,855	0,047
-19	-0,001	0,008	-0,355	-0,611	-0,012
-18	0,000	-0,001	0,062	0,244	-0,001
-17	-0,002	0,026	-1,141	-1,833	-0,189
-16	0,000	-0,005	0,200	0,244	-0,157
-15	0,001	-0,006	0,282	0,611	-0,110
-14	0,000	-0,001	0,040	0,122	-0,103
-13	-0,001	0,006	-0,255	-0,122	-0,146
-12	-0,002	0,020	-0,859	-1,100	-0,287
-11	0,002	-0,024	1,055	0,367	-0,113
-10	0,001	-0,010	0,461	-1,344	-0,037
-9	0,001	-0,010	0,446	-0,367	0,036
-8	-0,002	0,024	-1,065	-1,833	-0,139
-7	0,001	-0,014	0,597	0,611	-0,041
-6	0,000	0,000	-0,003	-0,122	-0,041
-5	0,001	-0,010	0,425	0,733	0,029
-4	0,000	-0,004	0,174	-0,733	0,057
-3	0,001	-0,011	0,486	0,489	0,137
-2	0,003	-0,028	1,239	0,855	0,342
-1	0,003	-0,027	1,189	1,710	0,538
0	**0,001**	**-0,011**	**0,503**	**0,977**	**0,621**
1	0,010	-0,102	4,490	3,787	1,361
2	0,004	-0,041	1,806	1,466	1,659
3	0,003	-0,035	1,533	1,100	1,912
4	0,000	0,004	-0,167	-0,244	1,884
5	0,000	0,000	0,001	-1,344	1,884
6	0,001	-0,011	0,464	-1,344	1,961
7	0,003	-0,030	1,319	-0,122	2,178
8	-0,002	0,019	-0,829	-0,244	2,041
9	-0,001	0,010	-0,445	-0,489	1,968
10	-0,002	0,017	-0,768	-1,588	1,841
11	0,002	-0,019	0,845	0,855	1,981
12	0,002	-0,025	1,089	-0,367	2,160
13	-0,001	0,010	-0,430	-1,344	2,089
14	-0,001	0,008	-0,356	-0,244	2,031
15	0,001	-0,010	0,458	-0,611	2,106
16	0,000	0,002	-0,082	-0,611	2,092
17	-0,003	0,029	-1,282	-2,199	1,881
18	0,000	0,000	-0,002	-0,489	1,881
19	0,003	-0,028	1,221	2,321	2,082
20	0,000	0,000	0,011	-0,855	2,084
STD.DEV	0,002	0,013			

C.3 No news

		AAR	CAAR	θ_{1AAR_t}	θ_{2AAR}	θ_{1CAAR_t}
-20		-0,002	-0,002	-0,817	-1,633	-0,424
-19		-0,002	-0,005	-0,779	-0,544	-0,828
-18		0,001	-0,003	0,499	0,816	-0,569
-17		0,004	0,000	1,217	1,633	0,063
-16		-0,007	-0,007	-2,411	-2,449	-1,189
-15		-0,002	-0,009	-0,828	-1,633	-1,618
-14		-0,001	-0,010	-0,237	-0,544	-1,741
-13		-0,004	-0,014	-1,299	-1,361	-2,415
-12		0,005	-0,009	1,645	0,816	-1,561
-11		0,001	-0,008	0,388	0,544	-1,360
-10		0,001	-0,007	0,435	0,000	-1,134
-9		-0,001	-0,007	-0,183	0,000	-1,229
-8		0,001	-0,006	0,241	-0,544	-1,104
-7		-0,002	-0,008	-0,679	-0,544	-1,456
-6		-0,002	-0,011	-0,829	-1,089	-1,886
-5		-0,001	-0,011	-0,199	-0,816	-1,990
-4		-0,005	-0,016	-1,666	-0,544	-2,854
-3		0,000	-0,017	-0,133	0,272	-2,924
-2		0,000	-0,017	-0,064	-1,089	-2,957
-1		-0,003	-0,020	-0,926	-1,633	-3,437
0		**0,007**	**-0,013**	**2,310**	**1,63**	**-2,239**
1		0,009	-0,004	2,931	1,089	-0,718
2		0,000	-0,004	0,072	0,000	-0,681
3		0,000	-0,004	0,113	-0,272	-0,622
4		0,001	-0,003	0,208	0,272	-0,514
5		0,002	-0,001	0,631	1,089	-0,187
6		-0,001	-0,002	-0,192	0,000	-0,287
7		0,000	-0,002	-0,140	0,272	-0,359
8		0,002	0,000	0,593	1,089	-0,051
9		0,001	0,001	0,366	0,816	0,138
10		-0,001	0,000	-0,432	-0,272	-0,086
11		0,003	0,003	1,159	0,544	0,516
12		0,002	0,005	0,533	-0,816	0,792
13		-0,002	0,002	-0,691	-0,544	0,434
14		-0,004	-0,002	-1,344	-1,633	-0,263
15		-0,001	-0,003	-0,413	-1,361	-0,478
16		0,001	-0,002	0,331	0,816	-0,306
17		-0,001	-0,003	-0,358	-1,089	-0,492
18		-0,002	-0,005	-0,700	-0,816	-0,855
19		-0,003	-0,007	-0,862	-0,816	-1,303
20		0,001	-0,006	0,449	-0,544	-1,069
STD.DEV		0,003	0,006			

D. Market Capitalization Grouping

Company	Market Capitalization, end 2016	Size
Weifa	930.038	
Asetek	1.360.030	
Kongsberg Automotive	2.306.375	
Wilh. Wilhelmsen Holding ser. B	2.308.079	
REC Silicon	2.899.953	
Ekornes	3.922.049	
Hexagon Composites	4.482.290	
Norwegian Property	5.478.984	
Opera Software	5.575.508	
Seadrill	5.590.648	
Nordic Semiconductor	5.738.204	
Stolt-Nielsen	6.798.182	
Wilh. Wilhelmsen Holding ser. A	6.858.144	
Wilh. Wilhelmsen	7.436.000	**SMALL**
Atea	8.408.689	
DNO	9.190.744	
Petroleum Geo-Services	9.886.536	
Norwegian Air Shuttle	10.263.016	
Frontline	10.528.178	
Tomra Systems	13.395.817	
AF Gruppen	14.462.745	
Kongsberg Gruppen	14.940.000	
Veidekke	16.512.560	
Bakkafrost	16.748.545	
Olav Thon Eiendomsselskap	17.031.251	
TGS-NOPEC Geophysical Company	19.579.469	
Storebrand	20.659.862	
Schibsted ser. A	21.395.516	
Aker	24.005.961	
Lerøy Seafood Group	28.662.672	
SalMar	29.242.730	
Subsea 7	35.781.225	
Aker BP	52.180.377	
Gjensidige Forsikring	68.500.000	**LARGE**
Marine Harvest	70.078.336	
Orkla	79.680.402	
Norsk Hydro	85.449.629	
Yara International	92.894.062	
Telenor	193.688.086	
DNB	209.137.774	
Statoil	514.015.827	

E. Results, Sample by Market Capitalization

E.1 Small firms

Bad news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR}	θ_{1CAAR_t}
-20	-0,204%	-0,204%	-0,626	0,000	-0,180
-19	-0,311%	-0,516%	-0,953	-2,520	-0,455
-18	0,037%	-0,478%	0,114	-0,148	-0,423
-17	-0,849%	-1,328%	-2,600	-0,148	-1,173
-16	-0,007%	-1,335%	-0,021	-0,296	-1,179
-15	0,078%	-1,257%	0,238	-1,038	-1,110
-14	-0,069%	-1,326%	-0,210	-0,593	-1,171
-13	0,004%	-1,322%	0,012	0,445	-1,168
-12	0,146%	-1,176%	0,447	1,779	-1,039
-11	0,000%	-1,176%	-0,001	0,000	-1,039
-10	0,138%	-1,038%	0,421	-0,296	-0,917
-9	-0,203%	-1,242%	-0,623	-1,482	-1,097
-8	0,293%	-0,949%	0,897	1,186	-0,838
-7	-0,151%	-1,100%	-0,462	-0,445	-0,972
-6	0,044%	-1,056%	0,135	-0,296	-0,933
-5	0,075%	-0,981%	0,231	1,186	-0,866
-4	-0,211%	-1,192%	-0,647	-0,296	-1,053
-3	0,306%	-0,885%	0,938	0,296	-0,782
-2	0,024%	-0,861%	0,075	0,148	-0,761
-1	0,010%	-0,851%	0,030	-0,593	-0,752
0	**-1,594%**	**-2,445%**	**-4,880**	**-3,854**	**-2,160**
1	-0,562%	-3,007%	-1,720	-1,927	-2,656
2	0,047%	-2,960%	0,145	-0,148	-2,614
3	-0,181%	-3,141%	-0,554	-0,889	-2,774
4	-0,174%	-3,315%	-0,533	-0,593	-2,928
5	0,111%	-3,204%	0,341	-1,927	-2,830
6	-0,117%	-3,321%	-0,358	-1,186	-2,933
7	-0,061%	-3,382%	-0,187	-1,631	-2,987
8	0,006%	-3,376%	0,019	0,148	-2,982
9	0,032%	-3,344%	0,097	-1,334	-2,954
10	-0,033%	-3,377%	-0,100	-0,593	-2,983
11	-0,017%	-3,394%	-0,053	-1,186	-2,998
12	-0,104%	-3,499%	-0,320	-0,445	-3,090
13	0,261%	-3,237%	0,799	-0,889	-2,860
14	-0,097%	-3,334%	-0,297	-1,631	-2,945
15	-0,019%	-3,354%	-0,058	0,000	-2,962
16	0,280%	-3,073%	0,857	1,779	-2,715
17	-0,197%	-3,270%	-0,603	-0,741	-2,889
18	0,283%	-2,988%	0,865	0,741	-2,639
19	0,023%	-2,965%	0,069	-1,186	-2,619
20	0,122%	-2,843%	0,373	-0,445	-2,511
STD.DEV	0,003	0,011			

Good news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR}	θ_{1CAAR_t}
-20	-0,093%	-0,093%	-0,336	-1,154	-0,041
-19	-0,003%	-0,096%	-0,013	-0,444	-0,042
-18	0,201%	0,105%	0,727	1,154	0,046
-17	-0,207%	-0,103%	-0,750	-1,154	-0,045
-16	-0,018%	-0,120%	-0,063	-0,621	-0,053
-15	0,128%	0,008%	0,464	1,331	0,004
-14	-0,026%	-0,017%	-0,092	0,089	-0,008
-13	-0,120%	-0,137%	-0,433	-1,863	-0,060
-12	-0,212%	-0,349%	-0,766	-1,509	-0,152
-11	0,405%	0,056%	1,463	0,444	0,024
-10	0,280%	0,335%	1,012	-0,621	0,147
-9	0,218%	0,553%	0,788	-0,444	0,242
-8	-0,265%	0,288%	-0,959	-2,396	0,126
-7	0,188%	0,476%	0,681	0,799	0,208
-6	0,012%	0,488%	0,042	0,266	0,213
-5	0,094%	0,582%	0,341	0,976	0,255
-4	0,076%	0,659%	0,276	-0,976	0,288
-3	0,090%	0,749%	0,327	0,444	0,328
-2	0,387%	1,136%	1,398	0,444	0,497
-1	0,531%	1,667%	1,921	2,928	0,729
0	**0,256%**	**1,923%**	**0,925**	**0,444**	**0,841**
1	0,890%	2,813%	3,220	2,041	1,230
2	0,686%	3,499%	2,482	2,928	1,530
3	0,655%	4,154%	2,370	1,331	1,816
4	0,030%	4,184%	0,109	-0,976	1,830
5	0,100%	4,284%	0,361	-0,799	1,873
6	0,303%	4,587%	1,096	-0,976	2,006
7	0,351%	4,938%	1,270	-0,266	2,159
8	-0,189%	4,749%	-0,684	-0,266	2,076
9	-0,291%	4,458%	-1,052	-0,799	1,949
10	-0,004%	4,455%	-0,013	-0,621	1,948
11	0,254%	4,709%	0,920	0,621	2,059
12	0,563%	5,272%	2,036	-0,266	2,305
13	0,046%	5,318%	0,166	-0,621	2,325
14	-0,089%	5,228%	-0,324	-0,089	2,286
15	0,098%	5,326%	0,355	-0,976	2,329
16	0,031%	5,357%	0,111	-0,266	2,342
17	-0,347%	5,010%	-1,255	-0,976	2,191
18	0,140%	5,150%	0,507	0,266	2,252
19	0,357%	5,507%	1,290	1,509	2,408
20	-0,016%	5,491%	-0,058	0,266	2,401
STD.DEV	0,003	0,023			

No news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR}	θ_{1CAAR_t}
-20	0,114%	0,114%	0,256	-0,962	0,163
-19	-0,072%	0,043%	-0,160	-0,192	0,061
-18	0,622%	0,665%	1,393	1,732	0,949
-17	0,044%	0,709%	0,098	0,962	1,011
-16	-0,891%	-0,182%	-1,995	-2,502	-0,260
-15	-0,128%	-0,310%	-0,286	-0,577	-0,442
-14	-0,025%	-0,334%	-0,055	0,192	-0,477
-13	-0,055%	-0,390%	-0,124	-0,962	-0,556
-12	0,857%	0,468%	1,920	0,962	0,667
-11	0,040%	0,508%	0,089	1,732	0,724
-10	-0,116%	0,392%	-0,259	-0,192	0,559
-9	0,011%	0,403%	0,025	-0,192	0,575
-8	-0,129%	0,273%	-0,290	-0,962	0,390
-7	-0,315%	-0,042%	-0,706	-0,192	-0,060
-6	-0,092%	-0,134%	-0,206	0,192	-0,191
-5	-0,432%	-0,566%	-0,967	-1,347	-0,807
-4	-0,897%	-1,463%	-2,008	-0,577	-2,087
-3	0,144%	-1,319%	0,323	-0,192	-1,882
-2	-0,123%	-1,442%	-0,276	-1,347	-2,057
-1	-0,980%	-2,421%	-2,193	-3,272	-3,455
0	**1,145%**	**-1,277%**	**2,563**	**0,962**	**-1,822**
1	0,841%	-0,436%	1,883	0,192	-0,622
2	0,080%	-0,356%	0,179	0,962	-0,508
3	-0,224%	-0,581%	-0,503	-0,962	-0,828
4	0,161%	-0,420%	0,360	0,577	-0,599
5	0,353%	-0,067%	0,791	0,577	-0,095
6	-0,171%	-0,237%	-0,382	-0,577	-0,338
7	-0,234%	-0,471%	-0,525	-0,962	-0,673
8	0,191%	-0,280%	0,429	0,577	-0,400
9	0,267%	-0,013%	0,598	0,577	-0,019
10	-0,466%	-0,479%	-1,042	-0,962	-0,683
11	0,480%	0,001%	1,075	0,577	0,002
12	0,142%	0,143%	0,318	-0,962	0,204
13	-0,106%	0,038%	-0,236	0,192	0,054
14	-0,736%	-0,698%	-1,647	-1,732	-0,996
15	-0,088%	-0,786%	-0,198	-1,347	-1,122
16	0,058%	-0,729%	0,130	0,577	-1,040
17	0,029%	-0,699%	0,065	-0,962	-0,998
18	-0,479%	-1,178%	-1,073	-0,962	-1,681
19	-0,226%	-1,404%	-0,505	-0,577	-2,003
20	-0,506%	-1,910%	-1,133	-2,502	-2,725
STD.DEV	0,004	0,007			

E.2 Large firms

Bad news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR}	θ_{1CAAR}
-20	0,061%	0,061%	0,297	0,000	0,174
-19	-0,053%	0,008%	-0,256	-0,343	0,024
-18	-0,224%	-0,216%	-1,088	-0,514	-0,616
-17	0,026%	-0,190%	0,125	0,171	-0,543
-16	0,044%	-0,146%	0,213	0,171	-0,417
-15	0,041%	-0,105%	0,201	-0,171	-0,299
-14	0,056%	-0,049%	0,271	-1,200	-0,140
-13	-0,134%	-0,183%	-0,650	-0,514	-0,522
-12	0,098%	-0,085%	0,475	1,200	-0,243
-11	-0,115%	-0,200%	-0,558	0,857	-0,571
-10	0,001%	-0,199%	0,006	0,514	-0,567
-9	-0,227%	-0,426%	-1,101	-0,686	-1,215
-8	-0,184%	-0,609%	-0,890	-0,857	-1,739
-7	0,000%	-0,610%	-0,002	1,029	-1,740
-6	-0,002%	-0,611%	-0,008	0,000	-1,744
-5	-0,005%	-0,617%	-0,026	-0,171	-1,760
-4	0,097%	-0,520%	0,468	0,514	-1,484
-3	-0,129%	-0,649%	-0,624	-0,514	-1,852
-2	-0,165%	-0,814%	-0,802	-1,372	-2,323
-1	0,116%	-0,699%	0,560	0,686	-1,994
0	**-0,887%**	**-1,586%**	**-4,301**	**-1,029**	**-4,523**
1	0,699%	-0,887%	3,388	1,543	-2,531
2	0,072%	-0,815%	0,349	-0,686	-2,325
3	0,040%	-0,775%	0,196	-0,171	-2,210
4	-0,100%	-0,875%	-0,487	-0,686	-2,497
5	0,038%	-0,837%	0,184	1,200	-2,389
6	-0,035%	-0,872%	-0,168	1,200	-2,488
7	0,010%	-0,862%	0,050	-0,686	-2,458
8	-0,040%	-0,901%	-0,192	0,514	-2,571
9	-0,181%	-1,083%	-0,879	-1,200	-3,088
10	0,095%	-0,988%	0,461	0,000	-2,817
11	0,243%	-0,745%	1,179	1,029	-2,124
12	-0,078%	-0,823%	-0,379	-1,543	-2,347
13	-0,059%	-0,882%	-0,287	0,000	-2,516
14	0,073%	-0,809%	0,354	1,200	-2,307
15	0,093%	-0,716%	0,449	1,886	-2,044
16	-0,054%	-0,770%	-0,261	0,343	-2,197
17	0,034%	-0,736%	0,165	-0,686	-2,100
18	0,064%	-0,672%	0,313	0,343	-1,916
19	-0,125%	-0,797%	-0,608	-1,886	-2,274
20	0,106%	-0,691%	0,515	0,857	-1,971
STD.DEV.	0,002	0,004			

Good news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR}	θ_{1CAAR}
-20	0,198%	0,198%	0,964	-0,084	0,405
-19	-0,140%	0,058%	-0,682	-0,421	0,118
-18	-0,156%	-0,098%	-0,757	-0,758	-0,200
-17	-0,274%	-0,372%	-1,332	-1,432	-0,759
-16	0,096%	-0,275%	0,469	0,926	-0,562
-15	-0,002%	-0,277%	-0,008	-0,421	-0,565
-14	0,039%	-0,238%	0,190	0,084	-0,485
-13	0,005%	-0,233%	0,023	1,600	-0,476
-12	-0,156%	-0,390%	-0,760	-0,084	-0,795
-11	0,062%	-0,328%	0,300	0,084	-0,669
-10	-0,066%	-0,394%	-0,319	-1,263	-0,803
-9	-0,016%	-0,410%	-0,078	-0,084	-0,836
-8	-0,191%	-0,601%	-0,930	-0,253	-1,227
-7	0,072%	-0,529%	0,348	0,084	-1,080
-6	-0,012%	-0,541%	-0,058	-0,421	-1,105
-5	0,087%	-0,455%	0,421	0,084	-0,928
-4	0,001%	-0,453%	0,007	-0,084	-0,925
-3	0,115%	-0,338%	0,559	0,253	-0,690
-2	0,152%	-0,186%	0,741	0,758	-0,379
-1	0,002%	-0,184%	0,010	-0,421	-0,375
0	**-0,027%**	**-0,211%**	**-0,132**	**0,926**	**-0,430**
1	1,012%	0,802%	4,918	3,284	1,636
2	0,112%	0,913%	0,542	-0,758	1,864
3	0,029%	0,943%	0,142	0,253	1,924
4	-0,095%	0,848%	-0,460	0,590	1,730
5	-0,089%	0,759%	-0,434	-1,095	1,548
6	-0,085%	0,673%	-0,415	-0,926	1,374
7	0,217%	0,890%	1,053	0,084	1,816
8	-0,165%	0,725%	-0,800	-0,084	1,480
9	0,082%	0,808%	0,399	0,084	1,648
10	-0,307%	0,500%	-1,492	-1,600	1,021
11	0,112%	0,613%	0,545	0,590	1,250
12	-0,067%	0,546%	-0,326	-0,253	1,113
13	-0,215%	0,330%	-1,045	-1,263	0,674
14	-0,063%	0,267%	-0,308	-0,253	0,545
15	0,097%	0,364%	0,470	0,084	0,742
16	-0,061%	0,303%	-0,296	-0,590	0,618
17	-0,206%	0,097%	-0,999	-2,105	0,198
18	-0,127%	-0,030%	-0,617	-0,926	-0,061
19	0,172%	0,142%	0,835	1,769	0,290
20	0,019%	0,161%	0,093	-1,432	0,329
STD.DEV	0,002	0,005			

