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Abstract

This thesis is an event study concerning earnings announcements in the Norwegian stock market, during the time period of 2007-2010. The study serves as a method of testing the efficiency of the Norwegian capital market, originating from the efficient market hypothesis. Several studies have confirmed a high degree of efficiency in capital markets, but some have also detected delayed stock-price responses to new value-altering information; a phenomenon referred to as the *post-earnings-announcement drift.* The methodology applied in this thesis first estimates the expected earnings via a time-series model, before estimating the event's abnormal returns by a market model. In this way the amount of information conveyed by earnings announcements can be determined, along with whether or not there are opportunities for earning abnormal stock returns associated with an event. My main result is that the Norwegian market appears to be largely efficient, with a couple of minor deviations. Earnings announcements that differ from expectations are confirmed to cause abnormal returns, but I find that the negative earnings surprises yield results easiest to interpret. I also detect indications that the speed of response to earnings news can be related to trading frequency and state of the economy. I do not, however, find any evidence of a post-earnings-announcement drift in my data.

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Preface

This thesis concludes my two-year graduate studies work in the area of applied finance, during which I have gained knowledge in numerous interesting aspects of the field. Topics range from pricing theories to macroeconomic factors affecting capital markets to behavioral finance issues, and so on. In position to decide on a topic for my master thesis, I had to review my previous courses to search for a specific field of interest in which I would immerse myself for the remaining time of my degree. One of the theoretic aspects that attracted me was the efficient market hypothesis. It seemed to me puzzling that if the markets are as efficient as predicted by this concept, why do so many individuals devote extensive time and money researching companies to discover underpriced securities? That is the reason I decided to design a research project that would indicate the strength of the efficient market hypothesis, by the use of Norwegian data. Specifically, I decided to perform an *event study* on earnings announcements and surprises; a very applicable method for testing market efficiency.

Before I shall proceed, I would like to thank my advisor, Bernt Arne Ødegaard, for the supply of both data and useful advice along the way. This process has involved a long time of analyzing a heavy load of data, necessarily demanding a great amount of time. But the study has certainly been interesting and educational. This is the largest school project I have single-handedly completed, and I hope the resulting paper offers the reader some intriguing insights.

1 Introduction

The *efficient market hypothesis* has existed in the finance literature since the 1960s, as the concept was proposed and developed by Eugene Fama. Since then, the hypothesis has been widely tested, yielding results both to its favor and disfavor. Certainly, the idea might be perceived as "pessimistic" to individuals who earn their living searching for underpriced securities with the intention to earn profits higher than the rest of the market. If the efficient market hypothesis holds, then any individual would be better off just holding a portfolio of an approximation of the market (e.g. an index portfolio) than costly information searching in securities. Obviously, the prospect of earning an abnormal return in stock investments is an attractive aspect of spending time researching these markets. This is probably a key reason for the heavy research activity regarding market efficiency. Investors would be interested in learning the extent to which their time spent searching for mispriced securities is profitable – if everyone could earn the same return just by indexing the market, then active portfolio management would plainly be a waste of time and money. As I will later explain in more detail, the underlying essence of the efficient market hypothesis is that "if there is an abnormal return to be earned, someone else has already exploited the opportunity".

Extensive research has been performed on the subject "market efficiency", mostly in the United States. The most important literature will be reviewed in chapter 3; spanning over nearly fifty years of researching efficiency in capital markets. The purpose of this paper is to examine whether the results that have been documented in the U.S. also apply to the Norwegian stock market. The Norwegian market differs from the American one (as well as other large, well-developed capital markets such as the Japanese and British stock markets) in more than one way. There could be a possibility that the well-documented efficiency in the U.S. capital market does not appear with the same conviction in a much smaller market like Norway. In this way, my research is an investigation of the universality of this phenomenon.

To "examine the capital market efficiency" is needless to say a vague formulation of a research problem. In order to test the hypothesis, it is often useful to examine the effects of a specific event that is believed to convey price-altering information to the capital market. Such an analysis is referred to as en *event study*; a heavily applied research method for testing market efficiency. Many types of events can be studied, such as announcements of mergers, dividend payouts and earnings. This paper will study *earnings announcements* as a means for

examining the efficiency of the Norwegian capital market. All listed companies are required to disclose quarterly earnings reports to the public; creating a huge number of individual events to study. It would be more problematic to study e.g. merger announcements, since there are only a few of these happening each year in a small market such as Norway. But with nearly 200 listed companies of varying size on the Oslo Stock Exchange, each announcing quarterly earnings; the events available for investigation are numerous. Event studies have been performed to a great extent. One puzzling empirical finding related to earnings announcements, is that stock prices of companies that have experienced a positive (negative) earnings surprise tend to drift upward (downward) for a long period after the announcement. This phenomenon is referred to as the "post-earnings-announcement drift". If capital markets are efficient, the earnings surprise should be incorporated almost immediately in stock prices, due to the many individuals watching over the market and making quick decisions; resulting in the stock's new "fair value" to be achieved very quickly after the announcement. This prediction has been contradicted by research in U.S. capital markets, but does the same phenomenon appear in the Norwegian market? This paper will examine whether the market is able to efficiently incorporate news, or if the earnings response is partly delayed, possibly creating a drift. We will find out which is stronger as I perform *my* investigation of earnings announcements' effect on stock returns and the post-earnings announcement drift.

In addition to studying inefficiencies and the presence of opportunities to earn abnormal stock returns, earnings-announcement event studies also seek to examine the *information content* of quarterly or annual earnings. The regulative organs in accounting intend to set standards that make sure there is real information content in financial reports. Event studying hereby is a very useful method of examining the information that is conveyed by financial disclosures (MacKinlay, 1997); in how the market participants react to new information. Hence, the importance of performing an event study of earnings announcements is both due to documenting market efficiency/inefficiency, and to map the informative value of a specific type of information disclosure, e.g. earnings announcements.

One specific aspect that is worth investigating more closely is whether the effects of earnings news differ according to the state of the economy. During the recent years, we have witnessed enormous transformations. The Norwegian stock market reached all-time highs in the former half of 2008, before the financial crisis led to worldwide market crashes. Currently, the Norwegian stock indices are climbing their way back towards the top. With these fluctuations

throughout the sample period, I intend to devote some attention to examining how the varying state of the economy affects the results. Figure 1.1 illustrates the fluctuations of the Oslo Stock Exchange's All-Share Index (OSEAX) during the years 2007 to 2010.

Figure 1.1. The Norwegian stock market's fluctuations during recent years, illustrated by the OSEAX index, January 2007 through December 2010

The thesis will proceed as follows: first, in chapter 2 I will review the most important previous research in the field of capital market efficiency, with emphasis on earnings-announcement event studies. Chapter 3 will present the choice of empirical methods for the study, including time-series models for estimating expected earnings and methodology for event studies. In chapter 4, I will describe the data included in the analysis. Chapter 5 will present the results from the study; determining whether there is evidence of a post-earnings announcement drift in the Norwegian stock market, along with other results provided by the analysis.

2 Background and Literature Review

2.1 The Efficient Market Hypothesis

2.1.1 Introduction to the Efficient Market Hypothesis

Credit for a preliminary definition of the expression *efficient market* can be given to Eugene Fama (1965):

> "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 values" (p. 90)

Fama, the acknowledged developer behind the efficient market hypothesis, has written several important papers on the subject. His 1970 paper reviewing theory and empirical work in support of the hypothesis, provides a more simply formulated and still well-recognized definition of an efficient market: "A market in which prices always "fully reflect" all available information is called "efficient" " (p. 383). How does one define a market that "fully reflects all available information"? This basic definition of the efficient market can be further extended into three definable categories: weak form, semi-strong form and strong-form efficiency. The weak form of capital market efficiency states that prices reflect all historic price information. Fama (1970) justifies that the weak-form efficient market hypothesis has been extensively confirmed. Attention in the 1970s was then devoted to testing the semi-strong form; in which prices reflect all *publicly* available information. Finally, strong-form efficiency is defined as having absolutely all information, including insider information, reflected in security prices. As Fama states, this would mean that company insiders (such as managers) are able to take advantage of currently undisclosed information to which they have exclusive access.

Fama (1970) concludes that "the evidence in support of the efficient markets model is extensive, and (…) contradictory evidence is sparse" (p. 416). At the same time, he also notes that real-world market frictions such as 1) transaction costs, 2) various degrees of information availability among investors and 3) diverse opinions of how specific information influences value can be potential, though not necessary, sources of market inefficiency.

2.1.2 Anomalies: Capital Market Inefficiency?

2.1.2.1 Introduction

Though reasonably supported in early empirical work (for example as noted in Fama, 1970 and 1991), puzzling anomalies have been documented in later work that contradicts the efficient market hypothesis. I will only review this part of the literature very briefly, since my paper will not focus on these anomalies, but I will display them in order to show that there have been documented contradictions to the efficient market hypothesis that argue against accepting the concept naively.

2.1.2.2 The Size Effect

Studies (beginning with Banz, 1981, and Reinganum, 1981) have shown that small-capitalization firms earn higher returns than predicted by the Capital Asset Pricing Model (CAPM) (developed by Sharpe, 1964, and Lintner, 1965), also known as the *size effect*. But Schwert (2002) states that the anomaly has disappeared since these papers were published. He also points out that this could be due to decreasing distance between risk premiums of small and large capitalization stocks.

2.1.2.3 The Turn-of-the-Year Effect

There has also been evidence that the small-firm effect mainly occurs in January, giving rise to an anomaly referred to as *the turn-of-the-year effect*, or *the small-firm-in-January effect* (Keim, 1983, Reinganum, 1983). The effect is according to Scwert (2002) "still reliably positive" (p. 9), even though it has experienced a slight decrease since its first discovery.

2.1.2.4. The Value Effect

Research has shown that so-called value firms, with high earnings relative to price, earn higher returns than predicted by the CAPM (e.g. Basu, 1977). This effect can also be applied to high D/P (dividend-to-price) or B/M (book-to-market) ratios. But these effects are rather likely to be caused by the CAPM being a model unable to fully capture security risk than the market being inefficient, as observed by Ball (1978).

2.1.2.5 The Three-Factor Model

Fama and French (1993) later developed an extended CAPM as a possible solution for its failure-to-account-for-risk problem. Their three-factor model added two factors to the traditional CAPM market beta: a size factor (market capitalization) and a value factor (book-to-market ratio). They associate the low book-to-market ratio stocks (growth stocks) with the largest deviation for their three-factor model; still they find that portfolios grouped into market capitalization, book-to-market ratio, dividend yield and earnings-to-price ratio do not yield abnormal returns significantly different from zero when using the three-factor model.

These are a few examples that demonstrate that the efficient market hypothesis to a certain extent can be rejected in semi-strong form, giving reason to believe that there are opportunities in the stock market to earn above-normal returns. But as I will present in a bit, solid evidence has also been documented in favor of the hypothesis.

2.2 Event Studies

2.2.1 Introduction

Event studies are the cleanest evidence we have on efficiency

Fama, 1991, p. 1602

In earlier empirical work, an event study is referred to as a semi-strong-form test of market efficiency (e.g. Fama, 1970). Similar to the study at hand, these tests were focusing on one particular event, and examining the stock-price adjustment to the new public information. Over the years numerous researchers have performed event studies, whether the topic of interest were stock splits, dividend announcements or quarterly earnings. Kothari and Warner (2006) note that there were over 500 published event studies. They also state that "the basic statistical format of event studies has not changed over time" (p. 7), and that the intention of event studies is still to measure mean and cumulative abnormal returns of the securities in the sample, induced by an event. The abnormal return can be defined as "(…) the (unexpected) change in security holder wealth associated with the event" (Kothari and Warner, 2006, p. 10). In an event study, the researcher hypothesizes that markets adjust to new information immediately; hence "markets are informationally efficient" (Kothari, 2001, p. 116).

2.2.2. Long-Horizon and Short-Window Event Studies

Kothari (2001) specifies a long-horizon event study as a measurement of abnormal returns for the one to five years following an event. Long-horizon studies are subject to troubling factors such as data problems and misleading estimations of risk. This paper will not focus on long-horizon event studies, since the study is concerned with short-period returns induced by an event. By Kothari's definition, short-window event studies can be characterized as studies estimating the abnormal returns up until one year from the event date.

2.2.3 Introduction to Event Study Methodology

When testing for market efficiency, the researcher must always use a model of "normal returns" – the tests are jointly testing market efficiency and the asset-pricing model. As Fama (1991) notes, this creates a joint-hypothesis problem with the consequence that conclusions about market inefficiency cannot be accepted naively without acknowledging a potential model misspecification's effect on the results. One way to possibly minimize this problem is to use daily data in event studies, allowing a precise measure of how quickly the stock price responds (Fama, 1991). Brown and Warner (1985) find that when the stock price response to a given event is large and mainly occurs over a few days, the method for estimating abnormal returns is of little significance. The average annual return on stocks is about 10%, constituting an average daily return of only 0.04%. Using e.g. monthly returns would cause the joint-hypothesis problem to be far more serious.

The transition from using mainly monthly returns to daily or intraday returns is one of the methodological changes in event studies through time since the early publications (Kothari and Warner, 2006). Also, the procedures for performing long-horizon event studies have evolved into more sophisticated ones, resulting from new findings in the 1990s on "the statistical properties of long-horizon security returns" (Kothari and Warner, p. 8).