No news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR}	θ_{1CAAR}
-20	-0,602%	-0,602%	-1,725	-1,347	-0,611
-19	-0,393%	-0,995%	-1,127	-0,577	-1,011
-18	-0,324%	-1,319%	-0,930	-0,577	-1,340
-17	0,682%	-0,637%	1,956	1,347	-0,647
-16	-0,548%	-1,184%	-1,569	-0,962	-1,203
-15	-0,367%	-1,551%	-1,051	-1,732	-1,576
-14	-0,117%	-1,668%	-0,334	-0,962	-1,694
-13	-0,720%	-2,387%	-2,062	-0,962	-2,425
-12	0,124%	-2,263%	0,356	0,192	-2,299
-11	0,192%	-2,071%	0,550	-0,962	-2,104
-10	0,375%	-1,696%	1,076	0,192	-1,723
-9	-0,120%	-1,816%	-0,344	0,192	-1,845
-8	0,273%	-1,543%	0,783	0,192	-1,567
-7	-0,090%	-1,633%	-0,258	-0,577	-1,659
-6	-0,402%	-2,035%	-1,153	-1,732	-2,067
-5	0,313%	-1,722%	0,897	0,192	-1,749
-4	-0,097%	-1,819%	-0,279	-0,192	-1,848
-3	-0,224%	-2,043%	-0,641	0,577	-2,075
-2	0,085%	-1,958%	0,244	-0,192	-1,989
-1	0,427%	-1,531%	1,224	0,962	-1,555
0	**0,234%**	**-1,297%**	**0,670**	**1,347**	**-1,318**
1	0,908%	-0,390%	2,601	1,347	-0,396
2	-0,037%	-0,427%	-0,106	-0,962	-0,433
3	0,292%	-0,135%	0,836	0,577	-0,137
4	-0,037%	-0,171%	-0,105	-0,192	-0,174
5	0,023%	-0,148%	0,066	0,962	-0,151
6	0,056%	-0,093%	0,160	0,577	-0,094
7	0,151%	0,058%	0,433	1,347	0,059
8	0,162%	0,221%	0,466	0,962	0,224
9	-0,049%	0,172%	-0,140	0,577	0,175
10	0,208%	0,380%	0,596	0,577	0,386
11	0,212%	0,592%	0,606	0,192	0,601
12	0,176%	0,768%	0,505	-0,192	0,780
13	-0,307%	0,461%	-0,879	-0,962	0,469
14	-0,066%	0,395%	-0,190	-0,577	0,401
15	-0,158%	0,237%	-0,453	-0,577	0,241
16	0,139%	0,376%	0,399	0,577	0,382
17	-0,243%	0,133%	-0,696	-0,577	0,135
18	0,062%	0,195%	0,177	-0,192	0,198
19	-0,289%	-0,094%	-0,827	-0,577	-0,095
20	0,774%	0,680%	2,218	1,732	0,691
STD.DEV	0,003	0,010			

F. Results, Sample by Year

F.1 2013

2013 BAD NEWS

DAY	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,319%	-0,32%	-0,708	-0,663	-0,302
-19	-0,036%	-0,36%	-0,081	-1,325	-0,336
-18	0,182%	-0,17%	0,405	1,988	-0,164
-17	-2,251%	-2,42%	-4,999	-1,104	-2,294
-16	0,024%	-2,40%	0,054	-0,221	-2,271
-15	0,607%	-1,79%	1,348	-1,325	-1,696
-14	0,198%	-1,60%	0,439	-0,883	-1,509
-13	-0,209%	-1,80%	-0,463	-0,442	-1,707
-12	-0,164%	-1,97%	-0,365	0,221	-1,862
-11	-0,461%	-2,43%	-1,025	-1,546	-2,299
-10	0,349%	-2,08%	0,775	1,546	-1,969
-9	-0,062%	-2,14%	-0,138	-1,988	-2,028
-8	0,110%	-2,03%	0,245	-0,442	-1,924
-7	-0,335%	-2,37%	-0,743	-1,325	-2,240
-6	-0,148%	-2,52%	-0,329	0,000	-2,381
-5	0,086%	-2,43%	0,191	0,883	-2,300
-4	-0,103%	-2,53%	-0,228	-1,767	-2,397
-3	0,054%	-2,48%	0,121	-1,546	-2,345
-2	-0,086%	-2,56%	-0,192	-0,883	-2,427
-1	0,006%	-2,56%	0,013	0,000	-2,422
0	**-1,086%**	**-3,65%**	**-2,412**	**-1,546**	**-3,449**
1	-0,384%	-4,03%	-0,852	-1,325	-3,813
2	0,067%	-3,96%	0,149	-1,988	-3,749
3	0,017%	-3,94%	0,039	1,104	-3,732
4	0,110%	-3,83%	0,245	0,663	-3,628
5	0,326%	-3,51%	0,725	0,221	-3,319
6	0,261%	-3,25%	0,580	1,546	-3,072
7	-0,370%	-3,62%	-0,821	-1,767	-3,422
8	0,115%	-3,50%	0,256	0,883	-3,313
9	-0,178%	-3,68%	-0,396	-1,104	-3,481
10	-0,088%	-3,77%	-0,197	-1,104	-3,565
11	0,004%	-3,76%	0,009	0,442	-3,561
12	0,026%	-3,74%	0,057	-0,442	-3,537
13	-0,146%	-3,88%	-0,324	-1,988	-3,675
14	-0,218%	-4,10%	-0,484	-0,883	-3,881
15	0,191%	-3,91%	0,425	-0,221	-3,700
16	0,090%	-3,82%	0,201	0,442	-3,614
17	-0,163%	-3,98%	-0,362	-0,221	-3,769
18	0,559%	-3,42%	1,242	0,442	-3,239
19	-0,030%	-3,45%	-0,066	-2,429	-3,267
20	0,140%	-3,31%	0,311	-0,442	-3,135
STD.DEV	0,00450	0,01056			

2013 GOOD NEWS

DAY	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,065%	-0,07%	-0,192	-1,565	-0,029
-19	-0,247%	-0,31%	-0,725	-0,602	-0,136
-18	0,178%	-0,13%	0,522	0,120	-0,059
-17	-0,359%	-0,49%	-1,054	-0,361	-0,215
-16	0,471%	-0,02%	1,383	1,565	-0,010
-15	-0,098%	-0,12%	-0,286	-0,120	-0,052
-14	0,449%	0,33%	1,318	1,324	0,144
-13	0,040%	0,37%	0,118	-0,602	0,161
-12	-0,086%	0,28%	-0,252	-0,843	0,124
-11	0,300%	0,58%	0,880	1,324	0,254
-10	-0,061%	0,52%	-0,178	-1,324	0,228
-9	-0,004%	0,52%	-0,012	-0,120	0,226
-8	-0,041%	0,48%	-0,120	0,120	0,208
-7	0,095%	0,57%	0,279	0,361	0,250
-6	0,417%	0,99%	1,224	0,602	0,432
-5	0,006%	1,00%	0,016	-0,602	0,434
-4	-0,330%	0,67%	-0,967	-2,047	0,290
-3	-0,128%	0,54%	-0,376	-1,083	0,235
-2	0,505%	1,04%	1,481	1,324	0,455
-1	0,171%	1,21%	0,502	1,806	0,529
0	**0,676%**	**1,89%**	**1,983**	**0,602**	**0,824**
1	1,060%	2,95%	3,109	3,491	1,285
2	0,857%	3,81%	2,513	2,287	1,659
3	0,363%	4,17%	1,064	0,602	1,817
4	0,003%	4,17%	0,007	0,361	1,818
5	0,441%	4,61%	1,293	-1,083	2,010
6	-0,013%	4,60%	-0,039	-0,602	2,004
7	0,202%	4,80%	0,592	0,120	2,092
8	-0,168%	4,63%	-0,492	-0,361	2,019
9	0,098%	4,73%	0,288	-0,120	2,062
10	0,269%	5,00%	0,789	-0,120	2,179
11	0,237%	5,24%	0,696	1,083	2,282
12	0,291%	5,53%	0,855	-1,565	2,409
13	-0,631%	4,90%	-1,851	-1,806	2,134
14	-0,107%	4,79%	-0,313	-0,120	2,088
15	0,358%	5,15%	1,050	1,083	2,244
16	0,097%	5,25%	0,285	0,120	2,286
17	-0,172%	5,07%	-0,506	-0,602	2,211
18	0,036%	5,11%	0,104	-0,602	2,227
19	0,580%	5,69%	1,702	2,528	2,479
20	0,653%	6,34%	1,915	1,324	2,764
STD.DEV	0,00340	0,02294			

2013 NO NEWS

DAY	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,537%	-0,54%	-0,864	-1,000	-0,474
-19	-0,031%	-0,57%	-0,049	-0,333	-0,501
-18	1,319%	0,75%	2,120	1,667	0,662
-17	-0,547%	0,20%	-0,880	-0,333	0,179
-16	-0,120%	0,08%	-0,193	-1,000	0,073
-15	-0,745%	-0,66%	-1,197	-2,333	-0,584
-14	-0,076%	-0,74%	-0,122	-0,333	-0,650
-13	-0,320%	-1,06%	-0,514	-1,667	-0,933
-12	-0,277%	-1,33%	-0,446	0,333	-1,178
-11	0,171%	-1,16%	0,275	1,667	-1,026
-10	-0,520%	-1,68%	-0,836	-0,333	-1,485
-9	0,203%	-1,48%	0,326	-0,333	-1,306
-8	0,340%	-1,14%	0,547	-0,333	-1,006
-7	-1,065%	-2,20%	-1,712	-2,333	-1,945
-6	-0,024%	-2,23%	-0,039	-0,333	-1,967
-5	-0,098%	-2,33%	-0,158	-0,333	-2,053
-4	-0,227%	-2,55%	-0,366	1,000	-2,254
-3	0,186%	-2,37%	0,298	-0,333	-2,090
-2	-0,713%	-3,08%	-1,147	-2,333	-2,720
-1	-0,555%	-3,64%	-0,892	-2,333	-3,209
0	**-0,128%**	**-3,77%**	**-0,205**	**-0,333**	**-3,322**
1	2,191%	-1,57%	3,522	1,667	-1,389
2	0,112%	-1,46%	0,180	0,333	-1,290
3	0,325%	-1,14%	0,522	1,667	-1,004
4	-0,154%	-1,29%	-0,248	-0,333	-1,140
5	0,963%	-0,33%	1,548	2,333	-0,290
6	-0,576%	-0,91%	-0,927	-1,000	-0,799
7	0,178%	-0,73%	0,286	0,333	-0,642
8	0,826%	0,10%	1,328	0,333	0,087
9	0,584%	0,68%	0,939	1,000	0,602
10	-0,477%	0,21%	-0,766	-1,000	0,181
11	0,438%	0,64%	0,704	1,000	0,568
12	-0,929%	-0,29%	-1,493	-1,667	-0,252
13	0,165%	-0,12%	0,266	-0,333	-0,106
14	-0,439%	-0,56%	-0,706	-1,000	-0,494
15	-0,483%	-1,04%	-0,777	-1,667	-0,920
16	-0,142%	-1,19%	-0,229	0,333	-1,046
17	-0,027%	-1,21%	-0,044	-1,000	-1,070
18	-0,781%	-1,99%	-1,256	-1,000	-1,759
19	-0,473%	-2,47%	-0,761	-1,000	-2,176
20	-0,491%	-2,96%	-0,790	-1,667	-2,610
STD.DEV	0,0062	0,0113			

F.2 2014

2014 BAD NEWS

DAY	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,019%	0,02%	0,047	-1,013	0,028
-19	-0,218%	-0,20%	-0,533	-0,788	-0,290
-18	-0,252%	-0,45%	-0,618	-1,913	-0,657
-17	0,031%	-0,42%	0,076	0,113	-0,612
-16	-0,159%	-0,58%	-0,390	-0,338	-0,844
-15	-0,214%	-0,79%	-0,525	-0,338	-1,156
-14	-0,515%	-1,31%	-1,262	-0,563	-1,907
-13	-0,540%	-1,85%	-1,322	-0,788	-2,694
-12	0,078%	-1,77%	0,191	1,013	-2,581
-11	0,239%	-1,53%	0,585	1,913	-2,233
-10	-0,052%	-1,58%	-0,127	0,788	-2,308
-9	0,021%	-1,56%	0,052	0,563	-2,277
-8	-0,062%	-1,63%	-0,152	-0,338	-2,368
-7	0,135%	-1,49%	0,331	1,238	-2,171
-6	0,159%	-1,33%	0,390	0,563	-1,939
-5	0,074%	-1,26%	0,180	0,113	-1,832
-4	0,718%	-0,54%	1,759	2,813	-0,785
-3	0,458%	-0,08%	1,121	0,788	-0,118
-2	-0,073%	-0,15%	-0,179	1,013	-0,224
-1	0,385%	0,23%	0,941	1,013	0,336
0	**-2,003%**	**-1,77%**	**-4,903**	**-2,363**	**-2,582**
1	0,275%	-1,50%	0,673	0,788	-2,182
2	-0,044%	-1,54%	-0,107	1,013	-2,246
3	0,070%	-1,47%	0,171	-0,563	-2,144
4	-0,370%	-1,84%	-0,905	-1,013	-2,682
5	-0,095%	-1,94%	-0,231	-0,338	-2,820
6	-0,533%	-2,47%	-1,305	-1,463	-3,596
7	0,148%	-2,32%	0,363	0,338	-3,380
8	-0,072%	-2,39%	-0,177	-0,113	-3,485
9	0,164%	-2,23%	0,403	0,113	-3,246
10	0,030%	-2,20%	0,073	0,338	-3,202
11	0,404%	-1,79%	0,989	-1,013	-2,614
12	-0,040%	-1,83%	-0,098	-1,013	-2,672
13	0,264%	-1,57%	0,647	-0,113	-2,287
14	0,003%	-1,57%	0,008	0,563	-2,282
15	0,060%	-1,51%	0,148	1,238	-2,194
16	0,317%	-1,19%	0,776	2,138	-1,732
17	-0,173%	-1,36%	-0,424	-0,563	-1,985
18	-0,050%	-1,41%	-0,122	0,788	-2,057
19	-0,093%	-1,51%	-0,227	-1,238	-2,192
20	0,144%	-1,36%	0,353	-0,113	-1,983
STD.DEV	0,00408	0,00686			

2014 GOOD NEWS

DAY	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,237%	0,24%	0,637	0,000	0,215
-19	-0,325%	-0,09%	-0,875	-0,750	-0,081
-18	0,292%	0,20%	0,786	0,250	0,185
-17	-0,613%	-0,41%	-1,649	-2,500	-0,372
-16	0,182%	-0,23%	0,490	0,000	-0,207
-15	0,176%	-0,05%	0,475	1,000	-0,046
-14	-0,307%	-0,36%	-0,827	-0,250	-0,326
-13	-0,320%	-0,68%	-0,862	-0,750	-0,617
-12	-0,350%	-1,03%	-0,942	-0,250	-0,936
-11	0,309%	-0,72%	0,831	0,500	-0,655
-10	0,444%	-0,28%	1,194	1,250	-0,251
-9	0,505%	0,23%	1,360	1,250	0,209
-8	-0,179%	0,05%	-0,481	-1,500	0,047
-7	-0,068%	-0,02%	-0,183	0,750	-0,015
-6	-0,056%	-0,07%	-0,151	0,250	-0,067
-5	-0,080%	-0,15%	-0,216	-0,500	-0,140
-4	0,362%	0,21%	0,974	0,750	0,190
-3	0,165%	0,37%	0,443	0,000	0,339
-2	0,670%	1,04%	1,802	1,500	0,949
-1	0,442%	1,48%	1,190	1,000	1,351
0	**-0,724%**	**0,76%**	**-1,949**	**-0,750**	**0,692**
1	1,049%	1,81%	2,823	1,250	1,647
2	0,081%	1,89%	0,218	0,000	1,721
3	0,666%	2,56%	1,792	0,500	2,327
4	-0,080%	2,48%	-0,216	-0,750	2,254
5	-0,125%	2,35%	-0,336	-0,250	2,140
6	-0,298%	2,05%	-0,801	-1,750	1,869
7	-0,116%	1,94%	-0,313	-1,750	1,763
8	0,099%	2,04%	0,265	0,500	1,853
9	-0,100%	1,94%	-0,270	0,250	1,762
10	-0,077%	1,86%	-0,207	-1,000	1,692
11	-0,386%	1,47%	-1,038	-3,500	1,341
12	0,065%	1,54%	0,174	0,500	1,400
13	0,604%	2,14%	1,626	0,750	1,950
14	0,128%	2,27%	0,346	-0,500	2,067
15	0,040%	2,31%	0,106	-0,250	2,103
16	-0,175%	2,14%	-0,471	-0,750	1,944
17	-0,277%	1,86%	-0,745	-1,750	1,692
18	0,013%	1,87%	0,036	1,500	1,704
19	0,099%	1,97%	0,265	0,750	1,793
20	-0,541%	1,43%	-1,456	-1,250	1,301
STD.DEV	0,00371	0,01098			

2014 NO NEWS

DAY	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,139%	0,14%	0,349	-0,728	0,136
-19	-0,252%	-0,11%	-0,630	-0,728	-0,110
-18	-0,227%	-0,34%	-0,569	0,728	-0,333
-17	0,616%	0,28%	1,544	0,728	0,271
-16	-0,977%	-0,70%	-2,448	-2,183	-0,686
-15	-0,329%	-1,03%	-0,824	-0,728	-1,008
-14	-0,401%	-1,43%	-1,004	-1,213	-1,400
-13	0,371%	-1,06%	0,929	-0,243	-1,037
-12	1,076%	0,02%	2,695	0,243	0,016
-11	-0,131%	-0,12%	-0,329	-0,728	-0,113
-10	0,626%	0,51%	1,570	0,243	0,501
-9	0,831%	1,34%	2,083	2,183	1,314
-8	0,021%	1,36%	0,052	0,243	1,335
-7	0,444%	1,81%	1,114	0,728	1,770
-6	-0,221%	1,59%	-0,554	0,243	1,553
-5	0,098%	1,68%	0,246	-0,243	1,649
-4	-0,166%	1,52%	-0,417	1,213	1,487
-3	-0,161%	1,36%	-0,403	-0,243	1,329
-2	-0,044%	1,31%	-0,111	-0,243	1,286
-1	-0,585%	0,73%	-1,465	-1,213	0,713
0	**0,237%**	**0,97%**	**0,595**	**0,243**	**0,946**
1	-0,046%	0,92%	-0,115	0,243	0,901
2	-0,020%	0,90%	-0,051	-0,243	0,881
3	0,340%	1,24%	0,852	-0,243	1,213
4	0,669%	1,91%	1,676	1,698	1,868
5	-0,180%	1,73%	-0,451	-0,243	1,692
6	-0,178%	1,55%	-0,447	-0,243	1,517
7	0,158%	1,71%	0,395	0,243	1,671
8	-0,201%	1,51%	-0,504	-0,243	1,474
9	-0,020%	1,49%	-0,049	0,728	1,455
10	0,046%	1,53%	0,116	-1,213	1,501
11	0,484%	2,02%	1,212	-0,728	1,974
12	0,374%	2,39%	0,937	-0,243	2,340
13	-0,240%	2,15%	-0,601	-0,728	2,106
14	0,161%	2,31%	0,403	0,243	2,263
15	0,271%	2,58%	0,678	0,243	2,528
16	-0,245%	2,34%	-0,613	-0,243	2,288
17	-0,283%	2,05%	-0,709	-0,243	2,011
18	-0,342%	1,71%	-0,857	-0,243	1,677
19	-0,162%	1,55%	-0,407	0,728	1,518
20	0,321%	1,87%	0,805	0,243	1,832
STD.DEV	0,00399	0,01021			

F.3 2015

2015 BAD NEWS

DAY	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,093%	-0,09%	-0,297	0,647	-0,067
-19	-0,200%	-0,29%	-0,635	-0,863	-0,211
-18	-0,072%	-0,36%	-0,228	0,647	-0,263
-17	0,197%	-0,17%	0,627	0,216	-0,121
-16	-0,184%	-0,35%	-0,587	0,000	-0,254
-15	0,116%	-0,24%	0,370	0,647	-0,170
-14	0,059%	-0,18%	0,187	-1,078	-0,127
-13	0,258%	0,08%	0,820	1,078	0,058
-12	0,247%	0,33%	0,785	1,725	0,236
-11	0,277%	0,61%	0,881	1,510	0,436
-10	-0,006%	0,60%	-0,018	-0,647	0,432
-9	-0,322%	0,28%	-1,024	0,000	0,200
-8	0,290%	0,57%	0,921	0,863	0,408
-7	-0,256%	0,31%	-0,816	0,431	0,223
-6	0,106%	0,42%	0,336	-0,431	0,299
-5	-0,171%	0,25%	-0,543	-0,216	0,176
-4	-0,183%	0,06%	-0,583	0,647	0,044
-3	-0,119%	-0,06%	-0,378	0,000	-0,041
-2	-0,218%	-0,28%	-0,693	-2,157	-0,198
-1	-0,249%	-0,52%	-0,791	-0,647	-0,377
0	**-1,592%**	**-2,12%**	**-5,063**	**-1,510**	**-1,524**
1	-0,085%	-2,20%	-0,269	-0,216	-1,585
2	0,331%	-1,87%	1,051	0,647	-1,347
3	-0,389%	-2,26%	-1,239	-2,157	-1,627
4	-0,053%	-2,31%	-0,169	-0,431	-1,666
5	0,009%	-2,30%	0,030	-1,078	-1,659
6	-0,149%	-2,45%	-0,475	-1,294	-1,766
7	0,111%	-2,34%	0,354	-0,863	-1,686
8	-0,044%	-2,38%	-0,139	1,078	-1,717
9	-0,281%	-2,67%	-0,893	-1,294	-1,920
10	-0,234%	-2,90%	-0,744	-1,078	-2,088
11	-0,009%	-2,91%	-0,030	0,431	-2,095
12	-0,219%	-3,13%	-0,696	-1,078	-2,252
13	-0,158%	-3,29%	-0,504	1,078	-2,366
14	0,140%	-3,15%	0,446	0,431	-2,265
15	0,124%	-3,02%	0,395	1,941	-2,176
16	0,267%	-2,75%	0,848	0,647	-1,984
17	0,097%	-2,66%	0,308	0,000	-1,914
18	0,095%	-2,56%	0,302	0,863	-1,845
19	-0,264%	-2,83%	-0,840	-2,157	-2,036
20	0,270%	-2,56%	0,859	1,725	-1,841
STD.DEV	0,00314	0,01389			