Event study methodology will be reviewed more thoroughly in section 3.2, along with the reasoning for the particular choice of research methods for this purpose. The next section will review some of the earlier research on earnings announcements applying event study methodology.

2.3 Research on the Information Content of Earnings

2.3.1 Introduction

Kothari (2001) defines firm value in an efficient market as "the present value of expected future net cash flows, discounted at the appropriate risk-adjusted rate of return" (p. 108-109). Hence, if earnings announcements have informational value about higher/lower future earnings, it should be reflected immediately in security prices. A company releasing higher-than-expected earnings will be anticipated by the market to increase earnings in the future, and thereby experiencing a jump in the value of the company's stock. But how much information content is there really in earnings, and how well is the market able to incorporate it?

2.3.2 Earnings Predictability

First, a few empirical results concerning the behavior of earnings, and the extent to which they are predictable, will be emphasized. In pioneering earnings research, Ball and Brown (1968) find that more than half of all the information that flows to the market about a firm during the year is captured in that year's income number. The authors also point out that the market's expectation of a firm's annual earnings can be derived from regressing a given firm's change in income on the average change in income for all the firms in the market. This points to the fact that economy-wide effects explain a large fraction of the change in a firm's earnings. Similarly, as Kothari (2001) explains, earnings changes from one period to the next are not unpredictable from a market perspective, since the information set reflected in prices contains information about future earnings changes. In this manner, only a portion of the earnings change is a surprise to the market. He also points out that "in an efficient market, the anticipated portion of the earnings change is irrelevant in explaining contemporaneous returns" (p 130).

2.3.2.1 The Time-Series Properties of Earnings

Several studies have shown that seasonally differenced quarterly earnings are positively correlated from one quarter to the next, and that changes in adjacent quarterly earnings are related. Some of these include Watts (1975) (referred to in Foster, 1977), Griffin (1977), Foster (1977) and Freeman and Tse (1989). Foster finds that annual earnings can be described by a submartingale process (in which next period's expected earnings are equal to or greater than this period's earnings), but quarterly earnings do not follow this process. Quarterly earnings series appear in Foster's paper to have both a seasonal *and* an adjacent-quarter component. The detected time-series properties of earnings are of special interest for this particular study, making it feasible to estimate expected earnings without having access to analyst forecasts.

Research by Bernard and Thomas (1989) indicates that the market fails to adequately revise its expectation of future earnings as current earnings deviate from expectations. Following up, Bernard and Thomas (1990) document evidence that stock prices partly reflect a naïve earnings expectation, meaning that future earnings are expected to equal the earnings in the comparable quarter the preceding year. But as pointed out, quarterly earnings have been documented to behave differently, with a positively correlated seasonal component. For example, if earnings in the third quarter of 2010 exceed the earnings in the third quarter of 2009, the efficient market builds up an expectation of earnings in the fourth quarter of 2010 higher than otherwise. If the market succeeds to fully incorporate the implications of last quarter's earnings, the mean reaction to this quarter's earnings should be zero. Along with Rendleman et al (1987) (referred to in Kothari, 2001) and Freeman and Tse (1989), Bernard and Thomas' (1989, 1990) study indicates that the market behaves as though quarterly earnings follow a random-walk process (like annual earnings), and fails to fully recognize the seasonal time-series properties. However, Brown and Han (2000) detect this phenomenon only in smaller firms, where investors are relatively unsophisticated. The implication is that for large, heavily traded firms which are constantly monitored by numerous high-skilled analysts, the market expectation of quarterly earnings are likely to be aligned with the detected time-series properties of quarterly data.

2.3.3 Previous Research on Earnings and Returns

This section summarizes important research on earnings announcements and their informational value. Both Beaver (1968) and May (1971) conclude that earnings announcements (including the days around which they occur) are associated with much larger price changes than on average (during periods without any financial reporting). These results support the view that earnings announcements carry information that affects firm value.

It also appears that the earnings information's characteristics influence the market reaction. Transitory earnings, for instance, represent in several cases the main component of large earnings surprises. Beaver et al (1979) proved that abnormal returns associated with extreme earnings changes (as a result of transitory earnings) are not as large as those associated with non-extreme earnings changes. These results can be interpreted as the market not expecting these extreme changes to persist, thereby inducing a smaller price response. Another factor that diversifies the responses to different firms' earnings is market capitalization. Related to the small-firm anomaly from section 2.1.2.2, Chambers and Penman (1984), as well as their reference Atiase (1980), find that the price reactions to small firms' earnings appear to be larger than to those of large firms. The sign of the earnings surprise also seems to be a determinant factor, as in Chambers and Penman's study. They find that the price variability on the days following a significant price-affecting earnings surprise is larger if the earnings number was perceived as "bad news" than "good news".

When studying price responses to earnings news, it is important to be aware of their implications for return variance. An increase in variance around earnings announcements was preliminarily documented by Beaver (1968). Ball and Kothari (1991) recognize that this leads to increasing required or expected returns. In their study of earnings announcements, they estimate a separate beta for each day of the event period, constituting a CAPM expected return for each day. But even after controlling for risk variation, their evidence concludes that stocks experience abnormal returns on the event day; this being most apparent for small firms.

Some studies have focused on examining whether the informational value of earnings has declined since the studies of the 1960s and 1970s. Studies like Landsman and Maydew (1999) and Buchheit and Kohlbeck (2002), as well as their reference study Kross and Kim (1999),

find no evidence that the information content in earnings has declined since the pioneering studies in the field. These studies actually find an increase over time with respect to information content. Buchheit and Kohlbeck's results also document an upward trend in the amount of information analysts and investors draw from earnings announcements, but the authors point out "the results do not imply that earnings announcements have become increasingly useful over time" (p. 152). Nonetheless, the evidence proving that earnings still have informational value implies that even today it should be possible to discover abnormal returns associated with earnings surprises, similar to the pioneering studies in the 1960s and 1970s.

As reviewed above, several studies have documented a positive relation between earnings announcements, security price movements and return variability, implying that earnings do in fact convey information to the capital market about firm value. This is a good starting point for an analysis seeking to examine market efficiency – if the news contain informational value, how quickly is the market able to incorporate it? An efficient market predicts immediate price reaction to new information, where "(…) subsequent price movement is expected to be unrelated to the event-period reaction or its prior return" (Kothari, 2001, p. 187). Kothari states that substantial evidence from short-window event studies confirms that capital markets are very efficient, with the ability to quickly incorporate news into prices. In fact, Lee (1992) documents that the price reaction to earnings majorly occurs within 30 minutes of the earnings being released to the public, by finding statistically significant reaction immediately, and then none after. However, some studies have documented contradictions to the efficiency evidence from the general portion of short-window event studies. These studies will be reviewed in section 2.4.

2.3.4 Some Results from Other Countries

While the great majority of the research in the field of earnings announcements has been performed using data from U.S. firms, I was able to find a couple of studies investigating other countries. Annaert et al (2002) use Belgian (semi-annual) stock market data, and find, consistent with most U.S. studies, that both good and bad earnings news cause significant average abnormal returns for the firm's stock on the announcement day. They also find a significant difference between above- and below-expectations news. Similarly, Pellicer and

Rees (1999) examine the market's reaction to earnings announcements in Spain, and also find a relation between earnings announcements and abnormal volatility, a presence of positive abnormal returns, and increasing betas around announcements. Because Spain does not have the long experience of applying the accounting and security market practices consistent with those in the U.K. and the U.S., the authors suspect that the relation between accounting numbers and security prices might be different from what has been previously documented by U.S. research. But they do indeed find that earnings announcements are followed by positive returns, and that both expected and unexpected earnings cause abnormal returns, although the latter is "mainly driven by the results for the smaller firms in the sample" (p. 604).

These are only two studies using data from nationalities other than the U.S., but they both yield results similar to the previously reviewed literature. The findings indicate that abnormal event-related returns exist on a universal level, not only limited to the large, highly developed U.S. market. My study acts as a further extension of investigating the relation between earnings announcements and security returns, using data from other national markets.

2.4 The Post-Earnings-Announcement Drift

2.4.1 Introduction

Some special attention will be devoted to the anomaly known as the *post-earnings-announcement drift,* referred to by Shivakumar (2007) as the "longest standing anomaly in the finance and accounting literature" (p. 434). Such an anomaly represents a contradiction to the efficient market hypothesis. The drift implies market under-reaction to earnings news, meaning that the information is not immediately reflected in prices with its full implication for firm value, and that prices need some time to completely adjust. The drift has been widely documented, since its discovery by Ball and Brown (1968). Some of the follow-up supporting studies include Brown and Kennelly (1972), Watts (1978), Foster, Olsen and Shevlin (1984), Mendenhall (1991) and Ball and Bartov (1996).

2.4.2 Previous Research

Ball and Brown (1968) established that security prices do not always immediately reflect the new earnings information – firms experiencing a positive (negative) earnings surprise have been documented to experience a drift in estimated cumulative abnormal returns upward (downward) for some time after the event day. Brown and Han (2000) have however detected a certain asymmetry to the drift, in that the drift seems to follow positive, and not negative, earnings surprises.

Bernard and Thomas (1989) propose two possible reasons for the post-earnings-announcement drift: first, there is the possibility that a part of the price response to new information is delayed, due to failure to assimilate available information, or to cost exceeding gains of immediately exploiting this information for a large number of traders. Second, when the drift has been observed in research where the normal returns are estimated with the CAPM, studies have shown that the model fails to properly adjust the securities for risk (e.g. Ball, Kothari and Watts, 1993, and Foster, Olsen and Shevlin, 1984). Ball, Kothari and Watts solve this problem by allowing beta to shift annually, and find the post-earnings-announcement drift to be no longer significant (similar to how Ball and Kothari (1991) solved the risk-adjustment problem as reviewed in section 2.3.3). Foster, Olsen and Shevlin's study shows an inverse relationship between firm size and the absolute magnitude of the drift. Bernard and Thomas' results support this finding. They also find that much of the drift is in fact concentrated around next quarter's earnings announcement, which suggests that the market does not fully recognize the implication of current earnings for future earnings, in line with the discussion of the time-series properties of earnings in section 2.3.2.1.

In section 2.1.2, some documented anomalies in contradiction to the efficient market hypothesis were briefly introduced. Questions have been raised about whether the post-earnings-announcement drift exists independently of these other anomalies, such as the size effect and the book-to-market effect in Fama and French's (1993) three-factor model. Kraft (1999) (referred to in Kothari, 2001) finds that the drift is not integrated in the other anomalies, while Fama and French (1996) find evidence implying that the post-earnings-announcement drift could possibly be explained by their three-factor model.

But what are the implications of the post-earnings-announcement drift for securities trading? Kothari states,

> "The post-earnings announcement drift appears to be incremental to a long list of anomalies that are inconsistent with the joint hypothesis of market efficiency and an equilibrium asset-pricing model" (p. 196).

He also notes, "fundamental analysis can yield a rich return in an inefficient market" (p. 208) because of all the empirical evidence supporting the suspicion about capital markets being informationally inefficient. A few years later, Shivakumar (2007) pointed out that a trading strategy utilizing the post-earnings-announcement drift is still profitable, nearly forty years after it first realization. A study by Francis, LaFond, Olsson and Schipper (2007) confirms that information uncertainty is one reason why the market might under-/overreact to earnings surprises. They suggest that since information uncertainty is tightly bound to accounting quality, less restrictive accounting standards in a country will lead to greater post-earnings-announcement drift.

2.4.3 A Few Remarks

It can seem astonishing that the post-earnings-announcement drift has been so well documented as a profitable strategy since its discovery more than forty years ago. As I have pointed out, it can exist because of information uncertainty, real-world frictions and the market's failure to revise its expectations of future earnings from current earnings surprises. On the other hand, several short-window event studies have concluded to confirm capital market efficiency. It will be interesting to see if I am able to detect signs of a post-earnings-announcement drift in the Norwegian stock market, or if the results are able to confirm an efficient market in Norway. But before I can begin presenting my results, I will discuss the rationale for my specific choice of models in both time-series estimation and the estimation of abnormal returns due to earnings surprises. This will be the topic for chapter three.

3 Empirical Methods

3.1 Time-Series Models for Estimating Expected Earnings

3.1.1 Introduction

The research of Griffin (1977) and Foster (1977), as well as Foster's reference Watts (1975), provided early evidence of the time-series properties of quarterly earnings. A mutual result is that quarterly series can be described as a combination of 1) movement from one quarter to the next, and 2) the seasonal quarter-by-quarter movement over time. Brown and Rozeff (1979) propose an ARIMA model (autoregressive integrated moving average), with the disadvantage that estimation requires the Box-Jenkins ARIMA software (as referred to in Foster, 1977). Foster proposes a simpler model that can be applied without the software. The Foster model has been shown to perform just as well as more complex models (Kothari, 2001).