2015 GOOD NEWS

DAY	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,095%	-0,10%	-0,370	0,788	-0,097
-19	0,317%	0,22%	1,235	0,000	0,227
-18	0,227%	0,45%	0,882	1,576	0,459
-17	-0,010%	0,44%	-0,040	-1,050	0,448
-16	0,034%	0,47%	0,132	0,788	0,483
-15	-0,145%	0,33%	-0,565	-0,263	0,335
-14	0,053%	0,38%	0,207	-0,525	0,389
-13	-0,046%	0,33%	-0,179	-0,525	0,342
-12	0,022%	0,36%	0,085	0,525	0,364
-11	0,246%	0,60%	0,958	0,525	0,616
-10	-0,080%	0,52%	-0,310	-1,313	0,535
-9	-0,049%	0,47%	-0,190	-0,525	0,485
-8	-0,225%	0,25%	-0,877	-0,788	0,254
-7	0,387%	0,64%	1,506	0,525	0,650
-6	-0,378%	0,26%	-1,471	-1,313	0,263
-5	0,199%	0,46%	0,775	2,101	0,467
-4	0,341%	0,80%	1,329	1,313	0,816
-3	0,324%	1,12%	1,262	1,576	1,148
-2	0,238%	1,36%	0,925	0,263	1,391
-1	0,172%	1,53%	0,669	0,000	1,567
0	**-0,041%**	**1,49%**	**-0,159**	**1,050**	**1,525**
1	0,542%	2,03%	2,109	0,263	2,079
2	0,328%	2,36%	1,277	1,576	2,414
3	0,418%	2,78%	1,629	0,263	2,842
4	-0,083%	2,70%	-0,322	-0,525	2,758
5	-0,506%	2,19%	-1,969	-0,788	2,241
6	0,460%	2,65%	1,789	0,263	2,711
7	0,201%	2,85%	0,781	0,525	2,916
8	-0,004%	2,85%	-0,015	0,525	2,912
9	-0,310%	2,54%	-1,206	-0,525	2,595
10	-0,346%	2,19%	-1,347	-1,576	2,241
11	0,415%	2,61%	1,616	2,101	2,666
12	-0,098%	2,51%	-0,380	-1,576	2,566
13	-0,069%	2,44%	-0,270	-0,263	2,495
14	0,174%	2,61%	0,679	1,050	2,673
15	-0,416%	2,20%	-1,621	-3,151	2,247
16	-0,067%	2,13%	-0,260	0,525	2,179
17	-0,187%	1,94%	-0,728	-1,838	1,988
18	0,040%	1,98%	0,157	-0,263	2,029
19	0,025%	2,01%	0,099	-0,788	2,055
20	-0,181%	1,83%	-0,705	-0,788	1,870
STD.DEV	0,00256	0,00977			

2015 NO NEWS

DAY	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,080%	-0,08%	-0,132	-1,000	-0,070
-19	-0,275%	-0,36%	-0,455	-1,000	-0,310
-18	-0,029%	-0,38%	-0,048	-1,000	-0,335
-17	0,313%	-0,07%	0,517	1,000	-0,062
-16	-1,049%	-1,12%	-1,734	-1,000	-0,978
-15	0,246%	-0,88%	0,406	0,000	-0,764
-14	-0,370%	-1,25%	-0,611	-0,500	-1,087
-13	-0,716%	-1,96%	-1,182	0,000	-1,712
-12	0,583%	-1,38%	0,963	1,000	-1,203
-11	0,135%	-1,24%	0,224	0,000	-1,084
-10	-0,026%	-1,27%	-0,043	0,500	-1,107
-9	-1,296%	-2,56%	-2,142	-2,500	-2,239
-8	-0,014%	-2,58%	-0,024	-0,500	-2,252
-7	-0,409%	-2,99%	-0,675	0,000	-2,609
-6	-0,016%	-3,00%	-0,027	-0,500	-2,623
-5	-0,192%	-3,20%	-0,316	-1,000	-2,790
-4	-0,914%	-4,11%	-1,510	-1,000	-3,588
-3	-0,256%	-4,37%	-0,424	0,000	-3,812
-2	0,503%	-3,86%	0,830	0,000	-3,373
-1	0,000%	-3,86%	0,001	0,500	-3,373
0	**2,096%**	**-1,77%**	**3,463**	**2,000**	**-1,543**
1	1,461%	-0,31%	2,414	0,000	-0,267
2	0,323%	0,02%	0,534	0,500	0,015
3	-0,361%	-0,34%	-0,596	-0,500	-0,300
4	-0,589%	-0,93%	-0,974	-1,500	-0,815
5	0,308%	-0,62%	0,509	1,000	-0,545
6	-0,107%	-0,73%	-0,176	0,500	-0,638
7	-0,156%	-0,89%	-0,257	0,500	-0,774
8	-0,292%	-1,18%	-0,482	0,000	-1,029
9	0,184%	-0,99%	0,305	-0,500	-0,868
10	-0,209%	-1,20%	-0,345	1,000	-1,050
11	-0,199%	-1,40%	-0,328	-0,500	-1,224
12	0,747%	-0,65%	1,234	0,500	-0,571
13	-0,460%	-1,11%	-0,759	-1,000	-0,973
14	-0,804%	-1,92%	-1,329	-0,500	-1,675
15	0,088%	-1,83%	0,146	0,000	-1,598
16	0,471%	-1,36%	0,778	1,000	-1,187
17	0,245%	-1,11%	0,405	0,000	-0,973
18	-0,157%	-1,27%	-0,259	-1,500	-1,110
19	-0,210%	-1,48%	-0,346	-1,000	-1,293
20	0,293%	-1,19%	0,484	1,000	-1,037
STD.DEV	0,00605	0,01145			

F.4 2016

2016 BAD NEWS

DAY	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,054%	0,05%	0,192	1,068	0,144
-19	-0,373%	-0,32%	-1,339	-1,305	-0,858
-18	-0,177%	-0,50%	-0,638	-1,780	-1,335
-17	0,199%	-0,30%	0,716	0,831	-0,800
-16	0,439%	0,14%	1,578	0,356	0,381
-15	-0,325%	-0,18%	-1,168	-0,831	-0,493
-14	0,205%	0,02%	0,736	0,119	0,058
-13	0,282%	0,30%	1,014	0,119	0,816
-12	0,367%	0,67%	1,318	1,305	1,802
-11	-0,289%	0,38%	-1,041	-0,831	1,024
-10	0,017%	0,40%	0,062	-1,543	1,070
-9	-0,518%	-0,12%	-1,861	-1,780	-0,323
-8	-0,010%	-0,13%	-0,035	0,593	-0,349
-7	0,159%	0,03%	0,571	0,356	0,078
-6	-0,024%	0,01%	-0,086	-0,593	0,014
-5	0,209%	0,21%	0,750	0,831	0,575
-4	-0,815%	-0,60%	-2,930	-1,543	-1,617
-3	0,110%	-0,49%	0,397	0,593	-1,321
-2	0,191%	-0,30%	0,688	0,593	-0,806
-1	0,113%	-0,19%	0,407	-0,356	-0,502
0	**-0,374%**	**-0,56%**	**-1,344**	**-1,780**	**-1,508**
1	0,138%	-0,42%	0,495	-0,119	-1,138
2	-0,170%	-0,59%	-0,610	-0,831	-1,594
3	-0,013%	-0,61%	-0,048	0,119	-1,630
4	-0,291%	-0,90%	-1,045	-1,068	-2,412
5	0,075%	-0,82%	0,269	-0,119	-2,210
6	0,105%	-0,72%	0,379	1,068	-1,927
7	-0,010%	-0,73%	-0,038	-1,068	-1,955
8	-0,060%	-0,79%	-0,214	-1,068	-2,115
9	0,097%	-0,69%	0,350	-1,305	-1,853
10	0,451%	-0,24%	1,621	1,068	-0,640
11	-0,022%	-0,26%	-0,079	-0,356	-0,699
12	-0,137%	-0,40%	-0,494	-0,119	-1,068
13	0,622%	0,22%	2,235	-0,356	0,604
14	-0,031%	0,19%	-0,111	-1,068	0,521
15	-0,310%	-0,12%	-1,116	-0,593	-0,314
16	-0,166%	-0,28%	-0,595	-0,119	-0,759
17	-0,176%	-0,46%	-0,633	-1,305	-1,233
18	0,142%	-0,32%	0,511	-0,593	-0,851
19	0,276%	-0,04%	0,991	1,780	-0,110
20	-0,133%	-0,17%	-0,480	-0,831	-0,469
STD.DEV	0,00278	0,00371			

2016 GOOD NEWS

DAY	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,144%	0,14%	0,419	-0,798	0,147
-19	-0,010%	0,13%	-0,029	0,114	0,137
-18	-0,527%	-0,39%	-1,534	-1,254	-0,401
-17	-0,005%	-0,40%	-0,015	0,114	-0,407
-16	-0,452%	-0,85%	-1,315	-1,709	-0,868
-15	0,259%	-0,59%	0,754	0,570	-0,603
-14	-0,158%	-0,75%	-0,459	-0,342	-0,765
-13	0,076%	-0,67%	0,222	1,481	-0,687
-12	-0,284%	-0,96%	-0,827	-1,481	-0,977
-11	0,069%	-0,89%	0,202	-1,481	-0,906
-10	0,086%	-0,80%	0,251	-1,254	-0,818
-9	-0,050%	-0,85%	-0,145	-1,254	-0,869
-8	-0,433%	-1,28%	-1,261	-1,481	-1,311
-7	0,122%	-1,16%	0,354	-0,342	-1,187
-6	-0,045%	-1,21%	-0,131	0,114	-1,233
-5	0,226%	-0,98%	0,658	0,570	-1,002
-4	-0,134%	-1,11%	-0,390	-1,254	-1,138
-3	0,093%	-1,02%	0,271	0,570	-1,043
-2	-0,271%	-1,29%	-0,790	-1,254	-1,320
-1	0,230%	-1,06%	0,669	0,570	-1,085
0	**0,399%**	**-0,66%**	**1,163**	**1,026**	**-0,678**
1	1,093%	0,43%	3,183	2,393	0,439
2	0,254%	0,68%	0,740	-0,798	0,698
3	-0,059%	0,62%	-0,173	0,798	0,638
4	0,003%	0,63%	0,009	0,342	0,641
5	0,091%	0,72%	0,265	-0,570	0,733
6	0,257%	0,97%	0,748	-0,570	0,996
7	0,741%	1,72%	2,157	0,798	1,752
8	-0,542%	1,17%	-1,580	-1,026	1,198
9	-0,100%	1,07%	-0,293	-0,570	1,096
10	-0,485%	0,59%	-1,413	-0,570	0,600
11	0,420%	1,01%	1,224	1,937	1,029
12	0,564%	1,57%	1,644	1,709	1,606
13	-0,203%	1,37%	-0,592	-1,254	1,398
14	-0,406%	0,96%	-1,182	-0,798	0,984
15	0,299%	1,26%	0,870	0,798	1,289
16	0,048%	1,31%	0,139	-1,026	1,337
17	-0,423%	0,89%	-1,233	-0,342	0,905
18	-0,075%	0,81%	-0,218	-1,481	0,829
19	0,282%	1,09%	0,822	1,937	1,117
20	0,010%	1,10%	0,029	-1,026	1,127
STD.DEV	0,00343	0,00979			

2016 NO NEWS

DAY	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,784%	-0,78%	-1,734	-0,577	-1,322
-19	-0,299%	-1,08%	-0,662	1,155	-1,826
-18	0,042%	-1,04%	0,092	0,577	-1,756
-17	0,754%	-0,29%	1,668	1,732	-0,485
-16	-0,364%	-0,65%	-0,805	-0,577	-1,098
-15	-0,415%	-1,07%	-0,918	-0,577	-1,797
-14	0,800%	-0,27%	1,770	1,155	-0,448
-13	-1,074%	-1,34%	-2,376	-1,155	-2,259
-12	0,115%	-1,22%	0,255	0,000	-2,065
-11	0,399%	-0,83%	0,882	0,577	-1,393
-10	0,121%	-0,70%	0,269	-0,577	-1,188
-9	0,153%	-0,55%	0,339	0,577	-0,929
-8	0,058%	-0,49%	0,128	-0,577	-0,832
-7	-0,198%	-0,69%	-0,438	0,000	-1,165
-6	-0,759%	-1,45%	-1,678	-1,732	-2,444
-5	-0,078%	-1,53%	-0,172	0,000	-2,575
-4	-0,612%	-2,14%	-1,354	-2,309	-3,608
-3	0,251%	-1,89%	0,556	1,155	-3,184
-2	-0,158%	-2,05%	-0,350	0,000	-3,451
-1	0,001%	-2,05%	0,002	-0,577	-3,449
0	**0,066%**	**-1,98%**	**0,145**	**1,155**	**-3,339**
1	0,408%	-1,57%	0,903	0,577	-2,650
2	-0,389%	-1,96%	-0,862	-0,577	-3,307
3	-0,092%	-2,05%	-0,204	-1,155	-3,463
4	0,233%	-1,82%	0,516	0,577	-3,069
5	-0,031%	-1,85%	-0,068	-0,577	-3,121
6	0,569%	-1,28%	1,259	0,577	-2,162
7	-0,336%	-1,62%	-0,744	-0,577	-2,729
8	0,850%	-0,77%	1,881	2,309	-1,295
9	-0,165%	-0,93%	-0,365	0,577	-1,574
10	-0,010%	-0,94%	-0,021	0,577	-1,590
11	0,807%	-0,14%	1,786	1,732	-0,229
12	-0,114%	-0,25%	-0,252	-0,577	-0,420
13	-0,098%	-0,35%	-0,217	1,155	-0,586
14	-0,631%	-0,98%	-1,395	-2,309	-1,649
15	-0,694%	-1,67%	-1,535	-1,732	-2,819
16	0,269%	-1,40%	0,596	0,577	-2,364
17	-0,386%	-1,79%	-0,855	-1,155	-3,016
18	0,341%	-1,45%	0,754	1,155	-2,441
19	-0,293%	-1,74%	-0,648	-0,577	-2,935
20	0,126%	-1,61%	0,279	-1,155	-2,723
STD.DEV	0,00452	0,00593			

G. Results, Sample by Financial Quarters

G.1 FQ1

FQ1 Bad news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,126%	-0,126%	-0,258	-0,798	-0,073
-19	-0,458%	-0,584%	-0,932	-2,165	-0,339
-18	0,046%	-0,538%	0,095	-0,114	-0,312
-17	-2,305%	-2,843%	-4,697	-0,570	-1,650
-16	0,310%	-2,533%	0,631	0,798	-1,470
-15	0,463%	-2,070%	0,943	-1,481	-1,202
-14	-0,477%	-2,547%	-0,973	-2,393	-1,479
-13	-0,081%	-2,629%	-0,166	-0,798	-1,526
-12	-0,057%	-2,686%	-0,116	0,570	-1,559
-11	0,036%	-2,649%	0,074	0,798	-1,538
-10	0,507%	-2,143%	1,032	0,114	-1,244
-9	0,020%	-2,123%	0,041	-0,342	-1,232
-8	-0,344%	-2,467%	-0,701	-1,254	-1,432
-7	-0,720%	-3,186%	-1,467	-1,709	-1,850
-6	0,106%	-3,081%	0,215	0,342	-1,788
-5	-0,123%	-3,204%	-0,251	0,114	-1,860
-4	-0,071%	-3,275%	-0,145	-0,798	-1,901
-3	0,268%	-3,008%	0,545	-0,798	-1,746
-2	0,295%	-2,713%	0,601	0,342	-1,575
-1	0,013%	-2,700%	0,026	-0,114	-1,567
0	**-1,310%**	**-4,010%**	**-2,670**	**-2,849**	**-2,328**
1	-0,713%	-4,724%	-1,454	-0,798	-2,742
2	-0,431%	-5,155%	-0,879	-1,254	-2,992
3	-0,347%	-5,502%	-0,708	0,342	-3,194
4	-0,047%	-5,549%	-0,095	-0,570	-3,221
5	0,307%	-5,241%	0,626	0,114	-3,043
6	-0,196%	-5,437%	-0,400	0,114	-3,156
7	0,097%	-5,341%	0,197	-1,026	-3,100
8	-0,079%	-5,419%	-0,161	-1,026	-3,146
9	-0,377%	-5,796%	-0,769	-2,621	-3,365
10	0,315%	-5,481%	0,642	0,342	-3,182
11	-0,104%	-5,585%	-0,212	-0,342	-3,242
12	0,036%	-5,549%	0,074	-0,114	-3,221
13	0,051%	-5,498%	0,103	0,570	-3,192
14	-0,434%	-5,932%	-0,885	-2,393	-3,444
15	0,256%	-5,676%	0,522	0,114	-3,295
16	0,109%	-5,567%	0,222	0,570	-3,232
17	-0,291%	-5,858%	-0,592	-1,254	-3,401
18	0,054%	-5,804%	0,110	-0,342	-3,369
19	-0,044%	-5,847%	-0,089	-0,570	-3,394
20	-0,004%	-5,852%	-0,009	-0,798	-3,397
STD.DEV	0,0049	0,0172			

FQ1 Good news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,238%	-0,238%	-0,742	-0,465	-0,321
-19	-0,063%	-0,301%	-0,196	0,000	-0,405
-18	-0,039%	-0,340%	-0,121	-0,232	-0,458
-17	-0,449%	-0,788%	-1,399	-1,860	-1,062
-16	0,336%	-0,452%	1,048	0,697	-0,609
-15	0,004%	-0,448%	0,014	0,697	-0,604
-14	-0,211%	-0,658%	-0,657	-0,232	-0,887
-13	-0,255%	-0,913%	-0,794	-1,162	-1,230
-12	-0,043%	-0,956%	-0,135	-0,232	-1,289
-11	0,410%	-0,546%	1,279	-0,465	-0,736
-10	-0,044%	-0,590%	-0,136	-2,325	-0,795
-9	0,079%	-0,511%	0,247	0,000	-0,688
-8	-0,593%	-1,104%	-1,851	-3,022	-1,488
-7	0,405%	-0,699%	1,265	0,930	-0,942
-6	0,060%	-0,639%	0,187	-0,232	-0,861
-5	0,202%	-0,436%	0,631	1,395	-0,588
-4	-0,045%	-0,482%	-0,141	0,232	-0,649
-3	0,077%	-0,405%	0,241	0,930	-0,545
-2	0,359%	-0,046%	1,120	1,162	-0,061
-1	-0,131%	-0,176%	-0,408	-0,465	-0,238
0	**0,860%**	**0,683%**	**2,681**	**1,627**	**0,921**
1	0,320%	1,003%	0,998	0,930	1,352
2	0,295%	1,298%	0,920	-0,232	1,749
3	0,025%	1,323%	0,076	-0,697	1,782
4	-0,301%	1,022%	-0,937	-1,860	1,377
5	-0,325%	0,697%	-1,013	-1,162	0,939
6	0,118%	0,815%	0,367	-0,232	1,098
7	0,230%	1,045%	0,719	1,162	1,408
8	-0,275%	0,770%	-0,858	-0,930	1,038
9	-0,133%	0,637%	-0,416	-0,232	0,858
10	-0,410%	0,227%	-1,277	-1,395	0,306
11	0,377%	0,604%	1,176	1,395	0,814
12	0,882%	1,486%	2,750	1,162	2,003
13	-0,313%	1,173%	-0,977	-0,232	1,580
14	-0,250%	0,923%	-0,779	0,232	1,244
15	-0,065%	0,858%	-0,204	-1,860	1,156
16	-0,301%	0,557%	-0,939	-1,395	0,750
17	-0,290%	0,267%	-0,903	-1,395	0,360
18	0,070%	0,337%	0,220	0,232	0,455
19	0,120%	0,458%	0,375	1,162	0,617
20	0,098%	0,556%	0,307	0,232	0,750
STD.DEV	0,0032	0,0074			

FQ1 No News

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,065%	0,065%	0,113	19,000	0,035
-19	0,023%	0,088%	0,039	19,667	0,047
-18	0,373%	0,460%	0,647	19,000	0,245
-17	0,615%	1,075%	1,068	17,667	0,572
-16	-0,630%	0,446%	-1,094	19,667	0,237
-15	-0,126%	0,319%	-0,220	21,667	0,170
-14	0,887%	1,207%	1,541	21,667	0,641
-13	-0,091%	1,115%	-0,159	15,000	0,593
-12	0,667%	1,782%	1,158	18,333	0,947
-11	0,763%	2,545%	1,326	19,667	1,353
-10	-0,283%	2,262%	-0,492	14,333	1,203
-9	0,785%	3,047%	1,363	21,667	1,620
-8	-0,673%	2,374%	-1,168	9,000	1,262
-7	0,090%	2,465%	0,157	23,000	1,310
-6	-0,567%	1,898%	-0,985	20,333	1,009
-5	-0,186%	1,712%	-0,323	23,667	0,910
-4	-0,387%	1,325%	-0,672	21,667	0,704
-3	0,703%	2,028%	1,221	27,000	1,078
-2	-0,564%	1,463%	-0,980	22,333	0,778
-1	-0,626%	0,837%	-1,087	15,000	0,445
0	**0,955%**	**1,792%**	**1,658**	**29,000**	**0,953**
1	-1,124%	0,668%	-1,951	23,000	0,355
2	0,003%	0,671%	0,005	21,000	0,357
3	-0,380%	0,291%	-0,660	19,667	0,155
4	-0,073%	0,218%	-0,127	18,333	0,116
5	0,316%	0,534%	0,548	20,333	0,284
6	-0,543%	-0,009%	-0,944	21,000	-0,005
7	0,541%	0,532%	0,940	27,667	0,283
8	-0,362%	0,170%	-0,628	18,333	0,090
9	0,366%	0,536%	0,636	21,667	0,285
10	-0,289%	0,248%	-0,502	15,667	0,132
11	0,411%	0,659%	0,714	25,667	0,350
12	-0,499%	0,160%	-0,867	27,667	0,085
13	-0,244%	-0,084%	-0,424	20,333	-0,045
14	-1,228%	-1,312%	-2,132	23,667	-0,697
15	-0,863%	-2,175%	-1,500	15,000	-1,156
16	-0,782%	-2,957%	-1,358	16,333	-1,572
17	-0,774%	-3,731%	-1,344	19,000	-1,983
18	-0,529%	-4,260%	-0,919	21,000	-2,265
19	-0,309%	-4,569%	-0,536	24,333	-2,429
20	0,589%	-3,979%	1,024	22,333	-2,115
STD.DEV	0,0058	0,0188			