3.1.2 Time-Series Models

To extend the discussion of the behavior of quarterly earnings in section 2.3.2.1, I will show this concept more formally. Foster (1977) presents two basic models for forecasting expected quarter t-earnings, originally developed by Brown and Kennelly (1972), and referred to as "naïve models":

Model 1: $E(Q_t) = Q_{t-4}$ Model 2: $E(Q_t) = Q_{t-4} + \delta$

The distinction between the models lies in model 2 incorporating drift term; δ. The drift term in this application means the average quarterly change for the given quarter (1,2,3 or 4) in the time series. In application of the model, Beaver (1974) (referred to in Foster, 1977) finds indications of first-order autocorrelation, meaning that there is some pattern in the past series that forecasting future values so far fails to take advantage of. These findings are related to the discovery that quarterly time-series are not independent, as discussed in section 2.3.2.1. Foster extends model 2 to incorporate a first-order autocorrelation term:

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

The model can be estimated via an auto-regression of the first order, (an A.R. (1) model), where the drift term represents a constant, and ϕ_1 the first-order autoregressive coefficient. According to Foster, models that include a drift term are generally superior in forecasting compared to models excluding the drift term. One example of a study on earnings announcements applying the model is Bernard and Thomas (1989). However, as Foster also expresses, a disadvantage of this simple model is that one cannot know that the A.R. (1) process applies to all firms. One way of solving this issue is to estimate the autoregressive process of each individual firm, by use of the Box-Jenkins methodology (as referred to in Foster, 1977). Fitting the seasonal time-series to each individual firm's autocorrelation process is likely to yield greater forecast accuracy, but for the purpose of this study, I choose to estimate expected earnings using a simpler model – the A.R. (1) model shown above. Estimating a model for each individual firm will be extensively time-consuming, as well as demanding greater amounts of data (for example, a third order auto-regression requires earnings data for each quarter t, t-4, t-8 and back to t-12). In addition, my purpose of use for the time-series model is to obtain an estimate of the *market's* expectations of earnings, not to forecast earnings per se, so a simple model like the A.R. (1) model seems appropriate. Besides being simple to estimate, the first-order model takes into account both the quarterly component, and the adjacent-quarter component, which will produce an estimate of expected earnings that most likely is applicable for this specific purpose.

3.1.3 Analyst Forecasts vs. Time-Series Models

Many U.S. studies have examined the forecast accuracy of analysts versus time-series models, and evidence has been detected in favor of both, e.g. Brown and Rozeff (1979) and Collins and Hopwood (1980) for analysts, and Imhoff and Paré (1982) and O'Brien (1988) (the latter referred to in Kothari, 2001) for time-series forecasting. Kothari (2001) makes an important point that consensus analyst forecasts are a better proxy for market expectations of earnings. The problem for this study, however, is that consensus analyst forecasts are not readily available in Norway (unless you have access to news databases such as I/B/E/S or SME Direkt). For that reason, I choose to conduct my study using Foster's (1977) auto-regressive model for estimating expected quarterly earnings. The model is well validated to yield good forecasts, while still remaining a comparatively simple model relative to the Box-Jenkins ARIMA-models, that would require additional software.

3.2 Event Study Methodology

3.2.1 Introduction

In this section, methodology for conducting an event study will be reviewed, with the intention to detect abnormal returns associated with earnings announcements. As mentioned in section 2.2.3, the general procedure for conducting an event study has not drastically changed since the pioneering studies in the late 1960s, except for a few improvements. There is "a general flow of analysis" (MacKinlay, 1997, p. 14), although there is no required point-by-point list to finalize. In section 2.2.3, event study methodology was briefly introduced, so the background and development of event studies will be no further emphasized. The main intention is to measure abnormal stock returns associated with an event, which in this case is earnings announcements for various firms. This methodological review will begin with discussing models for measuring a stock's "normal" returns that would be predicted in absence of the event, following up with defining, and describing methodology for measuring, abnormal returns. Lastly, the procedure for calculating the *cumulative abnormal return,* which is the aggregated abnormal return for the specific event across time and securities, will be defined. This analysis follows the methodology described in MacKinlay (1997) as the standard blueprint for event studies.

3.2.2 Models of Normal Returns

MacKinlay describes two categories of models: statistical and economic models. The distinction lies in statistical models using assumptions from statistics and economic models from investor behavior in modeling expected returns (but it is required that statistical assumptions are added to the economic models in order to use them in practice). Statistical models impose the assumptions that "asset returns are jointly multivariate normal and independently and identically distributed" (MacKinlay p. 17), which the author defines sufficient for the constant mean return model and the market model, seldom causing problems.

3.2.2.1 Statistical Models

The simplest model, the *Constant Mean Return Model,* uses a constant-return parameter and a disturbance term (with expected value of zero) to define a stock's normal return. The *Market Model* uses the return on the broad market to define firms' expected returns, and will be described in more detail below. The market model can also be extended to *multifactor models*, adding other factors besides the market return to explain security returns, but these models have shown little increases in explanatory power over the plain market model (MacKinlay).

3.2.2.2 Economic Models

The Capital Asset Pricing Model (CAPM) is probably the best-known asset return model among students of finance. The model needs little introduction, but the essence lies in relating individual security returns to its covariance with the market. As noted in section 2.3.3, correctly estimating risk (beta) with the CAPM can be problematic. Another economic model is grounded in the *Arbitrage Pricing Theory (APT)*, where the normal return for a security is estimated with various explanatory risk factors. But research has shown that the market factor has the heaviest power in explaining expected returns, hence the APT does not offer important benefits relative to the market model (Brown and Weinstein, 1985).

3.2.2.3 The Market Model

The discussion so far has pointed in favor of the market model as the most beneficial model for estimating normal returns. The market model, relating individual security returns to the market return, has shown to have high explanatory power. The model can be expressed as:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \qquad E(\varepsilon_{it} = 0) \qquad \text{var}(\varepsilon_{it}) = \sigma_\varepsilon^2$$

The equation explains security i's return in period t, where the constant parameter α_i and the parameter β_i for the market return variable (R_{mt}) are estimated econometrically for each individual security. The security return also includes an error term, with expectation zero. Before estimating this model for each firm, the *estimation window* needs to be defined. MacKinlay, for example, uses the 250 trading days before the *event window* (the time period over which one measures abnormal returns related to an event). The closest approximation for "the return on the market portfolio" is a broad stock market index, e.g. the S&P 500 in the United States. After collecting data on both the return on the individual stock and the return

on the market index across the estimation window, the market model is estimated by OLS methodology for each sample firm. Then the abnormal returns for each security can be estimated as the residual terms – the deviation between the actual return and the return predicted by the market model, for each event window day. MacKinlay states that the benefit of choosing the market model over the constant mean return model is that the market model eliminates the part of the return that stems from the variance in the market return. In this way, the abnormal return obtains less variance, consequently creating easier access to detecting event effects. Exactly how beneficial the specific market model turns out depends on the model's R^2 – a higher R^2 means greater advantages from using the market model (relative to the constant mean return model).

3.2.3 Abnormal Returns

MacKinlay defines an abnormal return as "the actual ex post return of the security over the event window minus the normal return of the firm over the event window" (p. 15). After estimating the normal return using the market model (or one of the alternative models in section 3.2.2), abnormal returns for security i and event date τ is defined as:

$$AR_{i\tau} = R_{i\tau} - E(R_{i\tau} \mid X_{\tau})$$

The term X_{τ} represents the information the model for estimating normal returns is conditioning upon. Using the market model, the conditional variance of abnormal returns is defined as:

$$\sigma^2(AR_{i\tau}) = \sigma^2_{\varepsilon_i} + \frac{1}{L_1}\left[1 + \frac{(R_{m\tau} - \hat{\mu}_m)^2}{\hat{\sigma}^2_m}\right].$$

L_1 represents the length of the estimation window, and as L_1 becomes large, the second term moves towards zero and the conditional variance of abnormal returns can be approximated by the first term, which is the squared standard error of regression for each market model. By choosing a sufficiently long estimation window, estimating the variance of abnormal returns required to test the null hypothesis becomes unproblematic.

Before estimating abnormal returns, one needs to define the length of the event window. The event (e.g. earnings announcements) may be easily definable in time as one particular day, but it is often of interest to measure how stock returns behave during the days before and after the event. Then the researcher will be able to capture if the market participants assemble information before the announcement (MacKinlay), and if there is a quick versus a delayed price response (related to a post-earnings-announcement drift). MacKinlay's example on earnings announcements applies an event window of 41 days, including the announcement date and the 20 trading days both before and after this date. This constitutes a short-window event study, as reviewed in section 2.2.2. Hence, the problematic aspects of long-horizon studies as discussed in that section are not relevant for this type of study. First, the difficulties of properly adjusting expected returns for risk do not apply in the same way in a short-window study as a long-horizon study. Second, given that daily data is being used, the average daily return on stocks is nearly zero, so that any return that deviates remarkably from the market return can be easily detected as an abnormal return. With these arguments, I conclude that the market model's estimated abnormal returns are likely to be valid.

3.2.4 Cumulative Abnormal Returns

Observing a long line of abnormal returns for an individual firm does not say much about the event of interest. Therefore, the abnormal returns must be aggregated across time for each event firm. This produces the security's *cumulative abnormal return* (CAR). If the dates T_1 and T_2 represent the last day of the estimation window and the event window respectively, CAR is calculated from date τ_1 to date τ_2, where $T_1 < \tau_1 \leq \tau_2 \leq T_2$, in MacKinlay's (1997) notation. Then CAR for security *i* across the event window is defined by the following equation:

$$CAR_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AR_{i\tau}.$$

In order to infer conclusions about the earnings announcement's event effects, it is also necessary to aggregate across securities. A proposed method of detecting the cumulative abnormal returns associated with an event can be done in four steps. First, three types of earnings announcement events are defined (as in MacKinlay, 1997): "good news" (where actual earnings exceed forecast by 2.5% or more), "bad news" (where actual earnings fall below 2.5% of forecast) and "no news" (where the announced earnings are within 2.5% of

forecast). However, for the purpose of this study, close to none of the earnings announcements are within 2.5% of forecast, even within 5% there are very few occurrences. For that reason, a no-surprise event is defined as an earnings number within 10% or forecast. (When using EPS data, a 10% deviation is still very close to the forecasted value, since EPS numbers are generally small compared to measures of net earnings etc.). When companies are categorized, CAR across firms in each category can be calculated in order to detect conclusive results about positive, negative or non-existent earnings surprises' effects on security returns. When the securities are assigned to categories, the second step is to calculate the sample abnormal return in each category, for each of the 41 days in the event period. In this study, I calculate these sample abnormal returns on a quarter-by-quarter basis before aggregating across the entire sample. The sample abnormal return for period τ, $\tau = T_1 + 1, \ldots, T_2$, is defined as:

$$\overline{AR}_\tau = \frac{1}{N}\sum_{i=1}^{N} AR_{i\tau}$$

The sample variance of the abnormal returns can be calculated in the following manner:

$$\text{var}(\overline{AR}_\tau) = \frac{1}{N^2}\sum_{i=1}^{N} \sigma_{\varepsilon_i}^2.$$

The term σ_ε^2 is the squared standard error of the market model regression for each firm. The variance formula requires however that the number of days in the estimation period is large.

Step three is to aggregate the sample abnormal returns for each quarterly announcement period into one sample abnormal return for each event day across all the sample quarters, for the three news categories. Then, the fourth step is to calculate the cumulative abnormal return for each category:

$$\overline{CAR}(\tau_1,\tau_2) = \sum_{\tau=\tau_1}^{\tau_2} \overline{AR}_\tau,$$

The conditional variance of cumulative abnormal returns is defined as:

$$\text{var}(\overline{CAR}(\tau_1,\tau_2)) = \sum_{\tau=\tau_1}^{\tau_2} \text{var}\,(\overline{AR}_\tau).$$

When cumulative abnormal returns are defined, the null hypothesis that the event has no effect on returns can be tested. The cumulative abnormal returns' statistical properties are then assumed to be: expected value zero, variance as noted above. Testing the null hypothesis H_0 can be completed by calculating the value of θ_1:

$$\theta_1 = \frac{\overline{CAR}(\tau_1,\tau_2)}{\text{var}(\overline{CAR}(\tau_1,\tau_2))^{1/2}} \sim N(0,1).$$

The null hypothesis can also be tested on individual days, since special attention should be given to the event date and the most adjacent dates. The sample abnormal return for that day can then be divided by the one-day sample standard deviation for the corresponding earnings news category. Both these forms of testing the null hypothesis will be applied in this study, but before the results will be presented, a presentation of the included data is necessary.

4 Data Description

4.1 The Oslo Stock Exchange

As presented in chapter 2, most research in the field of market efficiency in general, and specifically event studies, are performed using data from U.S. exchanges. What distinguishes my study is the use of data from Norwegian firms, listed on the Oslo Stock Exchange. The Oslo Stock Exchange is Norway's only regulated market for securities exchange, and offers trading of stocks, bonds, derivatives and most other financial instruments. The 25 most liquid stocks are listed in the OBX index, containing some of Norway's largest companies. The other listed stocks on the Oslo Exchange are grouped into the "OB Match" and "OB Standard" categories. To be included in the former, a stock must either have at least 10 trades a day, or hold a liquidity provider scheme. The latter category contains the remaining firms. Besides the OBX, the (currently 61) most traded firms on the exchange comprise the benchmark index OSEBX. The broadest index on the Oslo Exchange is the all-share index (OSEAX), containing all listed companies.