G.2 FQ2

FQ2 Bad news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,152%	0,152%	0,743	0,697	0,293
-19	0,028%	0,180%	0,139	-0,697	0,347
-18	-0,520%	-0,339%	-2,539	-0,930	-0,653
-17	0,096%	-0,243%	0,469	0,000	-0,468
-16	-0,055%	-0,298%	-0,267	-1,162	-0,573
-15	0,122%	-0,176%	0,598	1,395	-0,338
-14	-0,096%	-0,272%	-0,471	-0,465	-0,523
-13	-0,027%	-0,299%	-0,132	0,465	-0,575
-12	-0,038%	-0,337%	-0,186	0,930	-0,649
-11	0,070%	-0,267%	0,340	0,930	-0,515
-10	-0,305%	-0,572%	-1,491	0,697	-1,102
-9	0,123%	-0,450%	0,599	0,232	-0,866
-8	0,028%	-0,422%	0,136	0,697	-0,812
-7	0,069%	-0,353%	0,336	0,465	-0,680
-6	-0,116%	-0,469%	-0,566	-0,930	-0,903
-5	0,150%	-0,320%	0,731	0,697	-0,615
-4	-0,122%	-0,441%	-0,595	-0,930	-0,850
-3	0,125%	-0,316%	0,610	0,930	-0,609
-2	-0,004%	-0,321%	-0,021	0,232	-0,617
-1	0,036%	-0,284%	0,178	0,000	-0,547
0	**0,256%**	**-0,028%**	**1,251**	**0,930**	**-0,054**
1	-0,512%	-0,540%	-2,500	-2,092	-1,039
2	0,477%	-0,063%	2,332	0,697	-0,121
3	-0,113%	-0,176%	-0,554	-0,465	-0,339
4	0,094%	-0,082%	0,461	1,162	-0,158
5	0,232%	0,150%	1,135	-0,465	0,290
6	-0,008%	0,142%	-0,041	-0,465	0,274
7	0,117%	0,260%	0,573	0,232	0,500
8	0,181%	0,441%	0,886	1,395	0,848
9	0,361%	0,801%	1,762	0,465	1,542
10	-0,251%	0,550%	-1,226	-1,162	1,059
11	0,004%	0,555%	0,020	0,232	1,067
12	0,200%	0,755%	0,978	-0,930	1,453
13	-0,195%	0,560%	-0,954	-0,930	1,077
14	0,165%	0,724%	0,806	0,465	1,394
15	-0,084%	0,641%	-0,409	0,465	1,233
16	0,260%	0,901%	1,271	1,860	1,734
17	0,189%	1,090%	0,923	0,000	2,097
18	-0,077%	1,013%	-0,377	-0,697	1,949
19	-0,137%	0,875%	-0,671	-1,860	1,684
20	0,280%	1,155%	1,366	1,162	2,223
STD.DEV	0,0020	0,0052			

FQ2 Good news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,196%	0,196%	1,003	0,361	0,173
-19	0,128%	0,325%	0,657	-0,602	0,286
-18	-0,054%	0,270%	-0,279	0,602	0,238
-17	-0,203%	0,067%	-1,037	-1,083	0,059
-16	-0,311%	-0,243%	-1,589	-0,361	-0,214
-15	-0,074%	-0,318%	-0,381	-0,361	-0,280
-14	0,004%	-0,314%	0,020	0,361	-0,277
-13	-0,165%	-0,479%	-0,842	2,047	-0,422
-12	0,153%	-0,325%	0,783	1,083	-0,287
-11	-0,130%	-0,455%	-0,664	0,120	-0,401
-10	0,335%	-0,120%	1,714	-1,324	-0,106
-9	0,181%	0,061%	0,925	-1,083	0,053
-8	-0,094%	-0,033%	-0,479	0,602	-0,029
-7	-0,038%	-0,071%	-0,192	0,602	-0,062
-6	-0,062%	-0,132%	-0,316	-0,602	-0,117
-5	0,124%	-0,009%	0,633	0,602	-0,008
-4	0,349%	0,340%	1,783	0,361	0,299
-3	-0,015%	0,325%	-0,079	-1,083	0,286
-2	0,198%	0,523%	1,013	-0,120	0,460
-1	0,513%	1,036%	2,627	1,565	0,913
0	**0,379%**	**1,415%**	**1,939**	**1,324**	**1,247**
1	0,290%	1,705%	1,483	0,361	1,502
2	0,273%	1,978%	1,396	2,047	1,742
3	0,009%	1,987%	0,048	0,602	1,751
4	-0,029%	1,958%	-0,148	0,361	1,725
5	0,268%	2,227%	1,373	-0,602	1,961
6	-0,003%	2,223%	-0,017	-0,602	1,958
7	0,460%	2,683%	2,351	0,361	2,363
8	-0,207%	2,476%	-1,058	-0,361	2,181
9	-0,185%	2,291%	-0,947	-0,602	2,018
10	-0,035%	2,256%	-0,178	-0,120	1,987
11	0,189%	2,445%	0,966	1,083	2,154
12	-0,154%	2,291%	-0,789	-0,120	2,018
13	-0,036%	2,255%	-0,183	-1,324	1,986
14	0,058%	2,313%	0,298	0,120	2,038
15	-0,053%	2,260%	-0,271	-0,361	1,991
16	-0,168%	2,092%	-0,860	-0,361	1,843
17	-0,018%	2,074%	-0,092	0,602	1,827
18	0,093%	2,168%	0,478	-0,602	1,910
19	0,164%	2,332%	0,839	0,843	2,054
20	0,096%	2,428%	0,492	0,120	2,139
STD.DEV	0,0020	0,0114			

FQ2 No news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,041%	0,041%	0,091	-0,243	0,050
-19	0,152%	0,193%	0,336	-0,243	0,235
-18	0,374%	0,568%	0,827	-0,243	0,689
-17	-0,117%	0,450%	-0,259	0,243	0,546
-16	-0,595%	-0,145%	-1,315	-1,213	-0,176
-15	-0,514%	-0,659%	-1,134	-1,213	-0,799
-14	-0,174%	-0,833%	-0,384	-0,728	-1,010
-13	-0,329%	-1,161%	-0,726	-1,213	-1,409
-12	-0,485%	-1,647%	-1,072	-0,728	-1,998
-11	0,201%	-1,446%	0,444	-0,243	-1,754
-10	-0,022%	-1,467%	-0,048	0,243	-1,780
-9	-0,834%	-2,301%	-1,841	-0,728	-2,792
-8	0,479%	-1,822%	1,058	0,243	-2,210
-7	-0,050%	-1,872%	-0,111	0,243	-2,271
-6	-0,064%	-1,936%	-0,141	-0,243	-2,349
-5	-0,179%	-2,115%	-0,395	0,243	-2,566
-4	-0,670%	-2,784%	-1,479	-1,213	-3,378
-3	-0,019%	-2,803%	-0,042	0,728	-3,402
-2	0,483%	-2,320%	1,067	-0,243	-2,815
-1	0,032%	-2,288%	0,071	0,243	-2,776
0	**0,414%**	**-1,874%**	**0,914**	**1,698**	**-2,274**
1	1,715%	-0,159%	3,789	1,213	-0,193
2	-0,546%	-0,705%	-1,206	-0,728	-0,855
3	-0,166%	-0,871%	-0,367	0,243	-1,057
4	-0,423%	-1,294%	-0,935	-1,698	-1,571
5	0,183%	-1,111%	0,404	0,243	-1,348
6	0,231%	-0,880%	0,510	0,243	-1,068
7	-0,020%	-0,900%	-0,045	-0,243	-1,093
8	0,244%	-0,657%	0,538	0,728	-0,797
9	-0,051%	-0,708%	-0,113	0,243	-0,859
10	0,183%	-0,525%	0,403	1,698	-0,638
11	0,155%	-0,370%	0,343	0,728	-0,449
12	-0,222%	-0,592%	-0,489	-1,213	-0,718
13	-0,475%	-1,067%	-1,049	-1,698	-1,295
14	-0,607%	-1,674%	-1,341	-1,213	-2,031
15	0,301%	-1,373%	0,664	0,243	-1,666
16	0,583%	-0,790%	1,287	0,728	-0,959
17	-0,071%	-0,861%	-0,157	-0,728	-1,045
18	-0,533%	-1,394%	-1,177	-1,213	-1,692
19	0,077%	-1,318%	0,169	0,243	-1,599
20	-0,476%	-1,793%	-1,051	-1,698	-2,176
STD.DEV	0,0045	0,0082			

G.3 FQ3

FQ3 Bad news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,259%	0,259%	1,097	0,759	0,551
-19	0,044%	0,303%	0,186	-1,193	0,644
-18	0,000%	0,303%	0,001	-0,759	0,645
-17	0,232%	0,534%	0,982	1,193	1,138
-16	-0,015%	0,520%	-0,063	0,976	1,106
-15	-0,289%	0,231%	-1,225	-0,976	0,491
-14	0,202%	0,433%	0,857	0,108	0,922
-13	-0,202%	0,231%	-0,857	-0,542	0,491
-12	0,145%	0,375%	0,613	1,844	0,799
-11	0,040%	0,415%	0,170	0,542	0,884
-10	-0,226%	0,189%	-0,957	-1,410	0,403
-9	-0,257%	-0,067%	-1,089	-1,627	-0,144
-8	0,320%	0,252%	1,355	0,325	0,537
-7	-0,054%	0,198%	-0,231	0,325	0,421
-6	0,164%	0,361%	0,693	0,108	0,769
-5	0,151%	0,512%	0,640	0,976	1,090
-4	0,034%	0,546%	0,145	0,976	1,163
-3	-0,040%	0,507%	-0,168	-0,976	1,079
-2	0,009%	0,516%	0,039	-0,108	1,099
-1	-0,143%	0,373%	-0,604	-0,325	0,795
0	**-0,801%**	**-0,427%**	**-3,394**	**-1,627**	**-0,910**
1	-0,206%	-0,633%	-0,874	0,542	-1,349
2	0,166%	-0,467%	0,704	0,108	-0,995
3	0,093%	-0,375%	0,393	-1,193	-0,798
4	-0,483%	-0,857%	-2,046	-2,712	-1,826
5	0,140%	-0,718%	0,592	1,193	-1,528
6	-0,101%	-0,818%	-0,426	-0,325	-1,743
7	0,056%	-0,762%	0,238	-0,325	-1,623
8	-0,046%	-0,808%	-0,195	0,325	-1,721
9	0,032%	-0,776%	0,137	0,108	-1,652
10	0,037%	-0,739%	0,155	0,325	-1,574
11	0,161%	-0,578%	0,682	-0,325	-1,231
12	0,039%	-0,539%	0,166	0,542	-1,148
13	0,589%	0,050%	2,496	0,108	0,106
14	-0,013%	0,036%	-0,057	0,108	0,077
15	-0,027%	0,009%	-0,115	0,542	0,020
16	0,103%	0,112%	0,438	0,542	0,239
17	-0,215%	-0,102%	-0,910	-0,976	-0,217
18	0,292%	0,190%	1,238	1,627	0,404
19	-0,284%	-0,094%	-1,205	-2,061	-0,201
20	0,182%	0,088%	0,772	0,976	0,187
STD.DEV	0,0024	0,0047			

FQ3 Good news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,200%	-0,200%	-0,655	-1,457	-0,114
-19	-0,068%	-0,267%	-0,222	0,397	-0,152
-18	-0,098%	-0,365%	-0,323	-0,927	-0,209
-17	-0,122%	-0,487%	-0,400	0,132	-0,278
-16	0,199%	-0,289%	0,652	0,662	-0,165
-15	0,245%	-0,043%	0,806	0,132	-0,025
-14	0,159%	0,116%	0,522	-1,192	0,066
-13	0,452%	0,568%	1,486	0,397	0,324
-12	-0,263%	0,305%	-0,864	-1,722	0,174
-11	0,637%	0,942%	2,091	0,662	0,538
-10	0,064%	1,006%	0,211	-0,132	0,574
-9	-0,008%	0,998%	-0,026	0,132	0,570
-8	0,016%	1,014%	0,051	0,397	0,578
-7	-0,112%	0,902%	-0,367	0,927	0,515
-6	0,230%	1,131%	0,754	0,132	0,646
-5	-0,383%	0,749%	-1,256	-1,722	0,427
-4	-0,107%	0,642%	-0,350	-1,722	0,367
-3	0,047%	0,689%	0,153	-0,662	0,393
-2	-0,004%	0,685%	-0,014	-0,397	0,391
-1	0,352%	1,037%	1,156	2,252	0,592
0	**0,072%**	**1,109%**	**0,237**	**0,927**	**0,633**
1	0,681%	1,790%	2,236	1,722	1,022
2	0,372%	2,162%	1,222	0,132	1,234
3	0,758%	2,920%	2,488	1,457	1,666
4	0,388%	3,308%	1,273	0,927	1,888
5	-0,275%	3,033%	-0,904	-1,722	1,731
6	0,054%	3,087%	0,179	-1,192	1,762
7	0,009%	3,096%	0,029	0,662	1,767
8	-0,344%	2,751%	-1,131	0,662	1,570
9	0,598%	3,349%	1,963	0,927	1,911
10	-0,042%	3,308%	-0,136	-0,927	1,888
11	0,479%	3,787%	1,574	1,192	2,161
12	0,113%	3,900%	0,372	-0,662	2,226
13	0,365%	4,265%	1,197	-0,927	2,434
14	0,098%	4,363%	0,320	-0,397	2,490
15	0,167%	4,530%	0,548	1,457	2,585
16	0,030%	4,560%	0,099	-0,132	2,602
17	-0,252%	4,308%	-0,826	-1,722	2,458
18	0,149%	4,457%	0,490	0,662	2,544
19	0,642%	5,099%	2,107	1,987	2,910
20	-0,457%	4,642%	-1,501	-2,517	2,649
STD.DEV	0,0030	0,0175			

FQ3 No news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,631%	-0,631%	-1,206	-1,886	-0,629
-19	-0,730%	-1,362%	-1,395	0,000	-1,357
-18	-0,228%	-1,589%	-0,435	1,414	-1,584
-17	0,520%	-1,070%	0,992	0,471	-1,066
-16	-0,519%	-1,588%	-0,990	-1,414	-1,583
-15	0,078%	-1,511%	0,148	-0,471	-1,506
-14	-0,374%	-1,885%	-0,714	-0,943	-1,879
-13	0,088%	-1,797%	0,168	0,000	-1,791
-12	0,856%	-0,941%	1,634	0,943	-0,938
-11	-0,098%	-1,039%	-0,187	0,471	-1,035
-10	0,443%	-0,596%	0,846	0,943	-0,594
-9	0,493%	-0,103%	0,941	0,943	-0,103
-8	0,024%	-0,080%	0,045	-0,471	-0,079
-7	-0,130%	-0,210%	-0,249	0,000	-0,209
-6	-0,336%	-0,546%	-0,641	-0,943	-0,544
-5	0,091%	-0,455%	0,173	-0,471	-0,454
-4	-0,733%	-1,188%	-1,400	-0,471	-1,184
-3	-0,253%	-1,441%	-0,482	-0,471	-1,436
-2	-0,169%	-1,609%	-0,322	-0,471	-1,604
-1	-1,224%	-2,834%	-2,339	-2,828	-2,825
0	**1,659%**	**-1,175%**	**3,169**	**1,414**	**-1,171**
1	0,272%	-0,903%	0,519	0,471	-0,900
2	0,402%	-0,501%	0,767	0,471	-0,499
3	0,253%	-0,248%	0,484	0,000	-0,247
4	0,195%	-0,053%	0,372	1,414	-0,053
5	0,507%	0,454%	0,968	1,414	0,452
6	-0,020%	0,433%	-0,039	0,471	0,432
7	-0,610%	-0,176%	-1,165	-1,414	-0,176
8	0,376%	0,200%	0,718	0,943	0,199
9	0,410%	0,610%	0,783	0,943	0,608
10	-0,674%	-0,065%	-1,288	-1,886	-0,065
11	0,928%	0,863%	1,772	0,943	0,860
12	-0,036%	0,827%	-0,069	0,000	0,824
13	0,145%	0,971%	0,277	0,943	0,968
14	0,204%	1,176%	0,390	0,000	1,172
15	-0,106%	1,070%	-0,203	-1,414	1,066
16	-0,109%	0,960%	-0,208	0,471	0,957
17	0,140%	1,101%	0,268	-0,471	1,097
18	-0,357%	0,743%	-0,683	-0,471	0,741
19	-0,423%	0,320%	-0,809	-0,471	0,319
20	0,303%	0,623%	0,579	-0,471	0,621
STD.DEV	0,0052	0,0100			

G.4 FQ4

FQ4 Bad news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,639%	-0,639%	-1,050	-0,663	-0,453
-19	-0,420%	-1,058%	-0,690	-0,221	-0,750
-18	0,136%	-0,923%	0,223	0,883	-0,654
-17	-0,005%	-0,927%	-0,008	-0,663	-0,658
-16	-0,169%	-1,096%	-0,277	-0,883	-0,777
-15	-0,005%	-1,101%	-0,008	-0,663	-0,781
-14	0,266%	-0,835%	0,437	0,221	-0,592
-13	0,096%	-0,738%	0,158	0,883	-0,524
-12	0,425%	-0,313%	0,699	0,883	-0,222
-11	-0,330%	-0,644%	-0,543	-1,104	-0,456
-10	0,341%	-0,302%	0,561	0,883	-0,214
-9	-0,691%	-0,993%	-1,136	-1,325	-0,704
-8	0,312%	-0,681%	0,513	0,883	-0,483
-7	0,334%	-0,347%	0,550	1,546	-0,246
-6	-0,069%	-0,416%	-0,114	0,000	-0,295
-5	-0,017%	-0,433%	-0,028	-0,221	-0,307
-4	-0,167%	-0,601%	-0,275	0,883	-0,426
-3	0,143%	-0,457%	0,236	0,663	-0,324
-2	-0,502%	-0,960%	-0,826	-1,988	-0,680
-1	0,316%	-0,643%	0,520	0,442	-0,456
0	**-3,180%**	**-3,823%**	**-5,229**	**-3,534**	**-2,711**
1	1,257%	-2,567%	2,066	1,325	-1,820
2	0,027%	-2,540%	0,044	-0,663	-1,801
3	-0,003%	-2,543%	-0,005	-0,221	-1,803
4	-0,094%	-2,637%	-0,155	0,442	-1,870
5	-0,333%	-2,970%	-0,548	-2,209	-2,106
6	-0,021%	-2,991%	-0,035	0,442	-2,121
7	-0,374%	-3,365%	-0,615	-2,209	-2,386
8	-0,094%	-3,459%	-0,155	0,221	-2,453
9	-0,235%	-3,694%	-0,386	-1,546	-2,620
10	-0,022%	-3,716%	-0,036	-0,442	-2,635
11	0,292%	-3,424%	0,480	0,000	-2,428
12	-0,617%	-4,041%	-1,014	-2,209	-2,866
13	0,000%	-4,042%	-0,001	-1,104	-2,866
14	0,178%	-3,863%	0,293	0,883	-2,739
15	-0,026%	-3,889%	-0,042	1,325	-2,758
16	0,088%	-3,801%	0,145	0,221	-2,695
17	-0,056%	-3,856%	-0,092	0,221	-2,735
18	0,451%	-3,406%	0,741	0,883	-2,415
19	0,302%	-3,104%	0,496	0,221	-2,201
20	0,010%	-3,094%	0,016	-0,883	-2,194
STD.DEV	0,0061	0,0141			

FQ4 Good news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,465%	0,465%	0,894	-0,243	0,246
-19	-0,303%	0,162%	-0,582	-0,970	0,086
-18	0,232%	0,395%	0,446	0,970	0,209
-17	-0,160%	0,235%	-0,307	-0,728	0,124
-16	-0,049%	0,185%	-0,095	-0,485	0,098
-15	0,101%	0,287%	0,195	0,728	0,152
-14	0,125%	0,412%	0,241	1,213	0,218
-13	-0,149%	0,263%	-0,286	-1,455	0,139
-12	-0,607%	-0,344%	-1,167	-1,455	-0,182
-11	0,035%	-0,309%	0,068	0,485	-0,163
-10	0,040%	-0,269%	0,076	1,213	-0,142
-9	0,111%	-0,158%	0,212	0,243	-0,084
-8	-0,164%	-0,323%	-0,316	-1,455	-0,171
-7	0,191%	-0,132%	0,367	-1,213	-0,070
-6	-0,198%	-0,330%	-0,380	0,485	-0,175
-5	0,331%	0,001%	0,636	0,970	0,001
-4	-0,069%	-0,068%	-0,133	-0,485	-0,036
-3	0,300%	0,232%	0,576	1,698	0,123
-2	0,450%	0,682%	0,865	0,970	0,361
-1	0,323%	1,004%	0,620	0,243	0,532
0	**-0,959%**	**0,045%**	**-1,843**	**-1,940**	**0,024**
1	2,549%	2,594%	4,898	4,608	1,373
2	0,603%	3,197%	1,160	0,970	1,692
3	0,613%	3,810%	1,178	0,970	2,017
4	-0,109%	3,702%	-0,209	0,243	1,960
5	0,313%	4,015%	0,601	0,728	2,125
6	0,219%	4,234%	0,420	-0,728	2,241
7	0,381%	4,614%	0,731	-2,425	2,443
8	0,103%	4,717%	0,198	0,243	2,497
9	-0,541%	4,176%	-1,040	-0,970	2,210
10	-0,128%	4,048%	-0,246	-0,728	2,143
11	-0,296%	3,752%	-0,569	-1,940	1,986
12	0,015%	3,766%	0,028	-1,213	1,994
13	-0,289%	3,478%	-0,555	-0,243	1,841
14	-0,168%	3,310%	-0,322	-0,485	1,752
15	0,368%	3,678%	0,708	-0,243	1,947
16	0,404%	4,082%	0,776	0,728	2,161
17	-0,530%	3,552%	-1,019	-1,940	1,880
18	-0,298%	3,254%	-0,573	-1,213	1,722
19	0,187%	3,441%	0,360	0,728	1,822
20	0,188%	3,629%	0,361	0,243	1,921
STD.DEV	0,0052	0,0189			

FQ4 No news

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,308%	-0,308%	-0,410	-1,265	-0,172
-19	-0,219%	-0,527%	-0,291	0,000	-0,294
-18	0,242%	-0,285%	0,322	-0,632	-0,159
-17	0,672%	0,387%	0,894	1,897	0,216
-16	-1,373%	-0,986%	-1,827	-0,632	-0,550
-15	-0,487%	-1,473%	-0,648	-0,632	-0,822
-14	-0,211%	-1,684%	-0,281	-1,265	-0,940
-13	-1,609%	-3,293%	-2,142	-0,632	-1,838
-12	1,335%	-1,958%	1,777	1,265	-1,093
-11	-0,227%	-2,185%	-0,302	0,000	-1,220
-10	0,195%	-1,990%	0,260	-0,632	-1,111
-9	-0,471%	-2,460%	-0,626	-1,265	-1,373
-8	0,136%	-2,324%	0,181	0,632	-1,297
-7	-0,856%	-3,180%	-1,139	-1,265	-1,775
-6	-0,111%	-3,291%	-0,148	0,000	-1,837
-5	-0,013%	-3,304%	-0,017	-0,632	-1,844
-4	0,121%	-3,182%	0,162	0,632	-1,776
-3	-0,360%	-3,543%	-0,479	-0,632	-1,977
-2	-0,113%	-3,655%	-0,150	0,000	-2,040
-1	1,221%	-2,435%	1,625	1,897	-1,359
0	**-0,828%**	**-3,263%**	**-1,102**	**-0,632**	**-1,821**
1	2,327%	-0,936%	3,097	1,897	-0,522
2	0,318%	-0,617%	0,423	0,000	-0,345
3	0,351%	-0,267%	0,467	0,000	-0,149
4	0,770%	0,503%	1,024	0,000	0,281
5	-0,491%	0,012%	-0,653	-1,265	0,007
6	-0,177%	-0,165%	-0,236	0,000	-0,092
7	0,420%	0,255%	0,559	1,265	0,142
8	0,190%	0,445%	0,253	0,632	0,248
9	-0,391%	0,053%	-0,521	-0,632	0,030
10	0,468%	0,521%	0,623	1,265	0,291
11	-0,437%	0,085%	-0,581	-1,265	0,047
12	1,750%	1,835%	2,329	0,632	1,024
13	-0,346%	1,489%	-0,460	0,632	0,831
14	-0,396%	1,093%	-0,528	0,000	0,610
15	-0,209%	0,883%	-0,278	-0,632	0,493
16	0,441%	1,325%	0,587	0,632	0,740
17	-0,012%	1,313%	-0,016	0,000	0,733
18	0,899%	2,211%	1,196	1,265	1,234
19	-0,479%	1,732%	-0,638	-0,632	0,967
20	0,457%	2,189%	0,608	1,265	1,222
STD.DEV	0,0075	0,0179			

H. Results, Sample by Industry Groups

H.1 Consumer Discretionary

CONSUMER DISCRETIONARY BAD NEWS

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,621%	-0,621%	-1,749	-1,029	-0,674
-19	0,088%	-0,533%	0,248	-0,686	-0,579
-18	0,058%	-0,476%	0,162	0,343	-0,516
-17	-0,149%	-0,625%	-0,420	-1,029	-0,678
-16	-0,037%	-0,662%	-0,105	0,000	-0,719
-15	-0,316%	-0,978%	-0,890	-1,029	-1,062
-14	-0,276%	-1,254%	-0,776	-1,715	-1,361
-13	0,190%	-1,063%	0,536	0,343	-1,154
-12	-0,046%	-1,109%	-0,129	1,372	-1,204
-11	-0,347%	-1,456%	-0,977	-0,343	-1,581
-10	-0,033%	-1,489%	-0,092	-0,343	-1,616
-9	-0,555%	-2,044%	-1,563	-1,372	-2,219
-8	-0,109%	-2,153%	-0,307	-0,343	-2,337
-7	0,506%	-1,647%	1,424	1,029	-1,788
-6	-0,128%	-1,775%	-0,360	0,000	-1,927
-5	0,172%	-1,603%	0,485	0,000	-1,740
-4	-0,160%	-1,763%	-0,450	-1,029	-1,913
-3	-0,177%	-1,940%	-0,499	-0,343	-2,106
-2	0,198%	-1,742%	0,557	0,686	-1,891
-1	0,087%	-1,655%	0,246	1,029	-1,796
0	**-0,769%**	**-2,424%**	**-2,165**	**-0,343**	**-2,631**
1	-0,954%	-3,377%	-2,685	-1,029	-3,666
2	-0,154%	-3,531%	-0,432	-1,029	-3,833
3	-0,407%	-3,938%	-1,146	-0,686	-4,275
4	0,526%	-3,411%	1,482	0,686	-3,703
5	0,294%	-3,117%	0,829	-2,058	-3,384
6	-0,669%	-3,786%	-1,883	-1,715	-4,110
7	0,364%	-3,422%	1,026	1,715	-3,714
8	0,350%	-3,071%	0,986	1,029	-3,334
9	0,135%	-2,936%	0,381	0,343	-3,187
10	0,226%	-2,710%	0,637	0,000	-2,942
11	0,770%	-1,941%	2,167	-1,029	-2,107
12	0,040%	-1,901%	0,111	0,343	-2,064
13	-0,159%	-2,060%	-0,447	-0,686	-2,236
14	0,362%	-1,698%	1,020	0,343	-1,843
15	-0,103%	-1,801%	-0,291	0,343	-1,955
16	0,009%	-1,792%	0,024	1,372	-1,946
17	0,078%	-1,714%	0,220	0,343	-1,861
18	-0,246%	-1,960%	-0,692	-1,372	-2,128
19	-0,079%	-2,040%	-0,223	-0,343	-2,214
20	-0,141%	-2,181%	-0,398	-0,343	-2,367
STD.DEV	0,00355	0,00921			

GOOD NEWS CONSUMER DISCRETIONARY

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,095%	0,095%	0,148	0,333	0,040
-19	-0,430%	-0,335%	-0,669	-1,000	-0,140
-18	-0,206%	-0,541%	-0,322	0,333	-0,226
-17	-1,325%	-1,866%	-2,064	-1,667	-0,780
-16	-0,159%	-2,026%	-0,248	-0,333	-0,847
-15	-0,631%	-2,657%	-0,983	-1,667	-1,110
-14	-0,967%	-3,624%	-1,506	-0,333	-1,514
-13	-0,415%	-4,039%	-0,646	-1,667	-1,688
-12	1,177%	-2,862%	1,833	1,000	-1,196
-11	0,703%	-2,159%	1,095	1,000	-0,902
-10	-0,245%	-2,404%	-0,381	-2,333	-1,005
-9	0,958%	-1,446%	1,491	1,667	-0,604
-8	-0,721%	-2,167%	-1,122	-0,333	-0,906
-7	0,564%	-1,603%	0,879	0,333	-0,670
-6	-0,422%	-2,025%	-0,657	-0,333	-0,846
-5	0,269%	-1,756%	0,418	1,000	-0,734
-4	-0,065%	-1,822%	-0,102	0,333	-0,761
-3	0,448%	-1,373%	0,698	0,333	-0,574
-2	-0,128%	-1,501%	-0,199	-1,000	-0,627
-1	-0,382%	-1,883%	-0,595	-0,333	-0,787
0	**2,196%**	**0,313%**	**3,420**	**1,667**	**0,131**
1	0,613%	0,925%	0,954	-1,000	0,387
2	-0,561%	0,365%	-0,873	-1,000	0,152
3	0,010%	0,374%	0,015	-0,333	0,156
4	1,009%	1,383%	1,571	1,667	0,578
5	0,369%	1,753%	0,575	0,333	0,732
6	0,301%	2,054%	0,469	-0,333	0,858
7	0,223%	2,277%	0,347	0,333	0,951
8	0,338%	2,614%	0,526	1,000	1,092
9	0,386%	3,001%	0,602	1,000	1,254
10	-0,324%	2,677%	-0,504	-0,333	1,119
11	0,798%	3,475%	1,242	0,333	1,452
12	-0,273%	3,202%	-0,425	-1,000	1,338
13	-0,183%	3,019%	-0,284	-0,333	1,262
14	-0,269%	2,750%	-0,418	-1,000	1,149
15	0,413%	3,163%	0,642	0,333	1,322
16	0,475%	3,638%	0,740	0,333	1,520
17	-0,490%	3,148%	-0,762	-1,000	1,316
18	-0,219%	2,929%	-0,341	-1,000	1,224
19	0,479%	3,408%	0,746	1,000	1,424
20	-0,128%	3,280%	-0,199	-0,333	1,371
STD.DEV	0,00642	0,02393			

CONSUMER DISCRETIONARY NO NEWS

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,581%	-0,581%	-0,609	-1,342	-0,276
-19	1,766%	1,185%	1,851	2,236	0,562
-18	1,203%	2,387%	1,261	-0,447	1,133
-17	0,092%	2,480%	0,097	1,342	1,177
-16	-0,035%	2,444%	-0,037	0,447	1,160
-15	-1,134%	1,311%	-1,189	-0,447	0,622
-14	0,208%	1,519%	0,218	0,447	0,721
-13	-0,775%	0,744%	-0,813	-2,236	0,353
-12	-0,002%	0,742%	-0,002	-0,447	0,352
-11	0,552%	1,294%	0,579	1,342	0,614
-10	-1,032%	0,262%	-1,082	-2,236	0,124
-9	0,350%	0,612%	0,367	-0,447	0,290
-8	-0,095%	0,516%	-0,100	0,447	0,245
-7	-0,360%	0,157%	-0,377	0,447	0,074
-6	-1,169%	-1,013%	-1,226	-1,342	-0,480
-5	-0,853%	-1,865%	-0,894	-0,447	-0,885
-4	-2,036%	-3,901%	-2,134	-1,342	-1,851
-3	-0,612%	-4,514%	-0,642	-1,342	-2,142
-2	0,015%	-4,499%	0,016	-0,447	-2,135
-1	-1,711%	-6,210%	-1,793	-1,342	-2,947
0	**1,944%**	**-4,266%**	**2,038**	**1,342**	**-2,024**
1	1,400%	-2,866%	1,468	0,447	-1,360
2	1,176%	-1,689%	1,233	1,342	-0,802
3	0,615%	-1,074%	0,645	-0,447	-0,510
4	-0,008%	-1,082%	-0,008	-0,447	-0,514
5	0,009%	-1,073%	0,010	0,447	-0,509
6	-1,060%	-2,133%	-1,111	-0,447	-1,012
7	1,099%	-1,034%	1,152	0,447	-0,491
8	0,239%	-0,795%	0,251	-0,447	-0,377
9	-0,499%	-1,295%	-0,524	-0,447	-0,614
10	0,017%	-1,278%	0,018	0,447	-0,606
11	1,367%	0,090%	1,433	-0,447	0,043
12	0,193%	0,282%	0,202	-0,447	0,134
13	-0,262%	0,021%	-0,274	0,447	0,010
14	-1,642%	-1,622%	-1,722	-2,236	-0,770
15	-1,028%	-2,650%	-1,078	-0,447	-1,258
16	0,757%	-1,894%	0,793	0,447	-0,899
17	-0,437%	-2,330%	-0,458	-1,342	-1,106
18	-0,017%	-2,348%	-0,018	1,342	-1,114
19	-1,370%	-3,717%	-1,436	-2,236	-1,764
20	-0,570%	-4,288%	-0,598	-1,342	-2,035
STD.DEV	0,00954	0,02107			

H.2 Consumer Staples

BAD NEWS CONSUMER STAPLES

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,169%	0,169%	0,572	0,160	0,220
-19	-0,239%	-0,070%	-0,809	-0,160	-0,091
-18	-0,240%	-0,310%	-0,811	-0,160	-0,403
-17	0,001%	-0,309%	0,002	0,160	-0,402
-16	0,021%	-0,288%	0,072	-0,801	-0,374
-15	0,072%	-0,216%	0,243	0,480	-0,281
-14	-0,417%	-0,632%	-1,409	-2,722	-0,823
-13	-0,849%	-1,482%	-2,872	-2,082	-1,928
-12	0,430%	-1,052%	1,453	1,761	-1,368
-11	0,177%	-0,875%	0,598	1,441	-1,138
-10	-0,035%	-0,910%	-0,118	0,801	-1,184
-9	-0,558%	-1,467%	-1,885	-1,121	-1,909
-8	-0,348%	-1,815%	-1,177	-0,480	-2,362
-7	-0,006%	-1,821%	-0,019	0,480	-2,369
-6	0,140%	-1,681%	0,474	0,801	-2,187
-5	-0,092%	-1,773%	-0,312	0,160	-2,307
-4	0,258%	-1,516%	0,871	0,480	-1,972
-3	-0,251%	-1,767%	-0,850	-1,761	-2,299
-2	-0,205%	-1,972%	-0,694	-0,160	-2,566
-1	-0,181%	-2,153%	-0,611	-0,801	-2,801
0	**-0,228%**	**-2,381%**	**-0,772**	**0,801**	**-3,098**
1	0,590%	-1,791%	1,995	1,441	-2,331
2	0,258%	-1,533%	0,872	0,480	-1,995
3	-0,278%	-1,811%	-0,939	-1,441	-2,356
4	-0,418%	-2,229%	-1,413	-1,121	-2,900
5	0,022%	-2,207%	0,075	0,480	-2,871
6	-0,112%	-2,319%	-0,379	1,121	-3,017
7	-0,203%	-2,522%	-0,685	-0,801	-3,281
8	0,093%	-2,429%	0,314	0,801	-3,160
9	-0,296%	-2,725%	-1,001	-1,121	-3,545
10	0,141%	-2,584%	0,477	0,160	-3,362
11	0,216%	-2,368%	0,730	1,121	-3,081
12	0,001%	-2,367%	0,002	-1,121	-3,080
13	-0,012%	-2,379%	-0,041	0,160	-3,095
14	0,356%	-2,023%	1,205	2,082	-2,632
15	0,369%	-1,654%	1,247	2,082	-2,152
16	0,162%	-1,492%	0,547	1,441	-1,942
17	0,154%	-1,339%	0,520	-0,801	-1,742
18	0,358%	-0,980%	1,212	0,801	-1,275
19	-0,420%	-1,401%	-1,421	-2,402	-1,822
20	0,229%	-1,172%	0,774	1,121	-1,525
STD.DEV	0,0030	0,0077			

GOOD NEWS CONSUMER DISCRETIONARY

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,085%	-0,085%	-0,235	-0,845	-0,076
-19	0,053%	-0,032%	0,147	0,507	-0,029
-18	-0,543%	-0,575%	-1,499	-2,535	-0,514
-17	-0,121%	-0,697%	-0,335	-0,507	-0,622
-16	0,370%	-0,326%	1,022	1,183	-0,291
-15	0,392%	0,066%	1,082	1,521	0,059
-14	0,187%	0,253%	0,515	-0,845	0,226
-13	-0,530%	-0,278%	-1,463	0,507	-0,248
-12	-0,433%	-0,710%	-1,194	0,169	-0,634
-11	-0,426%	-1,136%	-1,174	-1,183	-1,014
-10	0,067%	-1,069%	0,185	-0,507	-0,954
-9	0,069%	-1,000%	0,189	-0,169	-0,893
-8	-0,569%	-1,569%	-1,571	-1,183	-1,401
-7	0,230%	-1,340%	0,634	0,507	-1,196
-6	-0,082%	-1,421%	-0,225	-0,845	-1,269
-5	0,052%	-1,370%	0,143	-0,507	-1,223
-4	0,046%	-1,324%	0,126	1,183	-1,182
-3	-0,153%	-1,477%	-0,423	-1,183	-1,319
-2	0,380%	-1,097%	1,049	2,197	-0,980
-1	-0,144%	-1,241%	-0,396	-1,183	-1,108
0	**-0,669%**	**-1,909%**	**-1,845**	**-0,169**	**-1,705**
1	1,257%	-0,652%	3,468	1,521	-0,582
2	0,124%	-0,529%	0,342	-0,845	-0,472
3	0,050%	-0,478%	0,139	1,521	-0,427
4	-0,772%	-1,250%	-2,129	-1,183	-1,116
5	-0,252%	-1,502%	-0,695	-1,183	-1,341
6	-0,454%	-1,956%	-1,251	-1,183	-1,746
7	0,111%	-1,844%	0,307	0,169	-1,647
8	-0,355%	-2,199%	-0,980	-0,169	-1,964
9	0,116%	-2,084%	0,320	-0,169	-1,860
10	-0,311%	-2,395%	-0,858	-1,183	-2,138
11	-0,326%	-2,720%	-0,898	-1,183	-2,429
12	-0,032%	-2,752%	-0,087	0,169	-2,457
13	-0,162%	-2,914%	-0,448	-0,169	-2,602
14	-0,274%	-3,188%	-0,757	-1,859	-2,847
15	0,057%	-3,132%	0,157	0,507	-2,796
16	-0,128%	-3,260%	-0,354	-0,507	-2,910
17	-0,189%	-3,449%	-0,522	-0,845	-3,079
18	-0,192%	-3,642%	-0,531	0,845	-3,251
19	-0,059%	-3,701%	-0,163	0,169	-3,304
20	0,417%	-3,284%	1,150	-0,845	-2,932
STD.DEV	0,0036	0,0112			

NO NEWS CONSUMER DISCRETIONARY

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-1,235%	-1,235%	-1,595	-0,816	-0,765
-19	-1,010%	-2,245%	-1,305	-0,816	-1,391
-18	-0,297%	-2,542%	-0,384	0,816	-1,575
-17	0,500%	-2,043%	0,645	0,816	-1,266
-16	-0,766%	-2,808%	-0,989	-1,633	-1,740
-15	-0,876%	-3,684%	-1,131	-1,633	-2,283
-14	-0,349%	-4,033%	-0,451	-0,816	-2,499
-13	-0,160%	-4,193%	-0,207	0,000	-2,599
-12	-1,292%	-5,485%	-1,669	-1,633	-3,399
-11	1,502%	-3,983%	1,940	0,816	-2,469
-10	0,482%	-3,502%	0,622	0,000	-2,170
-9	-0,269%	-3,771%	-0,347	0,000	-2,337
-8	0,276%	-3,495%	0,356	-0,816	-2,166
-7	-1,181%	-4,675%	-1,525	-1,633	-2,897
-6	0,271%	-4,404%	0,350	-0,816	-2,729
-5	0,718%	-3,687%	0,927	0,816	-2,285
-4	-1,029%	-4,715%	-1,329	-2,449	-2,922
-3	-0,712%	-5,428%	-0,920	-0,816	-3,364
-2	1,032%	-4,396%	1,333	1,633	-2,724
-1	0,460%	-3,936%	0,594	0,000	-2,440
0	**1,677%**	**-2,260%**	**2,166**	**1,633**	**-1,400**
1	1,344%	-0,916%	1,736	0,816	-0,567
2	0,776%	-0,139%	1,003	-0,816	-0,086
3	-0,178%	-0,317%	-0,229	-0,816	-0,196
4	-0,841%	-1,158%	-1,087	-0,816	-0,718
5	-0,025%	-1,183%	-0,032	0,816	-0,733
6	0,238%	-0,946%	0,307	0,000	-0,586
7	0,047%	-0,899%	0,061	0,816	-0,557
8	0,011%	-0,887%	0,014	0,816	-0,550
9	-0,948%	-1,835%	-1,224	-1,633	-1,137
10	0,413%	-1,422%	0,533	0,816	-0,882
11	0,763%	-0,659%	0,986	0,816	-0,409
12	0,152%	-0,507%	0,197	0,000	-0,314
13	-0,120%	-0,627%	-0,155	0,816	-0,389
14	0,261%	-0,367%	0,337	0,816	-0,227
15	0,054%	-0,312%	0,070	-0,816	-0,194
16	-0,807%	-1,120%	-1,042	0,816	-0,694
17	-0,754%	-1,874%	-0,974	-0,816	-1,161
18	0,336%	-1,538%	0,434	0,000	-0,953
19	-0,233%	-1,771%	-0,301	-0,816	-1,098
20	1,142%	-0,629%	1,475	1,633	-0,390
STD.DEV	0,007741	0,016136			