The industry breakdown on the Oslo Stock Exchange possesses a certain unique character, given that almost 30 percent of the stocks are Energy (oil) companies, with Industrials being a strong runner-up. About half of the listed firms are in either the Energy or Industrials category. In contrast, the sectors Telecom and Utilities only contain a couple of firms. This factor could possibly create difficulties in determining whether there are differences between industries in the event effects. There are also other things that distinguish the Norwegian stock market from the U.S. market. First, the U.S. has several exchanges, while Norway only has one. Norway has far fewer listed companies, and comparatively few large-capitalization stocks. Another difficulty of the Norwegian stock market is that a great number of shares are thinly traded (the OB Standard stocks do not guarantee 10 or more trades a day). Pellicer and Rees (1999) examine data from Spain, where thin trading is a severe problem as well. They use a market model for the most traded firms (in the IBEX35 index, comparable to the OBX), and a market-adjusted model for the other firms, where abnormal returns for firm i on day τ is defined as

$$AR_{i\tau} = R_{i\tau} - R_{m\tau}$$

However, I choose to consistently apply the market model to all the firms in the sample. Even if a stock is very little correlated with the market, its expected return per trading day will be very close to zero, and any unusual return away from zero would constitute an abnormal return.

4.2 Event Study Definition

4.2.1 The Event and the Event Date

As already clarified, the event of interest for this study is earnings announcements from Norwegian listed companies. The study concerns announcements for the 16 quarters of the years 2007 through 2010. Each firm releases a date on which it will disclose its quarterly report to the public some time ahead of the announcement, so the event date is easily definable in time. Some definition must be made, however. Some firms release their reports in the morning, mostly before the stock exchange's opening bell, while other firms release reports after closing hours. The identification of event date will be as follows: for firms announcing earnings before or during a trading day, the event date will be the date of the announcement. For firms announcing earnings after trading hours, the event date will be defined as the first trading day after the announcement. The event dates are retrieved from the Oslo Stock Exchange's Newsweb, where listed companies release their earnings reports as well as other financial and firm-related information.

4.2.2 Event Window

In order to capture the effect of public information collecting ahead of the event as well as any signs of a post-earnings-announcement drift, the event window will be defined as the 20 trading days before the announcement date, the event date, and the 20 trading days after this date. This comprises a 41-day event window, similar to MacKinlay's (1997) example of a standard event study.

4.2.3 Estimation Window

In estimating a market model for each firm for each event period, an estimation window of 250 trading days before the event window is applied (approximately one calendar year), as suggested by MacKinlay (1997). I will assume this is a sufficiently large number of days in order to apply the variance definition of abnormal returns from section 3.2.3. As MacKinlay also points out, it is necessary to avoid an overlap between the event window and the estimation window, for event effects on returns not to affect the estimation of normal returns. Figure 4.1 illustrates the time dimension of the event study.

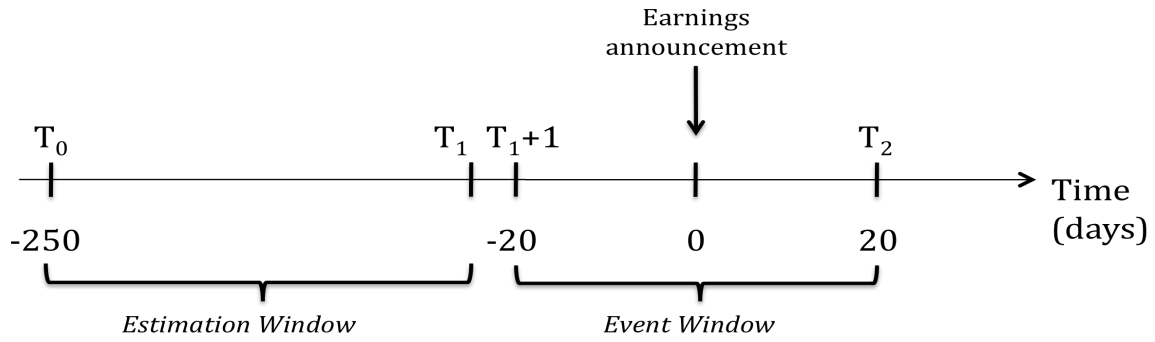

Figure 4.1. Timeline for event study

4.3 Data Selection and Collection

Similar to previous event studies on earnings announcements, a couple of criteria for a given firm to be included in the sample must be defined. First, the firm must have published financial reports for at least ten consecutive quarters before the first sample quarter (quarter 1 2007). Second, the company must have been listed on the Oslo Stock Exchange for at least 250 trading days preceding the event period for quarter 1, 2007. An earnings per share (EPS) number is used as the measure of earnings in this analysis.

In argument of criterion one, earlier studies using time-series earnings forecasts have required available quarterly earnings to be at least ten (e.g. Foster, Olsen and Shevlin, 1984, Bernard and Thomas, 1989). Bernard and Thomas, however, apply a seasonal random-walk model to the cases where less than 16 quarterly observations are available. This model is similar to "Model 1" under section 3.1.2. For the purpose of this study, the random-walk model is applied to cases where less than ten previous quarterly earnings are available, and the A.R.(1)

model (in section 3.1.2) otherwise. EPS data is retrieved from Oslo Børs Information as well as some additional financial reports from the Stock Exchange's Newsweb.

For criterion 2, it is necessary to have enough stock return data to be able to estimate the market models for each quarterly earnings period. The stock return data is retrieved from Oslo Børs Information. Only firms with the available amount of data as defined above are included in the study. This necessarily excludes some firms that have been listed on the exchange for a shorter time, causing the sample to be smaller than the number of listed stocks. This is to obtain a consistent sample of firms to examine across the entire period of interest.

Additionally, data to represent the return on the market is necessary. The all-share index OSEAX is used to proxy for the market return, because it is the broadest index in the Norwegian stock market, and includes all listed firms. Alternatively, the benchmark index OSEBX could represent the market, but this index only includes the most traded firms, thereby failing to capture some of the movement in the market viewed as a whole.

The criteria resulted in a sample of the following industry breakdown of firms:

Industry	**# Firms**
Energy	28
Industrials	27
Information Technology	20
Financials	10
Health Care	9
Consumer Discretionary	8
Consumer Staples	6
Materials	6
Utilities	2
Telecom	1
Total	117

Table 4.1. Industry breakdown of sample firms

Additionally, the firms can be broken down into categories according to trading frequency/liquidity: OBX, OB Match and OB Standard, where the largest capitalization firms are typically in the first category. The sample then consists of 20 OBX-firms, 71 OB Match firms and 26 OB Standard firms. A sample of 117 firms, four years and four quarterly

earnings announcement per year constitutes a sample of 1872 events (see appendix for a complete list of sample firms).

4.4 Estimation of the Market Model

Estimating the market model for each firm for each of the 16 sample quarters produces a total of 1872 individual market models. As previously noted, the R^2 of the market model measures the advantage of using this model compared to the constant-mean-return model. I find varying R^2 values for the securities in the sample. Many stocks in Norway are thinly traded, with the consequence of a low R^2, while the larger, more liquid companies' market models have relatively high values of R^2. This could point to a problem in correctly estimating the expected returns for some companies, but since daily returns are used (which are expected to be nearly zero), the market model will produce expected returns for these thinly traded companies very close to zero, and any deviation from zero will be definable as an abnormal return. As previously noted, the choice of normal-return model does not matter significantly when the study is concerned with daily returns. In the next chapter, I will finally present the results from my study of earnings announcements.

5 Results

5.1 Remarks on the Time-Series Model for Expected Earnings

In this chapter, the results from this event study of earnings announcements are presented. First, I would like to make a few remarks regarding the time-series model and its performance. Although the model has been proven by earlier research to produce fairly good estimates of earnings, it does not necessarily imply that the model's expected earnings are in line with the *market's* expectations. Working with the model, I find in several cases that it defines a positive earnings surprise, but the stock's abnormal return on the announcement date is negative, and vice versa. Intuitively, it does not seem very likely that the company should experience a drop in stock value following a positive earnings surprise (unless other news coincide with the announcement). With this remark, I warn the reader that some of the results might be influenced by the time-series model wrongfully assigning events to the good-news, no-news or bad-news categories.

With a reference to section 2.3.2.1, where it was noted that the market often has a "naïve" earnings expectation, with expected earnings in quarter *t* equal to the actual earnings in quarter *t-4*, I also performed the analysis applying a seasonal random-walk model (Model 1 in section 3.1.2). If it is the case that the market expects earnings in this quarter to be equal to the last quarter's earnings, such a model would be a better proxy for the market expectation of earnings. Some firms did indeed switch news categories, but the end results from using this model for expected earnings differ very little from the results which I now shall present, indicating that using the A.R. (1) time series model is the best available method in absence of consensus analyst forecasts for the expected-earnings portion of the study. This is justified by the fact that the model incorporates both a drift term and an adjacent-quarter component in addition to the change-from-last-quarter component. In line with Brown and Han's (2000) finding that the market only expects a random-walk process of quarterly earnings in the case of small firms with unsophisticated investors, I believe that in a highly developed market with many professional analysts and sophisticated investors it is more likely that the market's expectations also take account of the additional component.

5.2 Full Sample Results

The sample consisting of 1872 earnings announcements resulted in 797 positive earnings surprises, 931 negative surprises and 144 non-surprise events. As mentioned in section 4.2.3, very few of the earnings announcements were within proximity to the forecasted value. If the "no news" earnings category would be defined as deviations within the 2.5% range (as in MacKinlay, 1997), close to none events would end up in this category. Even when the 10% range is applied, less than 8% of the announcements could be categorized as "no news". The figures 5.1, 5.2 and 5.3 illustrate the cumulative abnormal returns for the three categories.

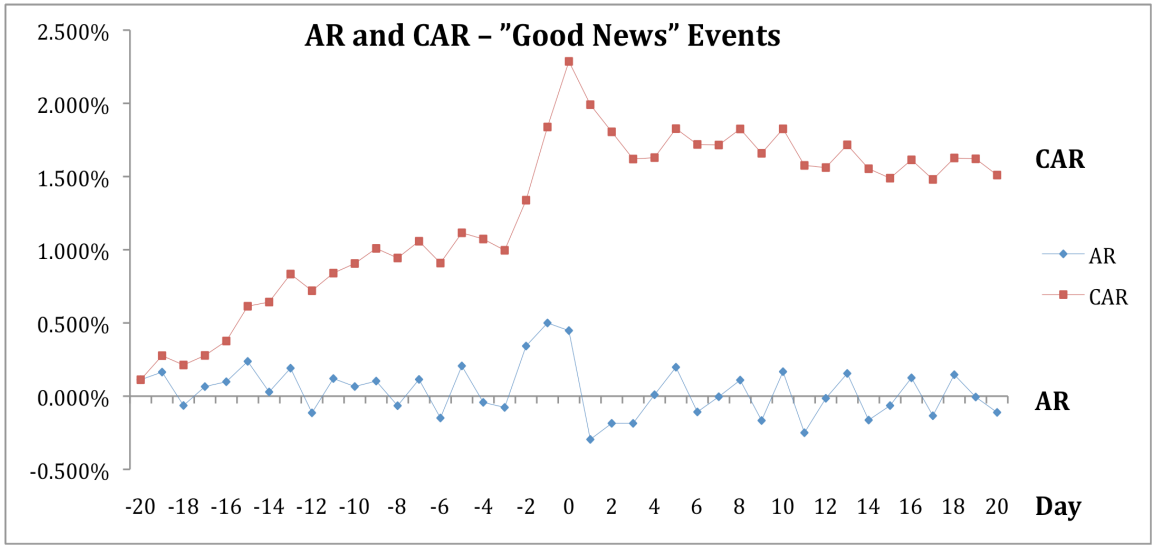

Figure 5.1. Abnormal returns and cumulative abnormal returns for the good-news category

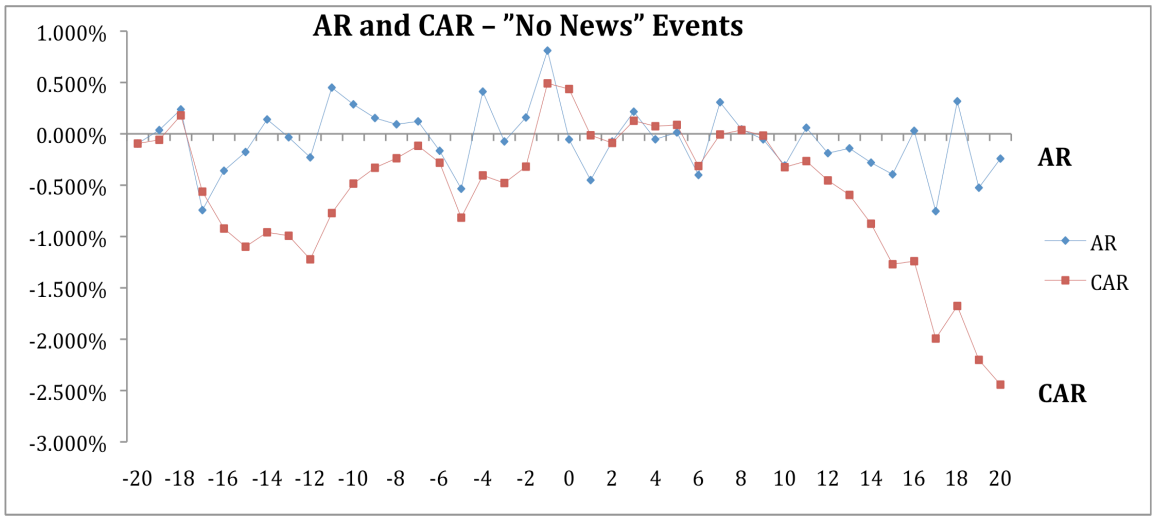

Figure 5.2. Abnormal returns and cumulative abnormal retunrs for the no-news category