H.3 Energy

BAD NEWS ENERGY

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,154%	-0,154%	-0,443	0,361	-0,336
-19	-0,672%	-0,826%	-1,933	-2,769	-1,803
-18	-0,193%	-1,019%	-0,555	0,361	-2,225
-17	0,352%	-0,667%	1,013	0,602	-1,456
-16	0,260%	-0,407%	0,746	0,843	-0,889
-15	-0,499%	-0,906%	-1,434	-2,047	-1,978
-14	0,360%	-0,546%	1,036	0,602	-1,192
-13	0,202%	-0,344%	0,580	0,120	-0,752
-12	0,250%	-0,094%	0,719	1,083	-0,206
-11	-0,210%	-0,305%	-0,605	-0,602	-0,665
-10	0,269%	-0,036%	0,772	0,361	-0,078
-9	-0,448%	-0,483%	-1,287	-0,843	-1,055
-8	0,201%	-0,282%	0,579	0,120	-0,616
-7	0,039%	-0,243%	0,112	0,120	-0,531
-6	0,335%	0,092%	0,963	0,361	0,201
-5	0,151%	0,243%	0,434	0,361	0,530
-4	-0,040%	0,203%	-0,114	0,361	0,444
-3	0,288%	0,492%	0,829	0,120	1,074
-2	-0,471%	0,021%	-1,354	-1,324	0,045
-1	-0,041%	-0,020%	-0,118	0,120	-0,045
0	**-1,256%**	**-1,277%**	**-3,612**	**-1,806**	**-2,787**
1	0,581%	-0,696%	1,669	-0,120	-1,520
2	-0,041%	-0,737%	-0,118	-1,565	-1,610
3	-0,197%	-0,934%	-0,566	-1,565	-2,039
4	-0,314%	-1,248%	-0,903	0,361	-2,724
5	0,238%	-1,010%	0,684	1,083	-2,205
6	-0,177%	-1,187%	-0,510	-0,843	-2,592
7	0,188%	-0,999%	0,541	-0,361	-2,181
8	0,000%	-0,999%	0,001	0,602	-2,181
9	-0,175%	-1,174%	-0,505	-1,565	-2,564
10	-0,101%	-1,276%	-0,291	-0,843	-2,785
11	0,465%	-0,811%	1,337	0,843	-1,769
12	-0,259%	-1,070%	-0,745	-0,602	-2,335
13	0,354%	-0,716%	1,018	-0,361	-1,562
14	0,049%	-0,666%	0,142	-0,602	-1,455
15	-0,240%	-0,907%	-0,691	0,361	-1,980
16	0,339%	-0,568%	0,975	0,120	-1,240
17	0,044%	-0,524%	0,127	1,324	-1,143
18	-0,044%	-0,567%	-0,126	0,361	-1,239
19	0,115%	-0,453%	0,330	0,120	-0,988
20	0,180%	-0,272%	0,519	-0,361	-0,595
STD.DEV	0,0035	0,0046			

GOOD NEWS ENERGY

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,689%	0,689%	1,548	-0,277	0,411
-19	-0,071%	0,617%	-0,160	0,555	0,368
-18	-0,504%	0,113%	-1,133	-1,664	0,068
-17	-0,421%	-0,307%	-0,946	-1,664	-0,183
-16	-0,156%	-0,463%	-0,351	0,000	-0,276
-15	0,073%	-0,390%	0,165	0,000	-0,232
-14	0,747%	0,357%	1,679	2,496	0,213
-13	0,077%	0,434%	0,173	0,555	0,259
-12	-0,188%	0,246%	-0,422	-1,109	0,147
-11	0,737%	0,983%	1,656	1,109	0,586
-10	0,469%	1,452%	1,054	-0,832	0,866
-9	0,138%	1,590%	0,311	-1,109	0,948
-8	-0,273%	1,317%	-0,614	-0,277	0,785
-7	0,019%	1,335%	0,042	-0,832	0,796
-6	0,165%	1,500%	0,371	0,000	0,894
-5	0,077%	1,577%	0,172	1,109	0,940
-4	0,170%	1,747%	0,382	0,000	1,042
-3	0,103%	1,850%	0,231	0,277	1,103
-2	-0,003%	1,846%	-0,008	-1,387	1,101
-1	0,328%	2,175%	0,738	0,555	1,297
0	**-0,493%**	**1,681%**	**-1,109**	**-0,555**	**1,003**
1	0,216%	1,898%	0,486	1,387	1,132
2	0,441%	2,339%	0,991	1,387	1,394
3	0,732%	3,070%	1,645	0,832	1,831
4	0,185%	3,255%	0,416	0,277	1,941
5	-0,288%	2,968%	-0,647	-0,832	1,770
6	0,560%	3,528%	1,259	-0,277	2,103
7	0,593%	4,121%	1,333	-0,555	2,457
8	-0,216%	3,905%	-0,485	0,000	2,329
9	-0,385%	3,520%	-0,866	-0,277	2,099
10	-0,410%	3,109%	-0,922	-1,109	1,854
11	0,385%	3,494%	0,864	0,832	2,083
12	0,679%	4,173%	1,526	0,277	2,488
13	0,293%	4,466%	0,660	-0,277	2,663
14	0,923%	5,389%	2,075	2,496	3,213
15	-0,498%	4,891%	-1,119	-0,277	2,916
16	0,187%	5,078%	0,420	0,000	3,028
17	-0,953%	4,125%	-2,142	-2,774	2,459
18	-0,043%	4,082%	-0,096	-0,555	2,434
19	0,761%	4,843%	1,711	0,832	2,888
20	-0,552%	4,291%	-1,242	-1,387	2,558
STD.DEV	0,0044	0,0168			

NO NEWS ENERGY

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,964%	-0,964%	-1,424	-1,890	-0,773
-19	-0,385%	-1,349%	-0,568	0,378	-1,082
-18	-0,935%	-2,284%	-1,381	-1,134	-1,832
-17	0,289%	-1,994%	0,427	-0,378	-1,600
-16	-0,355%	-2,349%	-0,524	-1,134	-1,885
-15	0,564%	-1,786%	0,833	-0,378	-1,432
-14	-1,054%	-2,840%	-1,557	-1,134	-2,278
-13	-0,860%	-3,700%	-1,271	-1,890	-2,968
-12	1,470%	-2,230%	2,171	1,890	-1,789
-11	-0,469%	-2,699%	-0,693	-0,378	-2,165
-10	0,476%	-2,223%	0,703	0,378	-1,783
-9	0,143%	-2,080%	0,211	-0,378	-1,669
-8	0,459%	-1,621%	0,677	1,134	-1,301
-7	-1,105%	-2,726%	-1,631	-1,134	-2,187
-6	0,742%	-1,984%	1,096	-0,378	-1,591
-5	0,027%	-1,957%	0,039	-0,378	-1,570
-4	0,496%	-1,460%	0,733	2,646	-1,172
-3	0,457%	-1,003%	0,675	1,134	-0,805
-2	-0,276%	-1,279%	-0,407	-0,378	-1,026
-1	-0,017%	-1,297%	-0,026	-0,378	-1,040
0	**0,050%**	**-1,246%**	**0,074**	**0,378**	**-1,000**
1	-0,857%	-2,103%	-1,266	-0,378	-1,687
2	0,327%	-1,776%	0,483	0,378	-1,425
3	0,572%	-1,205%	0,844	1,890	-0,966
4	-1,292%	-2,496%	-1,908	-1,890	-2,003
5	1,130%	-1,366%	1,669	1,134	-1,096
6	-0,090%	-1,456%	-0,133	-0,378	-1,168
7	0,828%	-0,628%	1,223	-0,378	-0,504
8	0,395%	-0,233%	0,584	0,378	-0,187
9	1,012%	0,779%	1,494	1,134	0,625
10	-0,207%	0,573%	-0,305	-1,890	0,459
11	0,088%	0,661%	0,130	-0,378	0,530
12	0,517%	1,178%	0,764	0,378	0,945
13	-0,639%	0,539%	-0,944	-1,134	0,432
14	-0,124%	0,415%	-0,183	-0,378	0,333
15	-0,209%	0,206%	-0,308	-0,378	0,165
16	0,524%	0,730%	0,774	1,134	0,586
17	0,474%	1,205%	0,701	-0,378	0,966
18	-1,115%	0,089%	-1,647	-1,890	0,072
19	-0,511%	-0,422%	-0,755	-1,890	-0,338
20	0,297%	-0,125%	0,438	0,378	-0,100
STD.DEV	0,0068	0,0125			

H.4 Financials

BAD NEWS FINANCIALS

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,036%	0,036%	0,107	-0,894	0,068
-19	-0,434%	-0,398%	-1,290	-1,789	-0,749
-18	0,017%	-0,380%	0,051	-0,894	-0,717
-17	0,451%	0,071%	1,342	1,789	0,133
-16	-0,192%	-0,121%	-0,571	-0,447	-0,228
-15	-0,096%	-0,217%	-0,287	-0,894	-0,410
-14	0,072%	-0,145%	0,215	0,894	-0,274
-13	0,300%	0,155%	0,894	0,000	0,293
-12	-0,487%	-0,331%	-1,448	-1,342	-0,625
-11	0,633%	0,302%	1,884	1,789	0,569
-10	-0,098%	0,204%	-0,291	-0,447	0,384
-9	0,501%	0,705%	1,492	2,683	1,330
-8	-0,237%	0,468%	-0,705	-1,342	0,883
-7	-0,305%	0,163%	-0,908	0,000	0,308
-6	-0,726%	-0,562%	-2,159	-1,342	-1,060
-5	-0,119%	-0,681%	-0,354	0,000	-1,285
-4	0,339%	-0,342%	1,009	0,894	-0,645
-3	-0,736%	-1,078%	-2,189	-1,789	-2,032
-2	0,019%	-1,059%	0,056	-0,447	-1,997
-1	0,219%	-0,840%	0,652	0,894	-1,583
0	**-0,600%**	**-1,440%**	**-1,786**	**-0,447**	**-2,715**
1	0,486%	-0,954%	1,447	0,894	-1,798
2	-0,077%	-1,031%	-0,229	-0,447	-1,944
3	0,119%	-0,912%	0,354	-0,447	-1,719
4	0,379%	-0,533%	1,128	0,000	-1,004
5	-0,093%	-0,626%	-0,276	0,894	-1,179
6	-0,077%	-0,703%	-0,229	0,894	-1,325
7	0,168%	-0,535%	0,500	0,000	-1,008
8	0,122%	-0,413%	0,364	1,342	-0,778
9	-0,380%	-0,792%	-1,130	-1,342	-1,494
10	0,163%	-0,629%	0,486	0,894	-1,186
11	-0,261%	-0,890%	-0,776	0,000	-1,677
12	0,092%	-0,798%	0,274	0,000	-1,504
13	-0,044%	-0,842%	-0,132	0,447	-1,588
14	0,169%	-0,673%	0,502	0,894	-1,270
15	0,041%	-0,632%	0,123	0,447	-1,192
16	0,093%	-0,539%	0,276	0,000	-1,017
17	-0,183%	-0,722%	-0,544	-1,342	-1,362
18	-0,588%	-1,310%	-1,749	-0,894	-2,470
19	-0,396%	-1,706%	-1,177	-1,789	-3,216
20	0,309%	-1,396%	0,921	0,894	-2,633
STD.DEV	0,0034	0,0053			

GOOD NEWS FINANCIALS

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,004%	-0,004%	-0,012	0,333	-0,005
-19	-0,516%	-0,520%	-1,699	-1,667	-0,783
-18	0,449%	-0,071%	1,477	2,333	-0,107
-17	-0,173%	-0,245%	-0,570	-0,333	-0,369
-16	-0,016%	-0,261%	-0,054	-0,667	-0,393
-15	0,295%	0,034%	0,970	1,000	0,051
-14	-0,366%	-0,332%	-1,204	-1,000	-0,500
-13	-0,041%	-0,373%	-0,135	0,333	-0,562
-12	-0,105%	-0,478%	-0,346	0,333	-0,721
-11	0,155%	-0,324%	0,509	0,333	-0,488
-10	-0,348%	-0,672%	-1,147	0,667	-1,013
-9	0,011%	-0,661%	0,036	1,000	-0,996
-8	-0,207%	-0,868%	-0,681	-0,333	-1,308
-7	-0,034%	-0,902%	-0,113	0,667	-1,360
-6	-0,022%	-0,925%	-0,073	0,333	-1,394
-5	0,316%	-0,609%	1,040	1,000	-0,917
-4	0,028%	-0,581%	0,091	0,000	-0,876
-3	0,265%	-0,316%	0,872	1,667	-0,477
-2	0,357%	0,041%	1,176	2,000	0,061
-1	0,038%	0,079%	0,125	1,667	0,119
0	**-0,501%**	**-0,423%**	**-1,650**	**-0,333**	**-0,637**
1	1,300%	0,877%	4,279	2,333	1,322
2	0,077%	0,954%	0,254	-0,667	1,438
3	-0,282%	0,672%	-0,929	-1,333	1,013
4	0,061%	0,733%	0,200	-0,333	1,105
5	-0,236%	0,496%	-0,779	-1,000	0,748
6	-0,185%	0,312%	-0,608	-1,000	0,470
7	0,280%	0,592%	0,922	-0,333	0,892
8	-0,068%	0,524%	-0,224	-0,667	0,790
9	0,155%	0,679%	0,510	1,333	1,023
10	0,045%	0,724%	0,148	0,667	1,091
11	0,179%	0,902%	0,589	0,333	1,360
12	-0,099%	0,803%	-0,326	-0,667	1,211
13	-0,014%	0,790%	-0,045	0,333	1,190
14	-0,271%	0,519%	-0,892	-0,333	0,782
15	0,169%	0,688%	0,557	-0,667	1,036
16	0,113%	0,801%	0,372	1,333	1,207
17	0,175%	0,976%	0,576	-0,667	1,470
18	0,018%	0,994%	0,060	0,000	1,498
19	0,305%	1,299%	1,003	1,333	1,957
20	0,081%	1,379%	0,266	0,333	2,079
STD.DEV	0,0030	0,0066			

NO NEWS FINANCIALS

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,374%	0,374%	0,702	0,707	0,238
-19	-0,884%	-0,509%	-1,656	-1,414	-0,324
-18	-0,008%	-0,518%	-0,015	0,000	-0,329
-17	0,622%	0,104%	1,165	0,707	0,066
-16	-0,515%	-0,411%	-0,965	-0,707	-0,261
-15	-0,536%	-0,946%	-1,004	-1,414	-0,601
-14	-0,008%	-0,954%	-0,015	-0,707	-0,607
-13	-2,051%	-3,005%	-3,843	-1,414	-1,910
-12	-0,090%	-3,095%	-0,168	0,000	-1,967
-11	0,227%	-2,868%	0,424	-0,707	-1,823
-10	-0,705%	-3,573%	-1,321	-1,414	-2,272
-9	-0,002%	-3,576%	-0,004	0,000	-2,273
-8	0,197%	-3,378%	0,369	0,707	-2,148
-7	-0,034%	-3,413%	-0,064	0,000	-2,170
-6	-0,033%	-3,445%	-0,061	-1,414	-2,190
-5	0,898%	-2,547%	1,683	0,707	-1,619
-4	-0,204%	-2,751%	-0,382	-0,707	-1,749
-3	0,678%	-2,073%	1,271	1,414	-1,318
-2	-0,095%	-2,168%	-0,178	-0,707	-1,378
-1	0,761%	-1,407%	1,425	1,414	-0,895
0	**-0,879%**	**-2,286%**	**-1,646**	**-0,707**	**-1,453**
1	0,494%	-1,792%	0,926	0,000	-1,139
2	0,035%	-1,757%	0,065	0,000	-1,117
3	0,157%	-1,600%	0,294	-0,707	-1,017
4	0,332%	-1,267%	0,622	0,000	-0,806
5	0,316%	-0,951%	0,593	0,707	-0,605
6	-0,028%	-0,979%	-0,053	0,707	-0,622
7	-0,093%	-1,072%	-0,175	0,000	-0,682
8	0,015%	-1,058%	0,028	0,000	-0,672
9	0,694%	-0,364%	1,300	1,414	-0,231
10	0,576%	0,212%	1,080	2,121	0,135
11	0,225%	0,437%	0,422	0,000	0,278
12	0,463%	0,901%	0,868	0,000	0,573
13	0,102%	1,002%	0,190	-0,707	0,637
14	-0,360%	0,643%	-0,674	-0,707	0,409
15	0,015%	0,657%	0,027	0,000	0,418
16	0,366%	1,024%	0,687	0,000	0,651
17	-0,222%	0,802%	-0,415	0,000	0,510
18	0,335%	1,137%	0,629	0,707	0,723
19	0,186%	1,323%	0,348	1,414	0,841
20	0,292%	1,615%	0,548	0,000	1,027
STD.DEV	0,0053	0,0157			

H.5 Health Care

BAD NEWS HEALTH CARE

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,245%	0,245%	0,063	0,000	0,052
-19	0,116%	0,362%	0,030	0,707	0,077
-18	-0,285%	0,077%	-0,074	0,000	0,016
-17	-22,411%	-22,334%	-5,800	-0,707	-4,776
-16	-0,477%	-22,811%	-0,123	-0,707	-4,878
-15	6,917%	-15,894%	1,790	2,121	-3,399
-14	1,031%	-14,863%	0,267	-0,707	-3,179
-13	-1,929%	-16,792%	-0,499	0,707	-3,591
-12	-0,853%	-17,645%	-0,221	-0,707	-3,774
-11	-0,115%	-17,761%	-0,030	0,707	-3,798
-10	3,105%	-14,655%	0,804	0,000	-3,134
-9	0,326%	-14,329%	0,084	-0,707	-3,064
-8	-0,970%	-15,299%	-0,251	0,000	-3,272
-7	-2,530%	-17,829%	-0,655	-2,121	-3,813
-6	0,862%	-16,967%	0,223	1,414	-3,628
-5	1,097%	-15,870%	0,284	1,414	-3,394
-4	2,150%	-13,720%	0,556	2,121	-2,934
-3	2,007%	-11,713%	0,519	1,414	-2,505
-2	-0,725%	-12,438%	-0,188	-2,121	-2,660
-1	1,465%	-10,973%	0,379	1,414	-2,347
0	**-1,939%**	**-12,912%**	**-0,502**	**-1,414**	**-2,761**
1	-2,152%	-15,064%	-0,557	-2,121	-3,222
2	-0,810%	-15,875%	-0,210	0,000	-3,395
3	0,223%	-15,652%	0,058	1,414	-3,347
4	0,134%	-15,518%	0,035	0,000	-3,319
5	-0,006%	-15,524%	-0,002	-0,707	-3,320
6	0,127%	-15,397%	0,033	0,000	-3,293
7	0,384%	-15,013%	0,099	1,414	-3,211
8	-0,602%	-15,614%	-0,156	-1,414	-3,339
9	0,526%	-15,088%	0,136	-0,707	-3,227
10	-0,431%	-15,520%	-0,112	-1,414	-3,319
11	0,071%	-15,448%	0,018	-0,707	-3,304
12	-0,247%	-15,695%	-0,064	-0,707	-3,357
13	0,233%	-15,463%	0,060	1,414	-3,307
14	-0,567%	-16,030%	-0,147	-0,707	-3,428
15	0,372%	-15,658%	0,096	0,000	-3,349
16	1,243%	-14,415%	0,322	0,000	-3,083
17	-0,717%	-15,132%	-0,186	-0,707	-3,236
18	0,358%	-14,773%	0,093	0,707	-3,159
19	0,844%	-13,929%	0,218	1,414	-2,979
20	-1,799%	-15,729%	-0,466	-1,414	-3,364
STD.DEV	0,0386	0,0468			

GOOD NEWS HEALTH CARE

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,132%	0,132%	0,078	0,000	0,014
-19	-0,315%	-0,183%	-0,186	0,000	-0,019
-18	2,542%	2,359%	1,504	0,000	0,250
-17	-0,890%	1,469%	-0,527	-0,816	0,156
-16	1,297%	2,765%	0,767	0,816	0,293
-15	-0,465%	2,300%	-0,275	0,816	0,244
-14	0,788%	3,088%	0,466	0,000	0,327
-13	1,781%	4,869%	1,054	0,816	0,516
-12	-0,496%	4,374%	-0,293	-0,816	0,464
-11	-1,239%	3,135%	-0,733	-0,816	0,332
-10	2,163%	5,298%	1,280	1,633	0,561
-9	-0,145%	5,153%	-0,086	-0,816	0,546
-8	-0,221%	4,932%	-0,131	-0,816	0,523
-7	1,548%	6,480%	0,916	0,816	0,687
-6	3,127%	9,606%	1,851	1,633	1,018
-5	-0,089%	9,517%	-0,053	0,000	1,009
-4	1,634%	11,151%	0,967	0,816	1,182
-3	-1,765%	9,386%	-1,045	-1,633	0,995
-2	3,808%	13,194%	2,254	1,633	1,398
-1	0,295%	13,489%	0,174	0,816	1,430
0	**-3,686%**	**9,803%**	**-2,182**	**-1,633**	**1,039**
1	5,134%	14,937%	3,039	1,633	1,583
2	0,897%	15,834%	0,531	0,000	1,678
3	0,400%	16,234%	0,237	0,000	1,720
4	1,974%	18,208%	1,168	-0,816	1,930
5	4,153%	22,361%	2,458	0,816	2,370
6	1,046%	23,407%	0,619	-0,816	2,481
7	0,691%	24,098%	0,409	1,633	2,554
8	0,306%	24,404%	0,181	0,000	2,586
9	1,054%	25,458%	0,624	-0,816	2,698
10	-0,980%	24,478%	-0,580	-0,816	2,594
11	0,153%	24,631%	0,091	0,000	2,610
12	-1,476%	23,155%	-0,874	-1,633	2,454
13	0,220%	23,375%	0,130	0,816	2,477
14	-0,294%	23,081%	-0,174	0,000	2,446
15	0,452%	23,533%	0,267	0,816	2,494
16	-0,135%	23,398%	-0,080	0,816	2,480
17	0,217%	23,615%	0,129	0,816	2,503
18	1,045%	24,660%	0,619	0,000	2,613
19	2,497%	27,158%	1,478	0,816	2,878
20	2,883%	30,040%	1,706	0,000	3,184
STD.DEV	0,0169	0,0944			