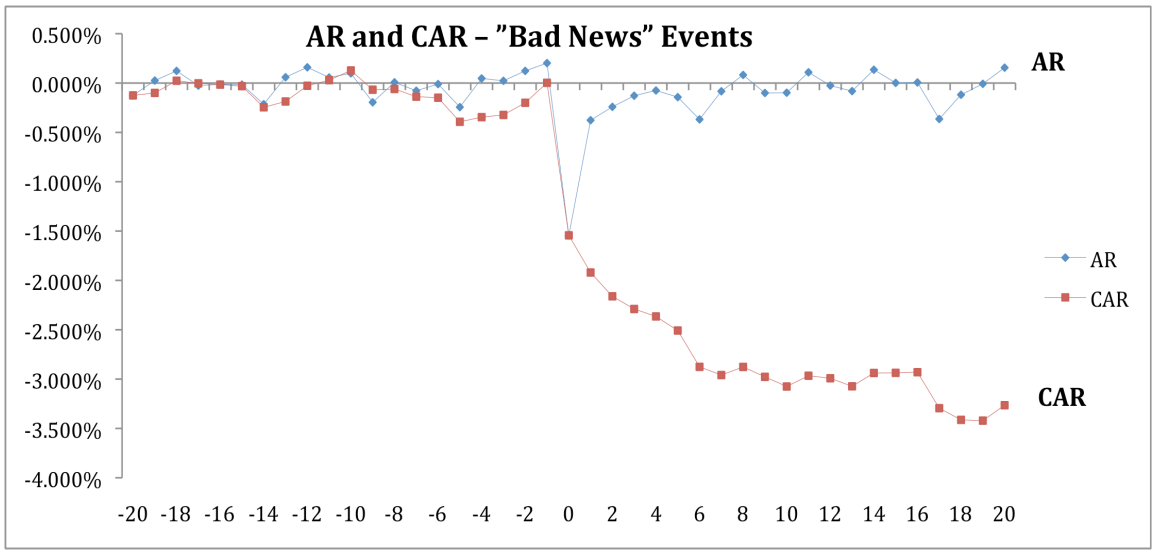

Figure 5.3. Abnormal returns and cumulative abnormal returns for the bad-news category

At first glance, figure 5.1 indicates that the CAR starts drifting upward in the good-news category a few days before the event, and then drifts downward before stabilizing. For the bad-news events in figure 5.3, however, the CAR appears to be close to zero up until the event, but starts drifting downward from the announcement day. As also indicated by the figure, this originates from a large negative sample abnormal return on the day zero. For the no-news category in figure 5.2, the cumulative abnormal returns are apparently mainly random, not following a specific path, except for quite a strong downward drift towards the end of the event window. Whether these results can be verified to document that the abnormal returns are significant still needs to be tested more formally, using the methodology from section 3.2.4. The results from the full sample are presented in table 5.1.

Day	Good News		No News		Bad News	
	AR%	CAR%	AR%	CAR%	AR%	CAR%
-20	.1123	.1123	-.0946	-.0946	-.1252	-.1252
-19	.1644	.2767	.0366	-.0580	.0253	-.0999
-18	-.0638	.2129	.2379	.1799	.1232	.0233
-17	.0652	.2781	-.7430	-.5631	-.0261	-.0029
-16	.0985	.3766	-.3592	-.9223	-.0129	-.0158
-15	.2375	.6141	-.1769	-1.0992	-.0156	-.0314
-14	.0287	.6428	.1403	-.9589	-.2143	-.2457
-13	.1912	.8341	-.0336	-.9925	.0589	-.1869
-12	-.1140	.7201	-.2295	-1.2220	.1595	-.0274
-11	.1204	.8404	.4502	-.7718	.0566	.0292
-10	.0657	.9061	.2872	-.4845	.0985	.1277
-9	.1030	1.0092	.1541	-.3305	-.1951	-.0675
-8	-.0654	.9438	.0927	-.2378	.0074	-.0600
-7	.1144	1.0581	.1213	-.1165	-.0778	-.1379
-6	-.1491	.9091	-.1650	-.2814	-.0104	-.1482
-5	.2066	1.1157	-.5349	-.8163	-.2442	-.3924
-4	-.0423	1.0733	.4115	-.4048	.0468	-.3456
-3	-.0771	.9963	-.0742	-.4790	.0226	-.3230
-2	.3423	1.3385	.1595	-.3195	.1232	-.1998
-1	.4999	1.8384	.8108	.4913	.2022	.0024
0	**.4480**	**2.2864**	**-.0548**	**.4365**	**-1.5456**	**-1.5432**
1	-.2955	1.9909	-.4508	-.0142	-.3768	-.1.9200
2	-.1856	1.8054	-.0744	-.0087	-.2412	-2.1611
3	-.1858	1.6196	.2159	.1272	-.1284	-2.2896
4	.0097	1.6293	-.0535	.0738	-.0755	-2.3650
5	.1978	1.8270	.0134	.0871	-.1427	-2.5077
6	-.1078	1.7192	-.4009	-.3138	-.3682	-2.8759
7	-.0039	1.7153	.3074	-.0064	-.0832	-2.9591
8	.1098	1.8251	.0436	.0373	-.0823	-2.8768
9	-.1665	1.6585	-.0542	-.0169	-.1003	-2.9771
10	.1672	1.8258	-.3080	-.3249	-.0979	-3.0750
11	-.2498	1.5760	.0594	-.2654	.1091	-2.9659
12	-.0146	1.5613	-.1882	-.4536	-.0256	-2.9915
13	.1553	1.7167	-.1412	-.5948	-.0816	-3.0731
14	-.1634	1.5333	-.2805	-.8754	.1351	-2.9380
15	-.0644	1.4889	-.3945	-1.2699	.0015	-2.9365
16	.1252	1.6141	.0297	-1.2402	.0062	-2.9303
17	-.1339	1.4802	-.7533	-1.9935	-.3643	-3.2946
18	.1467	1.6269	.3172	-1.6763	-.1184	-3.4130
19	-.0059	1.6210	-.5248	-2.2011	-.0077	-3.4207
20	-.1110	1.5100	-.2413	-2.4424	.1558	-3.2649
σ	σ	*.1370*	σ	*.3441*	σ	*.1274*

Table 5.1. Abnormal and cumulative abnormal returns for the sample firms that were assigned to the three groups "good news", "no news" and "bad news" earnings announcements, expressed as percentages. One-day standard deviations (%) are also listed.

As expected, the results show statistically significant abnormal returns on the day of the event, in the cases where earnings differed from forecast by 10% or more. Using the one-day standard deviation for each category, a test can be performed to determine whether the sample abnormal return on the event day is significantly different from zero on a 95% confidence level. The test calculates the value of θ_1 as presented in section 3.2.4. For both the good news and bad news categories the null hypothesis is rejected, with θ_1-values of 3.27 and -12.13 respectively. The null hypothesis is more clearly rejected for the bad news firms. Additionally, the negative abnormal return on day one after the announcement also proves significant for this category. This "drift" does not apply to the good news category. However, the good-news group has a significant *negative* day-one abnormal return. In addition, the sample abnormal returns on the two days before the event are positive and significant. For the no news category, I do not find any significant abnormal returns, as expected.

The results so far indicate that the Norwegian stock market is clearly efficient, in that earnings news are quickly reflected in security prices. However, for the bad news category, some of the reaction seems to be delayed, as shown by the statistically significant negative abnormal return on the day after the event. MacKinlay (1997) explains such a finding with varying hours of announcing earnings during the trading day. Some firms release earnings at a late hour, thereby affecting price response on the day after. This could hold for some of the securities in the sample, as the time of day for announcements differ, but as previously stated, the event dates have been adjusted so that day zero will be set to the first trading day after the announcement if the company releases earnings after the closing bell. Even if a firm announces its earnings at 2PM, an efficient market should predict that the price response occurs during the remaining hours of the trading day. With this justification, I will interpret the results as the price response being slightly delayed for the bad news firms. Possibly, the market needs some time to become aware of the full implications of the bad-news earnings for the fair stock price. Also, the discovery that the bad-news events induce negative abnormal returns on the days after the announcement is in line with the reported finding of Chambers and Penman (1984), that price variability on days following earnings announcements are larger for negative than positive surprises.

The fact that the good-news firms show significant positive abnormal returns also on the two days before the announcement could possibly imply that there is some information that leaks out to the public ahead of the announcement. Other company-specific news could signal to

investors that the company's earnings have experienced growth this quarter from the year before. The case could also be that insider trading occurs. These could be possible reasons for the abnormal returns, but there could also be other, more random causes behind them. The other result I find in the good-news category, is that the sample shows significant *negative* abnormal returns on the day after the event. A possible explanation could be market overreaction on the day of the event – the market might act excessively optimistic when discovering positive earnings surprises, but later on learn that the initial price response exceeded what should have been the fair price response grounded in fundamental value.

So far the results indicate *under-reaction* to negative earnings surprises, and *overreaction* to positive surprises. But what about the cumulative abnormal returns? In testing the significance of the cumulative abnormal returns over the 41-day event window, I find that only the CAR of the bad-news category is statistically significant, with a θ_1-value of -4.00. Correspondingly, the value of θ_1 for the good-news category is 1.72 and for the no-news category -1.11. Again, these results indicate some market overreaction to positive earnings surprises, since there are positive abnormal returns on the event day, but no significant CAR. The results also confirm the bad-news firms to have significant negative abnormal returns across an event window of 41 days.

5.3 Differences in Trading Frequency/Liquidity

The sample firms were divided into three groups, according to their categorization on the Oslo Stock Exchange: OBX, OB Match and OB Standard, where the former group contains the most traded and the latter the least traded firms. The sample firms are categorized accordingly in order to detect any differences in event-related abnormal returns with respect to how frequently the shares are traded. The suspicion is that the most liquid stocks are the most heavily researched ones, and that any news should be reflected very rapidly in their prices, and equivalently, the most thinly traded stocks will experience a slower response. With that being said, an efficient market hypothesizes in either case that the price response occurs quickly. Table 6.2 summarizes the results with respect to the statistical significance of abnormal returns.

Day	OBX			OB Match			OB Standard		
	θ_1 good	θ_1 no	θ_1 bad	θ_1 good	θ_1 no	θ_1 bad	θ_1 good	θ_1 no	θ_1 bad
-2	NO	NO	NO	**YES (+)**	NO	NO	NO	NO	NO
-1	NO	NO	NO	**YES (+)**	NO	NO	NO	**YES (+)**	NO
0	NO	NO	**YES (-)**	**YES (+)**	NO	**YES (-)**	**YES (+)**	NO	**YES (-)**
1	NO	**YES (+)**	NO	**YES (-)**	**YES (-)**	**YES (-)**	NO	NO	**YES (-)**
2	NO	**YES (+)**	NO	NO	NO	**YES (-)**	NO	NO	NO
CAR	NO	NO	NO	NO	NO	**YES (-)**	NO	**YES (-)**	NO

Table 5.2. Does the sample have abnormal returns significantly different from zero on the given day? + or – indicates positive or negative abnormal returns.

The most traded companies in the Norwegian stock market, the OBX, show only significant day-zero abnormal returns in the bad-news category, with a θ_1 of -2.73. The abnormal returns for the good-news and no-news cases are not statistically significant. However, I find significant positive abnormal returns in the no-news category on day one and day two after the event. This could be due to other important news about one or a few firms affecting the sample (since only 21 firms are included), or that the no-news firms are wrongfully placed in this category, due to the time-series model's failure to produce expected earnings in line with market expectations.

The OB Match group consists of companies that are less heavily traded than the OBX, but contain the greatest share of sample events. In this category, I find significant day-zero abnormal returns both in the good-news and bad-news groups, but not for the no-news firms. These results are in line with the theoretical prediction. Similar to the results from the sample in full, the good-news firms have significant positive abnormal returns on the two pre-event days, and negative abnormal returns on the first post-event day. The no-news category actually turns out to have significant negative abnormal returns on day one after the event. This could be due to under-reaction in this category, or wrongful placement due to the time-series model's predictions. For the bad-news firms, the significant abnormal returns from the event date are extended to day one and two after the event. Again, this points to a certain sluggish price response to negative earnings news. Finally, testing the CAR across the event window, only the bad-news abnormal returns prove significant, with a θ_1 of -3.74.

The OB Standard category presents significant abnormal returns in the good-news and bad-news groups, but not in the no-news group. Unlike the OB Match stocks, the OB Standard good-news events did not produce any significant abnormal returns on the days surrounding the event. The bad-news events, however, show negative abnormal returns on day one after

the event, similar to the results from the full sample. Testing the CAR across the event window, only the no-news firms have significant (negative) abnormal returns. This could be due to other types of information affecting one or few firms in a small sample (26 firms), or again, misleading estimates of expected earnings from the time-series model.

The clearest evidence from the trading-frequency categorization is seen from the bad-news events. Both the OB Match and the OB Standard groups show a slower price response to bad news than the OBX. Since the more liquid OBX group did not show any negative abnormal returns on the days after the event, these results could indicate that less traded stocks respond slower to news. For the case of positive earnings surprises, the OBX firms did not have the day one "correction" that was detected in both the OB Match sample and the full sample, indicating that the prices of the more heavily traded firms move quicker to the new "correct" levels, reflecting fundamental value.

5.4 Differences Between Industry Groups

The sample firms were also divided into industry groups, as presented in table 4.1 under section 4.3. As previously pointed out, some industry groups in Norway contain very few firms, which makes it difficult to infer conclusions about event effects, but the results from this categorization of the sample will still be presented.

Table 5.3 summarizes the results from testing the null hypothesis that the event has no effect on returns, using each industry group as a separate sample. On the event day for the good-news cases, only five out of ten sectors have significant positive abnormal returns, compared to eight out of ten for the bad-news cases. Again, the negative-surprise events bring forth the most verifiable results. When differentiating between industry groups in this manner, the delayed response that has been previously discovered appears to be limited to the energy sector (day-one negative abnormal returns) and partly the IT sector (day-two, but not day-one, negative abnormal returns). Correspondingly, the finding from the full sample that the good-news firms had significant positive abnormal returns on the two days before the event, appears in this context to be driven by Consumer Staples, Materials and in part Energy and Industrial firms. The Telecom, Financials and Utilities sectors show the least evidence of abnormal returns.

Day	Consumer Discretionary			Consumer Staples			Energy		
	θ_1 good	θ_1 no	θ_1 bad	θ_1 good	θ_1 no	θ_1 bad	θ_1 good	θ_1 no	θ_1 bad
-2	NO	NO	**YES (+)**	NO	NO	NO	**YES (+)**	NO	NO
-1	NO	NO	NO	**YES (+)**	NO	NO	NO	NO	NO
0	**YES (+)**	NO	**YES (-)**	**YES (+)**	NO	**YES (-)**	NO	NO	**YES (-)**
1	NO	NO	NO	NO	NO	NO	NO	NO	**YES (-)**
2	NO	NO	NO	NO	NO	NO	NO	NO	NO
CAR	NO	NO	NO	NO	NO	NO	NO	NO	NO

Day	Financials			Health Care			Industrials		
	θ_1 good	θ_1 no	θ_1 bad	θ_1 good	θ_1 no	θ_1 bad	θ_1 good	θ_1 no	θ_1 bad
-2	NO	NO	NO	NO	NO	NO	**YES (+)**	NO	NO
-1	NO	NO	NO	NO	NO	**YES (+)**	NO	NO	NO
0	**YES (+)**	NO	NO	**YES (+)**	NO	**YES (-)**	NO	NO	**YES (-)**
1	NO	NO	NO	**YES (-)**	NO	NO	NO	NO	NO
2	NO	NO	NO	NO	NO	NO	NO	NO	NO
CAR	NO	NO	NO	NO	NO	NO	NO	NO	NO

Day	Information Technology			Materials			Telecom		
-1	θ_1 good	θ_1 no	θ_1 bad	θ_1 good	θ_1 no	θ_1 bad	θ_1 good	θ_1 no	θ_1 bad
-2	**YES (+)**	NO	NO	NO	NO	NO	NO	NO	NO
-1	NO	**YES (+)**	NO	**YES (+)**	NO	NO	NO	NO	NO
0	NO	NO	**YES (-)**	**YES (+)**	NO	**YES (-)**	NO	NO	**YES (-)**
1	NO	**YES (-)**	NO	NO	NO	NO	NO	NO	NO
2	NO	NO	**YES (-)**	NO	NO	NO	NO	NO	NO
CAR	YES	NO	YES	NO	NO	NO	NO	NO	NO

Day	Utilities		
	θ_1 good	θ_1 no	θ_1 bad
-2	NO	NO	NO
-1	NO	NO	NO
0	NO	NO	NO
1	NO	NO	NO
2	NO	NO	NO
CAR	NO	NO	NO

Table 5.3. Does the industry group have abnormal returns significantly different from zero on the given day? + or – indicates positive or negative abnormal returns.

The results from this sample categorization should be interpreted with caution, due to the small size of some sectors. It is difficult to draw any general conclusions about the industry grouping's implications for abnormal event-related returns, but this categorization does point out to a certain degree what sectors pull the heaviest weight in the full sample's detected abnormal returns.

5.5 Differences in Time Periods

The final sample breakdown included in this study is by different time periods. The data was pooled into four groups according to year, so that each of the four years 2007 to 2010 could be studied separately. The motivation behind this was to investigate whether the time period surrounding the most recent financial crisis would display different effects from earnings news than other time periods. The heat of the crisis occurred in the latter part of 2008, in contrast to the first half of the year, when the Norwegian stock market reached all-time high levels, before plummeting towards the end of the year. Table 5.4 summarizes the number of good, bad and non-present earnings surprises for each of the sample years.

# of events	2007	2008	2009	2010	*Sum*
Good News	198	171	219	209	*797*
No News	50	39	34	21	*144*
Bad News	220	258	215	238	*931*
Sum	468	468	468	468	*1872*

Table 5.4. Event categorization on an annual basis

The table shows that the year 2008 had a greater fraction of events in the bad-news category and a smaller fraction in the good-news category corresponding to the other years. Table 5.5 presents the main results from treating the time periods as separate samples.

Day	Q1-2007 – Q4-2007			Q1-2008 – Q4-2008			Q1-2009-Q42009		
	θ_1 good	θ_1 no	θ_1 bad	θ_1 good	θ_1 no	θ_1 bad	θ_1 good	θ_1 no	θ_1 bad
-2	NO	NO	NO	NO	NO	NO	**YES (+)**	NO	NO
-1	**YES (+)**	NO	NO	**YES (+)**	**YES (+)**	NO	NO	NO	NO
0	NO	NO	**YES (-)**	**YES (+)**	NO	**YES (-)**	NO	NO	**YES (-)**
1	NO	NO	**YES (-)**	NO	NO	NO	NO	NO	NO
2	NO	NO	NO	NO	NO	NO	NO	NO	NO
CAR	**YES (-)**	NO	**YES (-)**	NO	**YES (-)**	NO	**YES (+)**	NO	NO

Day	Q1-2010 – Q4-2010		
	θ_1 good	θ_1 no	θ_1 bad
-2	NO	NO	NO
-1	NO	NO	NO
0	NO	NO	**YES (-)**
1	NO	NO	**YES (-)**
2	NO	NO	NO
CAR	NO	NO	**YES (-)**

Table 5.5. Does the annual time period have abnormal returns significantly different from zero on the given day? + or – indicates positive or negative abnormal returns.

Studying the sample on an annual basis, I actually find that the positive abnormal returns on day zero in the good-news category are only significant in 2008, and not in 2007, 2009 or 2010. I also find that the day-zero negative abnormal returns in the bad-news category in 2008 are significant with a θ_1-value of -7.78, with no significant abnormal returns on the succeeding days. With the exception of 2009 (when the effects of the crisis still were highly present), the other years showed significant negative abnormal returns on day one. This could indicate that during (and after) the financial crisis, the price response to bad news was quicker than usual, possibly because investors were more alert with respect to learning new critical information about firms during times of market distress. The positive abnormal returns limited to 2008 could imply that good news were perceived as "very good" during a time in which the market fell hard, causing excessive optimism and investment in these companies. Alternatively, the optimism could be limited to the former half of 2008, when the market conditions were far more beneficial.

To isolate the specific time period associated with the financial crisis, I decided to investigate the earnings announcements from quarter 3, 2008 through quarter 1, 2009 as one sample, consisting of announcement dates from October 2008 to May 2009. During this time, the Norwegian market had experienced a sharp drop, but started to grow again. Testing the null hypothesis, I find no significant abnormal returns in the good-news category on the event date, but a significant positive cumulative abnormal return. This points to the suspicion that not all the positive return due to good news was captured at once, or possibly that investors were careful on the event date with respect to excessively investing in the company, even though the stock appears to be perceived as a good buy. The story is however different for the bad-news case – similar to the year 2008 in total, the abnormal day-zero returns are negative and significant, with no significant abnormal returns on the days following, again indicating that for the bad-news events, the price responses occurred quickly during the period of and surrounding the financial crisis. Finally, as expected, the no-news events induced no day-zero significant abnormal returns neither in this period. The results are summarized in table 5.6.

Day	Q3-2008 – Q1-2009		
	θ_1 good	θ_1 no	θ_1 bad
-2	**YES (-)**	NO	NO
-1	NO	**YES (+)**	NO
0	NO	NO	**YES (-)**
1	NO	NO	NO
2	NO	NO	NO
CAR	**YES (+)**	NO	NO

Table 5.6. Does the given time period have abnormal returns significantly different from zero on the given day? + or – indicates positive or negative abnormal returns.

The results from separating the sample into different time periods with respect to the financial crisis indicate that negative news are more quickly reflected in security prices during times of market distress. But this conclusion should not be inferred without recognizing that there could be a significant amount of noise in the market surrounding financial crises. The implication is less precise estimates, creating difficulties in drawing any conclusions from the results. All though they indicate that bad news are reflected quicker than usual, disturbing factors in times of market turmoil could largely influence the results. The positive earnings surprises for Q3-2009 to Q1-2009 did not produce any abnormal returns on the announcement date, but the CAR is significant across the event window. The significant abnormal returns on day zero in 2008 could actually be limited to the former half of the year, due to more optimistic market conditions. As for the financial crisis, pessimism had a stronger presence in the market, probably destroying the believability of growth in future earnings. In total, the positive abnormal returns appear to be limited in time. The resulting implication for this study is that it becomes difficult to draw a general conclusion concerning the stock market reaction to positive earnings surprises.

6 Conclusion

This paper has been concerned with estimating and investigating the abnormal stock returns associated with a specific event, in this case earnings announcements or surprises. I have been simultaneously searching for evidence of efficiency in the Norwegian market, and for the well documented, puzzling anomaly called the post-earnings-announcement drift. A sample of 117 listed companies has been investigated throughout a four-year period of quarterly earnings announcements. The analysis was performed using a time-series model for expected earnings, and then grouping the events according to actual earnings below, above or around the expected earnings. Then the abnormal returns associated with the event were defined using a market model for normal returns. Various sub-categorization of the sample was also made in order to detect event effects dependent on specific characteristics.

My overall result is that the Norwegian stock market appears to be mainly efficient, just like the efficient market hypothesis has been widely confirmed in numerous earlier studies. In our time and day, with a sophisticated and developed securities market, and with a great number of investors and analysts watching over it at all times, it is highly believable that the hypothesis should prove to be true.

Analyzing the data and testing the null hypothesis that earnings announcements have no effect on security returns, I find evidence that rejects the null. Earnings announcements do contain informational value – the abnormal returns on the event day for both positive and negative earnings surprises are significantly different from zero. However, I find stronger evidence of abnormal returns in the bad-news category, with a wider margin for rejecting the null hypothesis. In fact, I find that the significant positive abnormal returns for positive earnings surprises are mainly limited to 2008. With this in mind, it becomes somewhat problematic to infer any clear conclusions about positive earnings surprises' effect on security returns, but I will state that announcements that deviate from the expectation (either way) do induce abnormal security returns, although of varying magnitude.

The results from the analysis are well aligned with the efficient market hypothesis, but I was also able to detect a few deviations. For the earnings announcements that fell into the bad-news category, I found significant negative abnormal returns also on the next day after the event date, indicating that some of the market response to negative earnings surprises is

delayed. This could potentially signal tendencies of market under-reaction to bad news. One possible explanation is that it takes some time for the market participants to fully understand the implications of the negative earnings surprise, and its effect on the stock's fair value. I also detected two contradictions to efficiency in the good-news category. First, these events had significant positive abnormal returns on the two days leading up to the announcement. The fact that the abnormal returns on day zero in this category was harder to verify than for the bad news category can be due to this finding. For instance, some news might have been leaked to the market ahead of the announcement that indicated earnings growth in the company, hence causing abnormal returns to be spread more evenly throughout these days. It is noteworthy that this only applies to the good-news category, but at the same time it is likely that firms about to announce disappointing earnings are more cautious with respect to signaling this to the market ahead of the announcement. The second finding for the good-news events is that they caused significant *negative* abnormal returns on the first day after the event A possible interpretation could be market overreaction on the event date – investors might readjust their beliefs in the aftermath of an earnings surprise, necessarily causing some negative return.

I introduced the post-earnings-announcement drift in the literature review section, and stated that this anomaly has been documented by several studies. These results, however, are unable to find any evidence of this drift, except for the negative abnormal return on day one after the event for the bad-news group. This again points in favor of an efficient Norwegian stock market. It appears to be true that most investors are able to exploit new information rather quickly. Most of the studies in favor of the drift's survival were performed decades ago, and it is not at all astonishing that in the information-technology age we now exist in, information travels quickly and is reflected in security prices just as fast, with very limited opportunities to earn above-normal returns with a trading strategy exploiting the post-earnings-announcement drift. As reviewed in section 2.4.2, one possible explanation for the drift is that costs can exceed gains of immediately exploiting opportunities, which can explain why some of the negative return is delayed until the next day. It might not be feasible for all investors to take advantage of the new information as fast as they would like. Aside from that, the only finding in my sample that could possibly relate to the drift is that the cumulative abnormal returns for the negative-surprise events keep drifting downward from the event date and until the end of the event window (20 days after the announcement). But since none of these abnormal returns

after day one are significantly different from zero, I do not have evidence to state that a downward drift in returns follows bad-news events.