NO NEWS HEALTH CARE

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,565%	-0,565%	-0,369	-1,414	-0,248
-19	0,666%	0,101%	0,434	0,000	0,044
-18	1,167%	1,267%	0,761	0,000	0,557
-17	0,737%	2,004%	0,481	1,414	0,880
-16	-1,594%	0,410%	-1,040	-1,414	0,180
-15	2,021%	2,430%	1,319	0,000	1,068
-14	0,265%	2,695%	0,173	0,000	1,184
-13	0,259%	2,955%	0,169	0,000	1,298
-12	0,486%	3,441%	0,317	0,000	1,512
-11	1,966%	5,407%	1,283	1,414	2,376
-10	0,013%	5,421%	0,009	0,000	2,382
-9	-0,717%	4,704%	-0,468	-1,414	2,067
-8	-1,051%	3,653%	-0,686	-1,414	1,605
-7	1,320%	4,973%	0,861	1,414	2,185
-6	0,822%	5,794%	0,536	0,000	2,546
-5	-1,544%	4,251%	-1,007	-1,414	1,868
-4	0,769%	5,019%	0,502	1,414	2,205
-3	2,015%	7,034%	1,315	1,414	3,091
-2	-2,341%	4,694%	-1,527	-1,414	2,062
-1	0,400%	5,093%	0,261	0,000	2,238
0	**-1,905%**	**3,189%**	**-1,243**	**0,000**	**1,401**
1	-1,347%	1,841%	-0,879	-1,414	0,809
2	1,596%	3,437%	1,041	1,414	1,510
3	-1,963%	1,474%	-1,281	-1,414	0,648
4	0,987%	2,462%	0,644	1,414	1,082
5	-0,144%	2,317%	-0,094	0,000	1,018
6	-0,742%	1,575%	-0,484	0,000	0,692
7	-1,220%	0,356%	-0,796	0,000	0,156
8	-1,115%	-0,759%	-0,727	0,000	-0,334
9	1,259%	0,500%	0,822	0,000	0,220
10	-0,658%	-0,158%	-0,430	0,000	-0,070
11	0,577%	0,419%	0,377	0,000	0,184
12	5,282%	5,701%	3,446	1,414	2,505
13	-1,695%	4,006%	-1,106	0,000	1,760
14	-2,380%	1,626%	-1,553	-1,414	0,714
15	-1,084%	0,542%	-0,707	-1,414	0,238
16	-1,718%	-1,176%	-1,121	-1,414	-0,517
17	-0,645%	-1,821%	-0,421	0,000	-0,800
18	1,823%	0,002%	1,190	0,000	0,001
19	-0,545%	-0,543%	-0,356	0,000	-0,238
20	0,801%	0,258%	0,523	0,000	0,114
STD.DEV	0,0153	0,0228			

H.6 Industrials

BAD NEWS INDUSTRIALS

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,137%	-0,137%	-0,406	-0,356	-0,090
-19	0,050%	-0,087%	0,149	-0,831	-0,057
-18	0,164%	0,077%	0,487	0,593	0,051
-17	0,045%	0,122%	0,132	-0,831	0,080
-16	-0,096%	0,026%	-0,284	-0,119	0,017
-15	-0,121%	-0,095%	-0,359	-0,119	-0,063
-14	-0,274%	-0,369%	-0,812	-1,305	-0,243
-13	-0,080%	-0,449%	-0,237	0,356	-0,296
-12	-0,193%	-0,641%	-0,571	0,831	-0,423
-11	-0,065%	-0,706%	-0,192	-0,593	-0,466
-10	0,172%	-0,534%	0,510	0,356	-0,352
-9	-0,096%	-0,630%	-0,285	-2,255	-0,416
-8	0,249%	-0,381%	0,738	1,305	-0,252
-7	0,155%	-0,226%	0,460	0,119	-0,149
-6	0,087%	-0,139%	0,257	0,356	-0,092
-5	-0,288%	-0,427%	-0,854	0,119	-0,282
-4	0,099%	-0,328%	0,293	0,119	-0,217
-3	0,305%	-0,023%	0,905	0,593	-0,015
-2	0,215%	0,191%	0,636	0,593	0,126
-1	0,064%	0,255%	0,189	-0,593	0,168
0	**-1,744%**	**-1,489%**	**-5,174**	**-3,442**	**-0,983**
1	-0,669%	-2,158%	-1,986	-1,068	-1,425
2	0,079%	-2,079%	0,236	0,593	-1,372
3	-0,183%	-2,262%	-0,543	-0,119	-1,493
4	-0,240%	-2,502%	-0,711	-2,018	-1,652
5	-0,014%	-2,515%	-0,040	-1,543	-1,661
6	-0,063%	-2,579%	-0,188	-0,356	-1,702
7	-0,167%	-2,746%	-0,495	-1,305	-1,813
8	-0,326%	-3,072%	-0,967	-1,068	-2,028
9	-0,153%	-3,225%	-0,454	-1,780	-2,129
10	0,073%	-3,152%	0,217	-0,119	-2,081
11	-0,209%	-3,361%	-0,621	-1,068	-2,219
12	-0,227%	-3,588%	-0,673	-1,543	-2,369
13	0,153%	-3,435%	0,453	-0,593	-2,268
14	-0,290%	-3,725%	-0,860	-2,492	-2,459
15	0,136%	-3,589%	0,403	0,356	-2,369
16	0,030%	-3,559%	0,088	0,356	-2,350
17	-0,160%	-3,719%	-0,475	-1,068	-2,455
18	0,030%	-3,689%	0,088	0,356	-2,436
19	-0,234%	-3,923%	-0,694	-2,255	-2,590
20	0,464%	-3,459%	1,378	0,593	-2,283
STD.DEV	0,0034	0,0151			

GOOD NEWS INDUSTRIALS

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,313%	-0,313%	-1,009	-2,092	-0,226
-19	0,108%	-0,204%	0,350	0,000	-0,148
-18	0,382%	0,178%	1,234	2,557	0,129
-17	-0,075%	0,103%	-0,241	-0,930	0,075
-16	0,110%	0,213%	0,354	0,232	0,154
-15	-0,110%	0,103%	-0,355	0,465	0,074
-14	-0,160%	-0,057%	-0,516	0,000	-0,041
-13	-0,118%	-0,175%	-0,382	-0,930	-0,127
-12	-0,139%	-0,314%	-0,448	-0,232	-0,228
-11	0,167%	-0,147%	0,540	0,000	-0,106
-10	-0,219%	-0,366%	-0,706	-1,395	-0,265
-9	-0,354%	-0,720%	-1,142	-1,860	-0,521
-8	-0,327%	-1,046%	-1,053	-2,092	-0,757
-7	0,074%	-0,972%	0,240	0,000	-0,703
-6	-0,311%	-1,283%	-1,003	0,232	-0,928
-5	0,061%	-1,221%	0,198	0,697	-0,884
-4	0,077%	-1,144%	0,248	-0,930	-0,828
-3	0,262%	-0,882%	0,845	1,395	-0,639
-2	0,107%	-0,775%	0,346	0,232	-0,561
-1	0,657%	-0,119%	2,118	2,325	-0,086
0	**0,238%**	**0,119%**	**0,767**	**0,232**	**0,086**
1	1,188%	1,307%	3,831	2,325	0,946
2	0,609%	1,916%	1,964	3,022	1,387
3	0,425%	2,341%	1,371	0,465	1,694
4	-0,212%	2,129%	-0,684	-0,697	1,541
5	0,106%	2,235%	0,343	-0,697	1,618
6	0,173%	2,407%	0,557	-0,465	1,742
7	0,181%	2,588%	0,584	0,697	1,873
8	-0,269%	2,319%	-0,868	-0,697	1,679
9	-0,158%	2,161%	-0,509	-1,162	1,565
10	-0,013%	2,148%	-0,042	-0,232	1,555
11	0,069%	2,217%	0,221	1,395	1,605
12	0,210%	2,427%	0,679	-0,697	1,757
13	-0,030%	2,398%	-0,095	0,000	1,736
14	-0,334%	2,063%	-1,078	0,000	1,494
15	0,259%	2,322%	0,834	-0,465	1,681
16	-0,061%	2,261%	-0,196	-0,930	1,637
17	-0,164%	2,098%	-0,528	-0,232	1,518
18	-0,077%	2,021%	-0,248	-0,232	1,463
19	-0,095%	1,925%	-0,307	1,162	1,394
20	0,443%	2,369%	1,430	1,860	1,714
STD.DEV	0,0031	0,0138			

NO NEWS INDUSTRIALS

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,544%	-0,54%	-1,061	-0,775	-0,870
-19	-0,002%	-0,55%	-0,004	0,775	-0,873
-18	-0,346%	-0,89%	-0,675	0,258	-1,427
-17	-0,008%	-0,90%	-0,016	-0,258	-1,440
-16	-1,074%	-1,97%	-2,094	-1,291	-3,157
-15	-0,152%	-2,13%	-0,296	-0,258	-3,400
-14	0,004%	-2,12%	0,007	-0,775	-3,394
-13	0,534%	-1,59%	1,041	0,775	-2,541
-12	1,148%	-0,44%	2,238	0,775	-0,705
-11	-0,425%	-0,87%	-0,828	-0,258	-1,384
-10	0,381%	-0,48%	0,743	0,775	-0,775
-9	0,218%	-0,27%	0,424	0,775	-0,427
-8	-0,061%	-0,33%	-0,120	-0,775	-0,525
-7	0,559%	0,23%	1,089	1,291	0,368
-6	-0,615%	-0,39%	-1,199	-0,258	-0,616
-5	0,040%	-0,34%	0,078	0,258	-0,552
-4	-0,369%	-0,71%	-0,719	-0,258	-1,141
-3	-0,373%	-1,09%	-0,727	-0,775	-1,737
-2	-0,528%	-1,61%	-1,029	-0,775	-2,580
-1	-0,581%	-2,19%	-1,133	-1,807	-3,509
0	**1,282%**	**-0,91%**	**2,500**	**1,291**	**-1,459**
1	0,377%	-0,54%	0,735	0,775	-0,856
2	-1,213%	-1,75%	-2,364	-1,807	-2,795
3	0,486%	-1,26%	0,947	1,291	-2,019
4	0,760%	-0,50%	1,483	1,291	-0,803
5	-0,179%	-0,68%	-0,350	-0,258	-1,089
6	0,023%	-0,66%	0,044	-0,258	-1,053
7	-0,712%	-1,37%	-1,388	-0,775	-2,192
8	-0,082%	-1,45%	-0,159	0,258	-2,322
9	-0,261%	-1,71%	-0,508	0,258	-2,739
10	-0,121%	-1,83%	-0,237	-0,258	-2,933
11	0,118%	-1,72%	0,231	-0,258	-2,744
12	-0,014%	-1,73%	-0,027	0,258	-2,766
13	0,128%	-1,60%	0,249	0,258	-2,562
14	-0,156%	-1,76%	-0,305	0,258	-2,812
15	0,614%	-1,14%	1,198	0,775	-1,829
16	-0,015%	-1,16%	-0,029	-0,258	-1,853
17	0,127%	-1,03%	0,248	-0,258	-1,650
18	-0,461%	-1,49%	-0,900	-0,775	-2,388
19	-0,211%	-1,70%	-0,412	0,775	-2,726
20	-0,227%	-1,93%	-0,443	-1,291	-3,089
STD.DEV	0,0051	0,0063			

H.7 Information Technology

BAD NEWS INFORMATION TECHNOLOGY

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,141%	0,141%	0,278	1,718	0,101
-19	-0,263%	-0,122%	-0,518	-1,093	-0,087
-18	-0,368%	-0,490%	-0,725	-0,469	-0,350
-17	-0,262%	-0,752%	-0,515	-0,156	-0,537
-16	0,038%	-0,714%	0,075	-0,781	-0,510
-15	0,323%	-0,391%	0,636	0,156	-0,279
-14	0,286%	-0,105%	0,563	1,406	-0,075
-13	0,224%	0,119%	0,441	0,156	0,085
-12	0,652%	0,771%	1,283	1,093	0,551
-11	-0,096%	0,675%	-0,189	-0,781	0,482
-10	-0,394%	0,281%	-0,776	-0,781	0,200
-9	-0,272%	0,009%	-0,536	-0,469	0,006
-8	0,189%	0,197%	0,371	-0,469	0,141
-7	-0,571%	-0,374%	-1,124	-0,781	-0,267
-6	-0,300%	-0,674%	-0,591	-1,718	-0,481
-5	0,346%	-0,328%	0,682	1,093	-0,234
-4	-1,223%	-1,550%	-2,407	-0,781	-1,107
-3	0,114%	-1,437%	0,224	-0,156	-1,026
-2	0,231%	-1,206%	0,455	-0,156	-0,861
-1	-0,332%	-1,538%	-0,654	-1,718	-1,098
0	**-1,915%**	**-3,453%**	**-3,770**	**-1,406**	**-2,466**
1	-0,050%	-3,503%	-0,098	-0,469	-2,502
2	0,321%	-3,182%	0,633	-0,469	-2,272
3	0,204%	-2,978%	0,402	0,781	-2,127
4	-0,354%	-3,332%	-0,698	0,469	-2,380
5	-0,044%	-3,376%	-0,086	-1,406	-2,411
6	0,607%	-2,769%	1,194	1,406	-1,978
7	-0,328%	-3,097%	-0,645	-2,030	-2,212
8	0,279%	-2,818%	0,549	0,469	-2,013
9	0,162%	-2,657%	0,318	0,781	-1,897
10	-0,106%	-2,763%	-0,209	-0,156	-1,973
11	-0,031%	-2,794%	-0,062	0,469	-1,995
12	-0,077%	-2,871%	-0,152	-0,156	-2,050
13	0,126%	-2,745%	0,248	-1,093	-1,961
14	-0,315%	-3,060%	-0,620	-0,469	-2,185
15	-0,064%	-3,124%	-0,126	-0,156	-2,231
16	0,033%	-3,091%	0,066	0,469	-2,207
17	-0,321%	-3,412%	-0,632	-0,156	-2,436
18	1,444%	-1,968%	2,842	2,030	-1,405
19	0,318%	-1,650%	0,626	-1,093	-1,178
20	0,016%	-1,634%	0,031	0,781	-1,167
STD.DEV	0,0051	0,0140			

GOOD NEWS INFORMATION TECHNOLOGY

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,064%	0,064%	0,080	0,728	0,016
-19	0,632%	0,696%	0,796	1,213	0,173
-18	-0,227%	0,468%	-0,286	-0,243	0,117
-17	-0,582%	-0,113%	-0,732	-0,728	-0,028
-16	-0,350%	-0,463%	-0,441	-0,728	-0,115
-15	0,375%	-0,088%	0,473	0,728	-0,022
-14	-1,045%	-1,133%	-1,316	-1,213	-0,282
-13	0,435%	-0,698%	0,548	-0,243	-0,174
-12	-0,633%	-1,331%	-0,797	-1,213	-0,331
-11	1,071%	-0,260%	1,348	0,243	-0,065
-10	1,741%	1,481%	2,192	2,183	0,369
-9	1,353%	2,833%	1,703	2,183	0,705
-8	0,527%	3,360%	0,663	-0,243	0,836
-7	0,047%	3,407%	0,059	0,243	0,848
-6	0,063%	3,470%	0,079	-0,243	0,863
-5	0,368%	3,837%	0,463	0,728	0,955
-4	-0,824%	3,014%	-1,037	-0,728	0,750
-3	0,237%	3,251%	0,298	0,243	0,809
-2	0,819%	4,070%	1,031	0,243	1,013
-1	-0,212%	3,858%	-0,267	-0,243	0,960
0	**2,017%**	**5,874%**	**2,538**	**1,213**	**1,462**
1	1,260%	7,134%	1,586	0,728	1,775
2	1,087%	8,222%	1,369	1,213	2,046
3	1,076%	9,298%	1,354	0,728	2,314
4	-0,218%	9,080%	-0,274	-0,243	2,260
5	-0,554%	8,526%	-0,698	-0,243	2,122
6	-0,302%	8,223%	-0,381	-0,243	2,046
7	-0,015%	8,208%	-0,019	-0,728	2,042
8	0,371%	8,579%	0,467	0,243	2,135
9	-0,685%	7,894%	-0,863	-0,243	1,964
10	0,710%	8,603%	0,893	1,213	2,141
11	0,646%	9,250%	0,814	0,243	2,302
12	0,581%	9,831%	0,731	-0,728	2,446
13	-0,316%	9,514%	-0,398	-0,728	2,368
14	-0,755%	8,759%	-0,950	-0,243	2,180
15	0,978%	9,738%	1,232	-0,728	2,423
16	0,207%	9,945%	0,261	0,243	2,475
17	-0,745%	9,200%	-0,937	-1,698	2,289
18	1,248%	10,448%	1,571	1,213	2,600
19	-0,167%	10,282%	-0,210	-0,728	2,558
20	-1,541%	8,741%	-1,939	-1,698	2,175
STD.DEV	0,0079	0,0402			

NO NEWS INFORMATION TECHNOLOGY

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	1,244%	1,244%	1,117	0,000	0,656
-19	-0,566%	0,678%	-0,508	-1,633	0,358
-18	2,170%	2,848%	1,949	2,449	1,503
-17	0,373%	3,222%	0,335	0,816	1,700
-16	-0,820%	2,402%	-0,736	-1,633	1,267
-15	-0,664%	1,738%	-0,596	0,000	0,917
-14	0,652%	2,390%	0,586	0,816	1,261
-13	-0,411%	1,979%	-0,369	0,816	1,044
-12	0,713%	2,692%	0,640	0,816	1,420
-11	-0,075%	2,617%	-0,067	0,816	1,381
-10	0,212%	2,829%	0,190	0,816	1,493
-9	-0,817%	2,012%	-0,734	0,000	1,061
-8	0,098%	2,110%	0,088	-0,816	1,113
-7	-1,213%	0,897%	-1,089	-1,633	0,473
-6	0,218%	1,116%	0,196	0,816	0,589
-5	-0,674%	0,442%	-0,605	-0,816	0,233
-4	-1,696%	-1,254%	-1,523	-0,816	-0,662
-3	-0,038%	-1,292%	-0,034	0,000	-0,682
-2	1,813%	0,520%	1,628	0,000	0,274
-1	-1,674%	-1,154%	-1,504	-2,449	-0,609
0	**0,958%**	**-0,197%**	**0,860**	**0,000**	**-0,104**
1	4,047%	3,850%	3,634	0,816	2,031
2	0,559%	4,409%	0,502	0,816	2,326
3	-1,853%	2,557%	-1,663	-2,449	1,349
4	0,478%	3,035%	0,429	0,816	1,601
5	0,714%	3,749%	0,641	0,816	1,978
6	0,663%	4,412%	0,595	0,000	2,327
7	-0,155%	4,257%	-0,139	0,816	2,246
8	1,497%	5,755%	1,345	1,633	3,036
9	0,495%	6,249%	0,444	0,816	3,297
10	-1,217%	5,032%	-1,093	-0,816	2,655
11	0,486%	5,519%	0,437	1,633	2,911
12	-1,042%	4,477%	-0,935	-2,449	2,362
13	-0,313%	4,164%	-0,281	0,000	2,197
14	-0,200%	3,964%	-0,180	0,000	2,091
15	0,076%	4,040%	0,068	-1,633	2,131
16	0,559%	4,600%	0,502	0,816	2,426
17	-0,177%	4,423%	-0,159	-0,816	2,333
18	-0,657%	3,766%	-0,590	0,000	1,987
19	0,247%	4,013%	0,222	0,000	2,117
20	-0,859%	3,154%	-0,771	-1,633	1,664
STD.DEV	0,0111	0,0190			

H.8 Materials

BAD NEWS MATERIALS

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	-0,382%	-0,382%	-1,391	-1,414	-0,905
-19	0,595%	0,213%	2,167	1,414	0,504
-18	0,194%	0,407%	0,708	0,471	0,965
-17	0,127%	0,535%	0,464	-0,471	1,266
-16	-0,008%	0,527%	-0,030	0,943	1,247
-15	0,121%	0,647%	0,439	0,471	1,533
-14	0,051%	0,698%	0,186	0,943	1,653
-13	-0,007%	0,692%	-0,024	0,943	1,638
-12	0,063%	0,755%	0,231	-0,471	1,788
-11	0,212%	0,967%	0,774	1,414	2,291
-10	-0,073%	0,894%	-0,268	0,943	2,117
-9	0,015%	0,908%	0,053	-0,471	2,151
-8	0,704%	1,612%	2,563	1,886	3,818
-7	-0,213%	1,399%	-0,775	0,471	3,313
-6	0,010%	1,410%	0,038	0,000	3,338
-5	0,130%	1,540%	0,474	0,000	3,646
-4	-0,194%	1,345%	-0,708	0,000	3,186
-3	0,098%	1,443%	0,358	0,943	3,418
-2	-0,079%	1,365%	-0,286	-0,943	3,232
-1	0,085%	1,450%	0,310	-0,471	3,433
0	**-0,681%**	**0,769%**	**-2,479**	**0,000**	**1,822**
1	0,189%	0,958%	0,689	0,000	2,270
2	0,371%	1,329%	1,350	0,471	3,147
3	0,077%	1,406%	0,282	0,471	3,331
4	0,017%	1,423%	0,061	-0,471	3,370
5	-0,113%	1,310%	-0,413	0,943	3,102
6	0,211%	1,521%	0,768	0,471	3,601
7	-0,315%	1,206%	-1,146	-1,886	2,856
8	-0,098%	1,108%	-0,355	-0,471	2,625
9	0,268%	1,376%	0,975	0,471	3,259
10	0,147%	1,523%	0,535	0,471	3,607
11	-0,612%	0,911%	-2,231	-0,943	2,157
12	0,110%	1,020%	0,399	-0,943	2,416
13	0,396%	1,416%	1,443	0,000	3,354
14	-0,192%	1,225%	-0,698	0,471	2,900
15	0,071%	1,296%	0,259	0,471	3,069
16	-0,279%	1,017%	-1,016	0,943	2,409
17	-0,394%	0,623%	-1,435	-1,414	1,476
18	0,185%	0,808%	0,674	0,000	1,914
19	0,190%	0,998%	0,693	0,943	2,365
20	0,096%	1,094%	0,350	-0,471	2,592
STD.DEV	0,0027	0,0042			