An extension of the analysis involved grouping the sample events further, and categorizing them according to firms' trading frequency, firms' industries and time period of event. First, investigating firms in three different groups depending on their trading frequency, I find a quicker response to negative earnings surprises in the category with the most traded firms than the other groups. These findings are well aligned with my initial suspicion: the most heavily traded firms are likely to be the most researched and monitored ones, hence causing news to be reflected very quickly without any "correcting" readjustments on the following days. Also, such a finding can be related to the presented small-firm anomaly (section 2.1.2.2), where small firms earn higher abnormal returns. In this case, the largest firms are concentrated in the group with the highest trading frequency.

Throughout the sample period, 2007 to 2010, the market has been through a turbulent and fluctuating time, from the Norwegian market's all-time highs to the deep fall of the financial crisis, and back to economic and stock market growth. Having witnessed these events in the past years, I thought it would be interesting to analyze differences in event-effects between time periods. First, dividing the sample into four sub-samples, each corresponding to one year, I find that the day-one negative abnormal return for the bad-news cases are limited to the years 2007 and 2010. The year of the crisis, 2008, and the year of the aftermath, 2009, showed only significant abnormal returns on the event date. These results indicate a certain tendency of increased speed of response to new information in times of market turmoil. I believe this could be a likely consequence of market participants becoming more alert and on guard in order to quickly acquire and exploit new information. On the other hand, increasing market noise in troubled financial times creates difficulties in rejecting the null hypothesis, since this noise in returns contributes to less precision in the coefficient estimates. Another surprising finding in application of this sample grouping, is that the significant positive abnormal returns are exclusively present in the year 2008. This finding could be a result of unusual market conditions, for example excessive optimism devoted to good-news firms, especially given the Norwegian market's booming conditions in the former half of 2008. But these results also further destroy the validity of the positive abnormal returns in the full sample, since they appear to be limited to a certain time period. Once again, the significance of these returns appears to be weaker than of the abnormal returns in the bad-news category.

I will conclude this paper with stating that even though the Norwegian stock market is relatively small, it appears to be highly efficient, and that the results lead me to believe that the post-earnings-announcement drift is a phenomenon of past days. But I do find some delayed responses to (bad) news, which I think means that new information arrives continuously, market participants perceive it differently, and later on differences of opinions resolve. After a day or two, all significant abnormal returns seem to have disappeared. It is somewhat more difficult to infer conclusions about the good-news category, as the abnormal returns related to these events proved to have varying significance. The efficiency indicated by the results from this study suggests that the Norwegian stock market consists of numerous sophisticated players, and possesses the fundament for being informationally efficient.

The analysis could possibly have come out differently if consensus analyst forecasts were applied instead of estimating expected earnings via time-series models. Having forecasts that are even more aligned with the true market expectations (which is indeed the deciding factor for whether or not there is an earnings surprise) could possibly have produced stronger results, with stronger evidence to reject the null hypothesis. But either way, I doubt that any evidence of an extensive post-earnings-announcement drift would be discovered. It would also be of interest to examine whether my results turn out similar for the years to come, as the economy grows even stronger up from the economic downturn – or alternatively, if the macroeconomic state develops in a completely different direction.

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Appendix A: List of Sample Firms

#	Company Name	Industry	OSE Group
1	ABG Sundal Collier Holding ASA	Financials	OB Match
2	Acta Holding ASA	Financials	OB Match
3	AF Gruppen ASA	Industrials	OB Match
4	Aker ASA	Energy	OB Match
5	Aker Seafoods ASA	Consumer Stapes	OB Match
6	Aker Solutions ASA	Energy	OBX
7	Aktiv Kapital ASA	Financials	OB Match
8	American Shipping Company ASA	Industrials	OB Standard
9	Apptix ASA	Information Technology	OB Match
10	Arendals Fossekompani ASA	Utilities	OB Standard
11	Atea ASA	Information Technology	OB Match
12	Belships ASA	Industrials	OB Match
13	Bionor Pharma ASA	Health Care	OB Match
14	Biotec Pharmacon ASA	Health Care	OB Match
15	Birdstep Technology ASA	Information Technology	OB Match
16	Blom ASA	Information Technology	OB Match
17	Bonheur ASA	Energy	OB Match
18	Borgestad ASA	Financials	OB Match
19	BWG Homes ASA	Consumer Discretionary	OB Match
20	Byggma ASA	Materials	OB Standard
21	Camillo Eitzen & Co ASA	Industrials	OB Standard
22	Cermaq ASA	Consumer Staples	OB Match
23	ContextVision AB	Health Care	OB Match
24	Data Respons ASA	Information Technology	OB Standard
25	DiaGenic ASA	Health Care	OB Match
26	DnB NOR ASA	Financials	OBX
27	DNO International ASA	Energy	OB Match
28	DOF ASA	Energy	OB Match
29	Dolphin Group ASA	Information Technology	OB Standard
30	Domstein ASA	Consumer Staples	OB Match
31	Eidesvik Offshore ASA	Energy	OB Match
32	Eitzen Maritime Services ASA	Industrials	OB Match
33	Ekornes ASA	Consumer Discretionary	OB Match
34	Eltek ASA	Information Technology	OB Match
35	FARA ASA	Information Technology	OB Match
36	Farstad Shipping ASA	Energy	OB Standard
37	Fred Olsen Energy ASA	Energy	OBX
38	Frontline Ltd.	Energy	OBX
39	Funcom N.V.	Information Technology	OB Match
40	Ganger Rolf ASA	Energy	OB Match
41	GC Rieber Shipping ASA	Energy	OB Standard
42	Golar LNG Ltd.	Energy	OB Match
43	Golden Ocean Group Ltd.	Industrials	OBX
44	Goodtech ASA	Industrials	OB Match
45	Green Reefers ASA	Industrials	OB Match

#	Company Name	Industry	OSE Group
46	Grenland Group ASA	Energy	OB Standard
47	Gyldendal ASA	Consumer Discretionary	OB Standard
48	Hafslund ASA	Utilities	OB Match
49	Havila Shipping ASA	Energy	OB Standard
50	Hexagon Composites ASA	Industrials	OB Match
51	Hurtigruten ASA	Consumer Discretionary	OB Match
52	IGE Resources AB	Materials	OB Match
53	Ignis ASA	Information Technology	OB Match
54	IM Skaugen SE	Energy	OB Match
55	Imarex ASA	Financials	OB Match
56	Inmeta Crayon ASA	Information Technology	OB Match
57	Itera ASA	Information Technology	OB Standard
58	Jinhui Shipping and Transportation Ltd.	Industrials	OB Match
59	Kitron ASA	Information Technology	OB Match
60	Komplett ASA	Consumer Discretionary	OB Standard
61	Kongsberg Automotive Holding ASA	Consumer Discretionary	OB Match
62	Kongsberg Gruppen ASA	Industrials	OB Match
63	Kverneland ASA	Industrials	OB Standard
64	Lerøy Seafood Group ASA	Consumer Staples	OB Match
65	Mamut ASA	Information Technology	OB Match
66	Marine Harvest ASA	Consumer Staples	OBX
67	Medi-Stim ASA	Health Care	OB Standard
68	Namsos Trafikkselskap ASA	Industrial	OB Standard
69	Navamedic ASA	Health Care	OB Standard
70	Nio Security, Inc.	Information Technology	OB Standard
71	NorDiag ASA	Health Care	OB Match
72	Nordic Semiconductor ASA	Information Technology	OB Match
73	Norsk Hydro ASA	Materials	OBX
74	Norske Skogindustrier ASA	Materials	OB Match
75	Norwegian Air Shuttle ASA	Industrials	OB Match
76	Norwegian Car Carriers ASA	Industrials	OB Match
77	Odfjell SE	Industrials	OB Match
78	Olav Thon Eiendomsselskap ASA	Financials	OB Standard
79	Opera Software ASA	Information Technology	OB Match
80	ORIGIO a/s	Health Care	OB Match
81	Orkla ASA	Industrials	OBX
82	Petroleum Geo-Services ASA	Energy	OBX
83	Petrolia ASA	Energy	OB Match
84	Photocure ASA	Health Care	OB Match
85	Prosafe SE	Energy	OBX
86	PSI Group ASA	Information Technology	OB Standard
87	Q-Free ASA	Information Technology	OB Match
88	Questerre Energy Corporation	Energy	OBX
89	Rieber & Søn ASA	Consumer Staples	OB Match
90	Rocksource ASA	Energy	OB Match
91	Royal Caribbean Cruises Ltd.	Consumer Discretionary	OBX
92	SAS AB	Industrials	OB Match
93	Scana Industrier ASA	Materials	OB Match

#	Company Name	Industry	OSE Group
94	Schibsted ASA	Consumer Discretionary	OBX
95	SeaBird Exploration PLC	Energy	OB Match
96	Seadrill Ltd.	Energy	OBX
97	Sevan Marine ASA	Energy	OBX
98	Siem Offshore Inc.	Energy	OB Match
99	Skiens Aktiemølle ASA	Financials	OB Standard
100	Solstad Offshore ASA	Energy	OB Standard
101	Solvang ASA	Industrials	OB Standard
102	Songa Offshore SE	Energy	OB Match
103	Star Reefers Inc.	Industrials	OB Standard
104	Statoil ASA	Energy	OBX
105	Stolt-Nielsen Ltd.	Industrials	OB Match
106	Storebrand ASA	Financials	OBX
107	TECO Maritime ASA	Industrials	OB Match
108	Telenor ASA	Telecom	OBX
109	TGS-NOPEC Geophysical Company ASA	Energy	OBX
110	Tomra Systems ASA	Industrials	OB Match
111	TTS Group ASA	Industrials	OB Match
112	Veidekke ASA	Industrials	OB Match
113	Vizrt Ltd.	Information Technology	OB Match
114	Voss Veksel- og Landmandsbank ASA	Financials	OB Standard
115	Wilh. Wilhelmsen Holding ASA	Industrials	OB Match
116	Wilson ASA	Industrials	OB Standard
117	Yara International ASA	Materials	OBX

Appendix B: Full Sample Results

Table of abnormal returns, cumulative abnormal returns and values of θ_1 for the full sample. AR and CAR are expressed as percentages. The θ_1 value is the test parameter for the null hypothesis that the event has zero effect on returns on the given day. The one-day standard deviations are listed at the bottom of the table.

Day	**Good News**			**No News**			**Bad News**		
	AR%	CAR%	θ_1	AR%	CAR%	θ_1	AR%	CAR%	θ_1
-20	.1123	.1123	.82	-.0946	-.0946	-.27	-.1252	-.1252	-.98
-19	.1644	.2767	1.20	.0366	-.0580	.11	.0253	-.0999	.20
-18	-.0638	.2129	-.47	.2379	.1799	.69	.1232	.0233	.97
-17	.0652	.2781	.48	-.7430	-.5631	-2.16	-.0261	-.0029	-.21
-16	.0985	.3766	.72	-.3592	-.9223	-1.04	-.0129	-.0158	-.10
-15	.2375	.6141	1.73	-.1769	-1.0992	-.51	-.0156	-.0314	-.12
-14	.0287	.6428	.21	.1403	-.9589	.41	-.2143	-.2457	-1.68
-13	.1912	.8341	1.40	-.0336	-.9925	-.10	.0589	-.1869	.46
-12	-.1140	.7201	-.83	-.2295	-1.2220	-.67	.1595	-.0274	1.25
-11	.1204	.8404	.88	.4502	-.7718	1.31	.0566	.0292	.44
-10	.0657	.9061	.48	.2872	-.4845	.83	.0985	.1277	.77
-9	.1030	1.0092	.75	.1541	-.3305	.45	-.1951	-.0675	-1.53
-8	-.0654	.9438	-.48	.0927	-.2378	.27	.0074	-.0600	.06
-7	.1144	1.0581	.83	.1213	-.1165	.35	-.0778	-.1379	-.61
-6	-.1491	.9091	-1.09	-.1650	-.2814	-.48	-.0104	-.1482	-.08
-5	.2066	1.1157	1.51	-.5349	-.8163	-1.55	-.2442	-.3924	-1.92
-4	-.0423	1.0733	-.31	.4115	-.4048	1.20	.0468	-.3456	.37
-3	-.0771	.9963	-.56	-.0742	-.4790	-.22	.0226	-.3230	.18
-2	.3423	1.3385	2.50	.1595	-.3195	.46	.1232	-.1998	.97
-1	.4999	1.8384	3.65	.8108	.4913	2.36	.2022	.0024	1.59
0	**.4480**	**2.2864**	**3.27**	**-.0548**	**.4365**	**-.16**	**-1.5456**	**-1.5432**	**-12.13**
1	-.2955	1.9909	-2.16	-.4508	-.0142	-1.31	-.3768	-.1.9200	-2.96
2	-.1856	1.8054	-1.35	-.0744	-.0087	-.22	-.2412	-2.1611	-1.89
3	-.1858	1.6196	-1.36	.2159	.1272	-.63	-.1284	-2.2896	-1.01
4	.0097	1.6293	.07	-.0535	.0738	-.16	-.0755	-2.3650	-.59
5	.1978	1.8270	1.44	.0134	.0871	.04	-.1427	-2.5077	-1.12
6	-.1078	1.7192	-.79	-.4009	-.3138	-1.17	-.3682	-2.8759	-2.89
7	-.0039	1.7153	-.03	.3074	-.0064	.89	-.0832	-2.9591	-.65
8	.1098	1.8251	.80	.0436	.0373	.13	-.0823	-2.8768	.65
9	-.1665	1.6585	-1.22	-.0542	-.0169	-.16	-.1003	-2.9771	-.79
10	.1672	1.8258	1.22	-.3080	-.3249	-.90	-.0979	-3.0750	-.77
11	-.2498	1.5760	-1.82	.0594	-.2654	.17	.1091	-2.9659	.86
12	-.0146	1.5613	-.11	-.1882	-.4536	-.55	-.0256	-2.9915	-.20
13	.1553	1.7167	1.13	-.1412	-.5948	-.41	-.0816	-3.0731	-.64
14	-.1634	1.5333	-1.19	-.2805	-.8754	-.82	.1351	-2.9380	1.06
15	-.0644	1.4889	-.47	-.3945	-1.2699	-1.15	.0015	-2.9365	.01
16	.1252	1.6141	.91	.0297	-1.2402	.09	.0062	-2.9303	.05
17	-.1339	1.4802	-.98	-.7533	-1.9935	-2.19	-.3643	-3.2946	-2.86
18	.1467	1.6269	1.07	.3172	-1.6763	.92	-.1184	-3.4130	-.93
19	-.0059	1.6210	-.04	-.5248	-2.2011	-1.53	-.0077	-3.4207	-.06
20	-.1110	1.5100	-.81	-.2413	-2.4424	-.70	.1558	-3.2649	1.22
CAR			*1.72*			*-1.11*			*-4.00*
σ			.1370			.3441			.1274

Appendix C: Results, Sample According to Trading Frequency

Tables of abnormal returns, cumulative abnormal returns and values of θ_1 for the OBX , Ob Match and OB Standard samples. The θ_1 value is the test parameter for the null hypothesis that the event has zero effect on returns on the given day. The one-day standard deviations are listed at the bottom of the table.