GOOD NEWS MATERIALS

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,003%	0,003%	0,005	0,577	0,003
-19	-0,275%	-0,273%	-0,536	0,000	-0,286
-18	-0,411%	-0,684%	-0,799	-1,155	-0,716
-17	-0,181%	-0,864%	-0,351	-0,577	-0,905
-16	-0,299%	-1,164%	-0,582	-1,155	-1,219
-15	-0,856%	-2,020%	-1,665	-2,309	-2,116
-14	0,297%	-1,723%	0,578	0,577	-1,804
-13	0,278%	-1,445%	0,541	1,155	-1,513
-12	-0,445%	-1,890%	-0,866	0,000	-1,979
-11	-0,159%	-2,049%	-0,309	-0,577	-2,146
-10	-0,355%	-2,404%	-0,691	-0,577	-2,518
-9	0,403%	-2,001%	0,783	0,577	-2,096
-8	0,327%	-1,674%	0,636	0,577	-1,754
-7	0,688%	-0,986%	1,339	1,155	-1,033
-6	-0,302%	-1,288%	-0,588	-1,155	-1,349
-5	-0,483%	-1,772%	-0,940	-1,732	-1,856
-4	0,291%	-1,480%	0,567	-1,155	-1,550
-3	-0,390%	-1,870%	-0,758	-2,309	-1,958
-2	-0,028%	-1,898%	-0,054	-0,577	-1,988
-1	0,356%	-1,542%	0,692	0,000	-1,615
0	**2,184%**	**0,642%**	**4,248**	**1,732**	**0,672**
1	-0,221%	0,420%	-0,431	0,000	0,440
2	-0,645%	-0,225%	-1,255	-2,309	-0,235
3	0,116%	-0,109%	0,226	0,577	-0,114
4	-0,121%	-0,230%	-0,236	0,577	-0,241
5	0,621%	0,391%	1,209	2,309	0,410
6	-0,008%	0,384%	-0,015	0,000	0,402
7	0,250%	0,634%	0,487	0,577	0,664
8	-0,385%	0,249%	-0,748	0,577	0,261
9	0,277%	0,527%	0,539	0,000	0,552
10	-0,234%	0,293%	-0,454	-1,155	0,307
11	0,399%	0,692%	0,776	0,577	0,725
12	0,121%	0,813%	0,236	-0,577	0,851
13	-0,995%	-0,182%	-1,935	-2,309	-0,190
14	-0,135%	-0,317%	-0,262	-0,577	-0,332
15	0,156%	-0,161%	0,303	1,155	-0,169
16	-0,366%	-0,527%	-0,713	-1,732	-0,552
17	0,324%	-0,203%	0,630	1,732	-0,213
18	0,110%	-0,093%	0,214	0,000	-0,098
19	0,175%	0,082%	0,341	1,155	0,086
20	-0,220%	-0,138%	-0,429	-0,577	-0,145
STD.DEV	0,0051	0,0095			

NO NEWS MATERIALS

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,942%	0,942%	0,822	0,000	0,333
-19	-1,477%	-0,536%	-1,289	-1,414	-0,189
-18	0,959%	0,423%	0,837	0,000	0,150
-17	1,330%	1,753%	1,161	1,414	0,620
-16	-1,122%	0,632%	-0,979	0,000	0,223
-15	-0,361%	0,271%	-0,315	0,000	0,096
-14	-0,190%	0,081%	-0,166	0,000	0,028
-13	0,563%	0,644%	0,491	0,000	0,227
-12	-0,078%	0,566%	-0,068	0,000	0,200
-11	0,046%	0,611%	0,040	0,000	0,216
-10	0,893%	1,504%	0,780	1,414	0,532
-9	-2,060%	-0,556%	-1,798	-1,414	-0,197
-8	0,349%	-0,207%	0,305	0,000	-0,073
-7	-1,269%	-1,476%	-1,108	-1,414	-0,522
-6	-2,053%	-3,529%	-1,792	0,000	-1,247
-5	-1,441%	-4,970%	-1,258	-1,414	-1,757
-4	0,029%	-4,941%	0,025	0,000	-1,747
-3	-0,932%	-5,873%	-0,814	0,000	-2,076
-2	-1,114%	-6,988%	-0,973	-1,414	-2,470
-1	1,747%	-5,241%	1,525	1,414	-1,852
0	**1,628%**	**-3,612%**	**1,422**	**1,414**	**-1,277**
1	2,630%	-0,982%	2,296	1,414	-0,347
2	0,347%	-0,635%	0,303	1,414	-0,224
3	0,111%	-0,524%	0,097	0,000	-0,185
4	-1,806%	-2,330%	-1,576	-1,414	-0,823
5	-0,029%	-2,359%	-0,025	0,000	-0,834
6	1,477%	-0,882%	1,289	1,414	-0,312
7	-0,819%	-1,701%	-0,715	-1,414	-0,601
8	0,089%	-1,612%	0,078	0,000	-0,570
9	-0,464%	-2,075%	-0,405	0,000	-0,734
10	-0,289%	-2,364%	-0,252	0,000	-0,836
11	-0,989%	-3,354%	-0,864	0,000	-1,185
12	-0,479%	-3,833%	-0,418	-1,414	-1,355
13	-0,170%	-4,003%	-0,149	0,000	-1,415
14	-0,039%	-4,043%	-0,034	-1,414	-1,429
15	-2,736%	-6,779%	-2,388	-1,414	-2,396
16	-0,012%	-6,791%	-0,011	0,000	-2,400
17	-0,506%	-7,297%	-0,442	0,000	-2,579
18	-0,429%	-7,726%	-0,374	-1,414	-2,731
19	0,230%	-7,496%	0,201	0,000	-2,649
20	1,512%	-5,983%	1,320	1,414	-2,115
STD.DEV	0,0115	0,0283			

H.9 Real Estate

BAD NEWS REAL ESTATE

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,300%	0,300%	0,370	0,000	0,337
-19	-1,082%	-0,782%	-1,334	0,000	-0,879
-18	0,668%	-0,114%	0,823	-0,816	-0,128
-17	1,376%	1,262%	1,696	2,449	1,418
-16	-0,894%	0,368%	-1,102	-0,816	0,413
-15	0,486%	0,854%	0,599	0,816	0,960
-14	-1,003%	-0,150%	-1,237	-1,633	-0,168
-13	-0,353%	-0,503%	-0,435	-0,816	-0,565
-12	-0,178%	-0,681%	-0,220	-0,816	-0,765
-11	0,455%	-0,226%	0,561	0,816	-0,254
-10	-0,817%	-1,043%	-1,007	0,000	-1,172
-9	1,102%	0,059%	1,358	1,633	0,066
-8	1,408%	1,467%	1,736	1,633	1,649
-7	-1,648%	-0,181%	-2,031	-1,633	-0,203
-6	0,016%	-0,165%	0,020	0,816	-0,185
-5	0,095%	-0,070%	0,117	0,000	-0,079
-4	-0,480%	-0,550%	-0,591	-0,816	-0,618
-3	0,570%	0,021%	0,703	0,000	0,023
-2	-0,338%	-0,318%	-0,417	-0,816	-0,357
-1	1,801%	1,484%	2,220	2,449	1,668
0	**-1,935%**	**-0,452%**	**-2,386**	**-2,449**	**-0,508**
1	-0,197%	-0,649%	-0,243	-0,816	-0,729
2	-0,284%	-0,933%	-0,350	0,816	-1,049
3	0,530%	-0,402%	0,654	-0,816	-0,452
4	0,165%	-0,237%	0,204	0,816	-0,267
5	0,291%	0,054%	0,359	0,000	0,061
6	-1,050%	-0,997%	-1,295	-1,633	-1,120
7	-0,049%	-1,046%	-0,061	-0,816	-1,176
8	-0,226%	-1,272%	-0,278	-0,816	-1,430
9	-0,374%	-1,646%	-0,461	-1,633	-1,851
10	-0,187%	-1,833%	-0,230	0,000	-2,061
11	-0,800%	-2,633%	-0,986	-1,633	-2,960
12	0,964%	-1,669%	1,188	1,633	-1,876
13	-0,076%	-1,745%	-0,094	-1,633	-1,962
14	0,049%	-1,696%	0,060	0,000	-1,907
15	0,298%	-1,398%	0,367	-0,816	-1,572
16	0,643%	-0,756%	0,792	0,816	-0,850
17	0,100%	-0,656%	0,123	0,000	-0,737
18	0,599%	-0,057%	0,738	0,816	-0,064
19	0,113%	0,056%	0,139	0,816	0,063
20	-1,343%	-1,288%	-1,656	-2,449	-1,448
STD.DEV	0,0081	0,0089			

GOOD NEWS REAL ESTATE

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,090%	0,090%	0,291	0,200	0,081
-19	-0,217%	-0,127%	-0,700	-1,400	-0,114
-18	0,028%	-0,099%	0,090	0,200	-0,089
-17	0,085%	-0,013%	0,275	1,400	-0,012
-16	0,061%	0,048%	0,197	0,600	0,043
-15	0,363%	0,411%	1,171	-0,200	0,370
-14	-0,031%	0,379%	-0,101	-0,200	0,341
-13	-0,221%	0,158%	-0,712	-0,200	0,143
-12	-0,134%	0,025%	-0,432	-1,400	0,022
-11	0,080%	0,104%	0,257	0,200	0,094
-10	-0,358%	-0,254%	-1,156	-1,800	-0,229
-9	0,280%	0,026%	0,903	-0,200	0,023
-8	-0,047%	-0,021%	-0,152	-0,200	-0,019
-7	-0,147%	-0,169%	-0,476	0,200	-0,152
-6	0,235%	0,066%	0,759	0,200	0,060
-5	0,028%	0,095%	0,091	-1,000	0,085
-4	-0,229%	-0,135%	-0,740	-1,400	-0,121
-3	0,374%	0,239%	1,205	0,600	0,215
-2	-0,051%	0,188%	-0,165	-1,000	0,169
-1	0,330%	0,518%	1,066	0,600	0,467
0	**0,711%**	**1,229%**	**2,293**	**1,800**	**1,106**
1	0,325%	1,554%	1,048	0,600	1,399
2	0,671%	2,224%	2,164	1,000	2,002
3	0,118%	2,343%	0,381	0,200	2,109
4	0,253%	2,596%	0,818	1,000	2,337
5	0,073%	2,669%	0,234	-1,000	2,402
6	0,140%	2,808%	0,450	0,200	2,528
7	0,189%	2,997%	0,610	-1,800	2,698
8	-0,372%	2,625%	-1,201	0,200	2,363
9	-0,180%	2,445%	-0,580	-0,600	2,201
10	-0,269%	2,176%	-0,868	-1,800	1,959
11	0,113%	2,289%	0,363	-0,600	2,060
12	0,588%	2,877%	1,898	2,200	2,590
13	-0,592%	2,285%	-1,911	-2,600	2,057
14	-0,294%	1,991%	-0,948	-1,000	1,792
15	0,019%	2,010%	0,063	-1,000	1,810
16	-0,454%	1,556%	-1,465	-1,000	1,401
17	0,020%	1,576%	0,064	-0,600	1,419
18	-0,584%	0,992%	-1,884	-2,200	0,893
19	0,364%	1,356%	1,175	1,000	1,221
20	-0,296%	1,060%	-0,956	-1,400	0,954
STD.DEV	0,0031	0,0111			

NO NEWS REAL ESTATE

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,264%	0,264%	0,150	1,000	0,102
-19	-0,192%	0,071%	-0,109	-1,000	0,028
-18	-2,161%	-2,090%	-1,228	-1,000	-0,807
-17	2,128%	0,037%	1,209	1,000	0,014
-16	-1,463%	-1,425%	-0,831	-1,000	-0,550
-15	1,812%	0,387%	1,030	1,000	0,149
-14	0,476%	0,863%	0,271	1,000	0,333
-13	0,049%	0,912%	0,028	1,000	0,352
-12	3,967%	4,879%	2,254	1,000	1,884
-11	-0,951%	3,928%	-0,540	-1,000	1,516
-10	-0,526%	3,403%	-0,299	-1,000	1,314
-9	1,195%	4,598%	0,679	1,000	1,775
-8	-1,116%	3,482%	-0,634	-1,000	1,344
-7	4,692%	8,174%	2,666	1,000	3,155
-6	-4,523%	3,651%	-2,570	-1,000	1,409
-5	-0,706%	2,945%	-0,401	-1,000	1,137
-4	1,707%	4,653%	0,970	1,000	1,796
-3	0,831%	5,484%	0,472	1,000	2,117
-2	-0,930%	4,554%	-0,528	-1,000	1,758
-1	0,848%	5,403%	0,482	1,000	2,086
0	**-0,283%**	**5,120%**	**-0,161**	**-1,000**	**1,976**
1	-0,359%	4,761%	-0,204	-1,000	1,838
2	-0,525%	4,235%	-0,298	-1,000	1,635
3	-0,138%	4,098%	-0,078	-1,000	1,582
4	1,962%	6,060%	1,115	1,000	2,339
5	-0,511%	5,550%	-0,290	-1,000	2,142
6	0,548%	6,098%	0,311	1,000	2,354
7	1,135%	7,232%	0,645	1,000	2,792
8	-1,349%	5,883%	-0,766	-1,000	2,271
9	0,842%	6,725%	0,478	1,000	2,596
10	-0,169%	6,556%	-0,096	-1,000	2,531
11	0,489%	7,045%	0,278	1,000	2,720
12	1,362%	8,407%	0,774	1,000	3,245
13	-0,773%	7,633%	-0,439	-1,000	2,947
14	-2,225%	5,409%	-1,264	-1,000	2,088
15	-2,226%	3,183%	-1,264	-1,000	1,229
16	-0,900%	2,283%	-0,512	-1,000	0,881
17	0,911%	3,193%	0,517	1,000	1,233
18	-0,181%	3,012%	-0,103	-1,000	1,163
19	-1,032%	1,981%	-0,586	-1,000	0,765
20	4,251%	6,232%	2,415	1,000	2,406
STD.DEV	0,0176	0,0259			

H.10 Telecommunication Services

BAD NEWS TELECOMMUNICATION SERVICES

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,214%	0,214%	0,363	1,155	0,363
-19	-0,028%	-0,028%	-0,048	1,155	-0,048
-18	-0,429%	-0,429%	-0,726	-2,887	-0,726
-17	-0,252%	-0,252%	-0,427	-0,577	-0,427
-16	0,469%	0,469%	0,794	1,155	0,794
-15	-0,085%	-0,085%	-0,143	-0,577	-0,143
-14	-0,086%	-0,086%	-0,145	0,000	-0,145
-13	0,279%	0,279%	0,472	0,577	0,472
-12	0,908%	0,908%	1,538	2,309	1,538
-11	-0,507%	-0,507%	-0,858	0,000	-0,858
-10	-0,296%	-0,296%	-0,500	-1,155	-0,500
-9	0,173%	0,173%	0,292	1,155	0,292
-8	-0,190%	-0,190%	-0,321	-1,155	-0,321
-7	0,436%	0,436%	0,738	2,309	0,738
-6	-0,246%	-0,246%	-0,417	-1,155	-0,417
-5	-0,230%	-0,230%	-0,389	-0,577	-0,389
-4	-0,140%	-0,140%	-0,236	-0,577	-0,236
-3	0,111%	0,111%	0,188	1,732	0,188
-2	-0,007%	-0,007%	-0,011	1,155	-0,011
-1	0,421%	0,421%	0,713	0,577	0,713
0	**-2,939%**	**-2,939%**	**-4,976**	**-0,577**	**-4,976**
1	1,410%	1,410%	2,388	1,732	2,388
2	0,054%	0,054%	0,092	0,577	0,092
3	0,555%	0,555%	0,940	1,732	0,940
4	-0,308%	-0,308%	-0,522	-0,577	-0,522
5	0,258%	0,258%	0,436	1,155	0,436
6	-0,334%	-0,334%	-0,566	0,000	-0,566
7	-0,199%	-0,199%	-0,337	-0,577	-0,337
8	-0,219%	-0,219%	-0,371	0,000	-0,371
9	0,437%	0,437%	0,739	1,732	0,739
10	-0,114%	-0,114%	-0,193	-0,577	-0,193
11	-0,015%	-0,015%	-0,025	1,155	-0,025
12	-0,122%	-0,122%	-0,207	0,577	-0,207
13	-0,227%	-0,227%	-0,385	1,155	-0,385
14	0,038%	0,038%	0,065	0,577	0,065
15	0,077%	0,077%	0,130	0,000	0,130
16	-0,038%	-0,038%	-0,065	-0,577	-0,065
17	-0,206%	-0,206%	-0,349	-0,577	-0,349
18	-0,145%	-0,145%	-0,246	-0,577	-0,246
19	-0,092%	-0,092%	-0,156	0,577	-0,156
20	0,081%	0,081%	0,136	0,000	0,136
STD.DEV	0,0059	0,0059			

GOOD NEWS TELECOMMUNICATION SERVICES

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,807%	0,807%	0,849	1,414	0,621
-19	-2,051%	-1,244%	-2,158	-1,414	-0,957
-18	-0,477%	-1,722%	-0,502	-1,414	-1,325
-17	0,046%	-1,675%	0,049	0,000	-1,289
-16	0,339%	-1,337%	0,356	1,414	-1,028
-15	-0,320%	-1,657%	-0,337	0,000	-1,275
-14	0,440%	-1,217%	0,463	0,000	-0,936
-13	-0,955%	-2,172%	-1,005	-1,414	-1,671
-12	0,927%	-1,245%	0,975	0,000	-0,958
-11	0,773%	-0,472%	0,814	1,414	-0,363
-10	0,562%	0,090%	0,592	0,000	0,070
-9	-0,484%	-0,393%	-0,509	0,000	-0,303
-8	0,591%	0,198%	0,621	1,414	0,152
-7	0,503%	0,700%	0,529	0,000	0,539
-6	-0,197%	0,503%	-0,208	0,000	0,387
-5	-0,269%	0,234%	-0,283	0,000	0,180
-4	-0,093%	0,141%	-0,098	0,000	0,108
-3	-1,675%	-1,534%	-1,762	-1,414	-1,180
-2	1,324%	-0,210%	1,393	1,414	-0,161
-1	-0,750%	-0,959%	-0,788	-1,414	-0,738
0	**1,124%**	**0,165%**	**1,183**	**0,000**	**0,127**
1	1,358%	1,523%	1,429	1,414	1,172
2	-0,024%	1,500%	-0,025	-1,414	1,154
3	0,568%	2,068%	0,598	1,414	1,591
4	-0,376%	1,692%	-0,396	0,000	1,302
5	-1,796%	-0,104%	-1,889	-1,414	-0,080
6	-0,077%	-0,181%	-0,081	0,000	-0,139
7	1,659%	1,478%	1,745	1,414	1,137
8	0,743%	2,221%	0,781	0,000	1,708
9	-0,137%	2,083%	-0,144	0,000	1,603
10	-2,973%	-0,889%	-3,128	-1,414	-0,684
11	0,669%	-0,221%	0,703	0,000	-0,170
12	0,568%	0,347%	0,597	1,414	0,267
13	0,523%	0,870%	0,551	1,414	0,670
14	0,900%	1,770%	0,946	1,414	1,362
15	-0,327%	1,443%	-0,344	-1,414	1,110
16	-0,364%	1,078%	-0,383	0,000	0,830
17	0,159%	1,238%	0,168	0,000	0,952
18	0,819%	2,057%	0,862	1,414	1,583
19	0,220%	2,277%	0,232	1,414	1,752
20	-0,407%	1,870%	-0,428	0,000	1,439
STD.DEV	0,0095	0,0130			

NO NEWS TELECOMMUNICATION SERVICES

	AAR	CAAR	θ_{1AAR_t}	θ_{2AAR_t}	θ_{1CAAR_t}
-20	0,295%	0,295%	0,386	0,000	0,177
-19	-0,156%	0,139%	-0,204	0,000	0,084
-18	0,250%	0,390%	0,328	1,414	0,234
-17	0,386%	0,776%	0,506	0,000	0,466
-16	0,225%	1,001%	0,294	1,414	0,601
-15	-0,473%	0,527%	-0,620	-1,414	0,317
-14	0,045%	0,573%	0,059	1,414	0,344
-13	-0,446%	0,126%	-0,585	-1,414	0,076
-12	-0,792%	-0,666%	-1,037	0,000	-0,400
-11	-0,148%	-0,814%	-0,194	0,000	-0,489
-10	1,656%	0,841%	2,168	1,414	0,505
-9	0,968%	1,809%	1,268	1,414	1,087
-8	0,382%	2,192%	0,501	0,000	1,316
-7	0,025%	2,216%	0,032	0,000	1,331
-6	0,420%	2,636%	0,550	1,414	1,583
-5	-0,253%	2,383%	-0,331	-1,414	1,431
-4	0,033%	2,416%	0,043	0,000	1,451
-3	-0,307%	2,109%	-0,402	0,000	1,266
-2	0,135%	2,243%	0,176	0,000	1,347
-1	-0,734%	1,510%	-0,961	-1,414	0,906
0	**-0,016%**	**1,493%**	**-0,021**	**0,000**	**0,897**
1	1,024%	2,517%	1,341	1,414	1,512
2	-0,238%	2,279%	-0,312	0,000	1,369
3	1,113%	3,392%	1,457	1,414	2,037
4	0,111%	3,503%	0,145	1,414	2,103
5	-0,453%	3,049%	-0,594	0,000	1,831
6	-2,355%	0,695%	-3,084	-1,414	0,417
7	0,737%	1,432%	0,966	1,414	0,860
8	0,524%	1,956%	0,687	1,414	1,175
9	-0,024%	1,932%	-0,031	0,000	1,160
10	-0,747%	1,185%	-0,979	-1,414	0,712
11	0,241%	1,426%	0,316	0,000	0,856
12	-2,561%	-1,135%	-3,354	-1,414	-0,682
13	-0,486%	-1,622%	-0,637	-1,414	-0,974
14	-0,327%	-1,949%	-0,429	-1,414	-1,170
15	-0,151%	-2,100%	-0,198	0,000	-1,261
16	0,505%	-1,595%	0,662	1,414	-0,958
17	-0,030%	-1,625%	-0,039	0,000	-0,976
18	0,088%	-1,537%	0,115	0,000	-0,923
19	-0,099%	-1,635%	-0,129	0,000	-0,982
20	-0,744%	-2,379%	-0,975	0,000	-1,429
STD.DEV	0,0076	0,0167			