C1. OBX Sample

Day	Good News			No News			Bad News		
	AR%	CAR%	θ_1	AR%	CAR%	θ_1	AR%	CAR%	θ_1
-20	-.4786	-.4786	-2.13	-.1778	-.1778	-.26	.0331	.0331	1.22
-19	-.1990	-.6776	.89	.0679	-.1099	.10	.1420	.4751	.52
-18	-.0758	-.7534	-.34	1.0673	.9574	1.57	-.1842	.2908	-.68
-17	-.1755	-.9289	-.78	-.4481	.5093	-.66	-.2721	.0187	-1.00
-16	.0843	-.8446	.38	-.4475	.0619	-.66	-.2111	-.1924	-.78
-15	.0564	-.7882	.25	-.1288	-.0669	-.19	-.1279	-.3203	-.47
-14	-.0908	-.8790	-.40	.5741	.5072	.85	.0060	-.3143	.02
-13	-.0574	-.9365	-.26	-.4923	.0149	-.73	-.1364	-.4507	-0.50
-12	.1750	-.7615	.78	-.4479	-.3230	-.50	.3089	-.1418	1.13
-11	-.0207	-.7822	-.09	.9946	.6716	1.47	-.2197	-.3615	-.81
-10	.2110	-.5711	.94	.1287	.8003	.19	-.2041	-.5656	-.75
-9	.0133	-.5579	.06	-.4538	.3465	-.67	-.2501	-.8157	-.92
-8	.2202	-.3377	.98	-.7469	-.4004	-1.10	-.0160	-.8317	-.06
-7	.0196	-.3181	.09	1.2047	.8043	1.78	.0180	-.8208	.04
-6	-.0843	-.4023	-.38	-.1668	.6375	-.25	-.0471	-.8679	-.17
-5	.2799	-.1225	1.25	.6179	1.2554	.91	-.2288	-1.0968	-.84
-4	.4910	.3685	2.19	-.2521	1.0034	-.37	.0210	-1.0758	.08
-3	-.2552	.1133	-1.14	-1.0244	-.0211	-1.51	-.0400	-1.1158	-.15
-2	.2338	.3471	1.04	.0520	.0309	.08	-.1928	-1.3086	-.71
-1	.3137	.6609	1.40	.4112	.4421	.61	-.0800	-1.3885	-.29
0	**.1358**	**.7967**	**.61**	**.1977**	**.6398**	**.29**	**-.7391**	**-2.1276**	**-2.71**
1	.2514	1.0481	1.12	1.9333	2.5731	2.85	-.1610	-.2.2887	-.59
2	.4306	1.4787	1.92	1.5753	4.1484	2.32	.0550	-2.2337	.20
3	-.4091	1.0696	-1.82	-.4953	3.6532	-.73	-.2701	-2.5038	-.99
4	-.1822	.8874	-.81	.7445	4.3977	1.10	.6641	-1.8397	2.44
5	.1304	1.0178	.58	.6812	5.0788	1.01	.0191	-1.8206	.07
6	-.1869	.8309	-.83	-.3961	4.6828	-.58	.1543	-1.6663	.57
7	-.2292	.6017	-1.02	.1602	4.8430	.24	.4967	-1.1696	1.82
8	-.4121	.1896	-1.84	.1044	4.9473	.15	.8140	-.3556	2.99
9	.2606	.4502	1.16	-.8354	4.1119	-1.23	.3446	-.0110	1.27
10	-.3823	.0678	-1.70	.2148	4.3267	.32	-.1518	-.1628	-.56
11	-.0800	-.0121	-.36	.3434	4.6701	.51	.0278	-.1350	.10
12	.1980	.1858	.88	-.3896	4.2805	-.57	-.3057	-.4407	-1.12
13	.1967	.3826	.88	-.6015	3.6789	-.89	-.1986	-.6393	-.73
14	-.3329	-.0497	-.48	-.0933	3.5856	-.14	.0679	-.5714	.25
15	-.0683	-.0186	-.30	-.3152	3.2704	-.47	.2457	-.3257	.90
16	-.1230	-.1416	-.55	-.9874	2.2831	-1.46	.1807	-.1450	.66
17	-.2518	-.3933	-1.12	-.5374	1.7456	-.79	-.2403	-.3853	-.88
18	-.3072	-.7006	-1.37	-.2724	1.4732	-.40	.2325	-.1527	.85
19	-.0582	-.7588	-.26	1.1060	2.4891	1.50	-.2806	-.4333	-1.03
20	.0120	-.7468	.05	-.2636	2.2255	-.39	.0294	-.4039	.11
CAR			*-.52*			*.52*			*-.23*
σ			.2244			.6776			.2723

C2. OB Match Sample

	Good news			No news			Bad news		
Day	AR	CAR	θ_1	AR	CAR	θ_1	AR	CAR	θ_1
-20	0.130%	0.130%	0.73	0.133%	0.133%	0.27	-0.056%	-0.056%	-0.33
-19	0.255%	0.385%	1.43	-0.048%	0.085%	-0.10	0.011%	-0.045%	0.06
-18	-0.015%	0.369%	-0.09	-0.153%	-0.068%	-0.31	0.069%	0.023%	0.40
-17	-0.041%	0.328%	-0.23	-0.404%	-0.472%	-0.82	0.082%	0.105%	0.48
-16	0.203%	0.531%	1.14	-0.247%	-0.719%	-0.50	-0.098%	0.007%	-0.57
-15	0.370%	0.901%	2.07	-0.368%	-1.087%	-0.75	0.168%	0.175%	0.98
-14	-0.057%	0.844%	-0.32	0.521%	-0.566%	1.06	-0.386%	-0.211%	-2.26
-13	0.237%	1.080%	1.33	0.056%	-0.510%	0.11	0.178%	-0.033%	1.04
-12	0.050%	1.130%	0.28	-0.170%	-0.680%	-0.35	0.236%	0.203%	1.38
-11	0.081%	1.211%	0.45	0.609%	-0.071%	1.24	0.083%	0.286%	0.48
-10	-0.093%	1.117%	-0.52	0.563%	0.492%	1.15	0.206%	0.492%	1.21
-9	0.137%	1.254%	0.77	0.311%	0.803%	0.63	-0.116%	0.376%	-0.68
-8	-0.307%	0.947%	-1.72	0.130%	0.933%	0.27	-0.118%	0.258%	-0.69
-7	0.126%	1.072%	0.70	-0.170%	0.763%	-0.35	-0.126%	0.132%	-0.74
-6	-0.253%	0.819%	-1.42	0.086%	0.849%	0.18	0.176%	0.308%	1.03
-5	0.191%	1.010%	1.07	-0.880%	-0.031%	-1.79	-0.279%	0.029%	-1.63
-4	-0.015%	0.995%	-0.08	0.378%	0.347%	0.77	0.091%	0.120%	0.53
-3	-0.024%	0.971%	-0.13	0.184%	0.530%	0.37	0.036%	0.156%	0.21
-2	0.427%	1.398%	2.39	0.614%	1.145%	1.25	0.066%	0.222%	0.39
-1	0.700%	2.098%	3.92	0.623%	1.768%	1.27	0.315%	0.537%	1.84
0	**0.358%**	**2.456%**	**2.00**	**-0.155%**	**1.612%**	**-0.32**	**-2.026%**	**-1.488%**	**-11.86**
1	-0.613%	1.844%	-3.43	-1.537%	0.076%	-3.13	-0.363%	-1.852%	-2.13
2	-0.201%	1.643%	-1.13	-0.136%	-0.060%	-0.28	-0.398%	-2.250%	-2.33
3	-0.263%	1.380%	-1.47	0.643%	0.583%	1.31	-0.097%	-2.347%	-0.57
4	0.331%	1.710%	1.85	-0.194%	0.388%	-0.40	-0.191%	-2.538%	-1.12
5	0.305%	2.015%	1.71	0.188%	0.576%	0.38	-0.150%	-2.688%	-0.88
6	-0.153%	1.862%	-0.86	-0.476%	0.100%	-0.97	-0.485%	-3.173%	-2.84
7	0.173%	2.036%	0.97	0.324%	0.424%	0.66	-0.205%	-3.379%	-1.20
8	0.234%	2.269%	1.31	-0.031%	0.394%	-0.06	-0.166%	-3.545%	-0.97
9	-0.372%	1.897%	-2.08	-0.194%	0.200%	-0.39	-0.308%	-3.853%	-1.80
10	0.129%	2.026%	0.72	-0.109%	0.090%	-0.22	-0.073%	-3.927%	-0.43
11	-0.310%	1.717%	-1.73	-0.342%	-0.252%	-0.70	0.125%	-3.801%	0.73
12	-0.191%	1.526%	-1.07	0.205%	-0.047%	0.42	0.111%	-3.690%	0.65
13	0.065%	1.591%	0.37	-0.157%	-0.204%	-0.32	-0.162%	-3.852%	-0.95
14	-0.069%	1.522%	-0.38	-0.194%	-0.398%	-0.39	0.181%	-3.670%	1.06
15	-0.087%	1.435%	-0.49	-0.467%	-0.864%	-0.95	-0.146%	-3.816%	-0.85
16	0.231%	1.666%	1.29	-0.040%	-0.905%	-0.08	-0.088%	-3.905%	-0.52
17	-0.065%	1.601%	-0.37	-0.128%	-1.032%	-0.26	-0.336%	-4.241%	-1.97
18	0.380%	1.981%	2.13	0.314%	-0.718%	0.64	-0.199%	-4.439%	-1.16
19	-0.091%	1.890%	-0.51	-1.078%	-1.796%	-2.19	0.121%	-4.318%	0.71
20	0.015%	1.905%	0.09	-0.071%	-1.867%	-0.14	0.230%	-4.088%	1.35
CAR			*1.69*			*-0.59*			*-3.74*
σ			0.1786			0.4913			0.1708

C3. OB Standard Sample

	Good news			No news			Bad news		
Day	AR	CAR	θ_1	AR	CAR	θ_1	AR	CAR	θ_1
-20	0.581%	0.581%	1.67	-0.630%	-0.630%	-1.15	-0.624%	-0.624%	-2.42
-19	0.222%	0.804%	0.64	0.275%	-0.355%	0.50	-0.018%	-0.642%	-0.07
-18	-0.193%	0.611%	-0.56	0.693%	0.338%	1.27	0.479%	-0.163%	1.86
-17	0.585%	1.196%	1.68	-1.792%	-1.455%	-3.28	-0.138%	-0.301%	-0.54
-16	-0.191%	1.005%	-0.55	-0.541%	-1.996%	-0.99	0.347%	0.046%	1.34
-15	0.015%	1.020%	0.04	0.288%	-1.708%	0.53	-0.418%	-0.372%	-1.62
-14	0.382%	1.402%	1.10	-1.105%	-2.813%	-2.02	0.082%	-0.291%	0.32
-13	0.278%	1.680%	0.80	-0.084%	-2.896%	-0.15	-0.116%	-0.407%	-0.45
-12	-0.841%	0.839%	-2.42	-0.198%	-3.094%	-0.36	-0.145%	-0.552%	-0.56
-11	0.360%	1.198%	1.03	-0.324%	-3.418%	-0.59	0.181%	-0.372%	0.70
-10	0.397%	1.596%	1.14	-0.369%	-3.787%	-0.68	0.026%	-0.345%	0.10
-9	0.084%	1.680%	0.24	0.164%	-3.623%	0.30	-0.364%	-0.709%	-1.41
-8	0.383%	2.064%	1.10	0.585%	-3.038%	1.07	0.353%	-0.356%	1.37
-7	0.165%	2.228%	0.47	0.172%	-2.866%	0.32	-0.014%	-0.371%	-0.05
-6	0.096%	2.324%	0.28	-0.939%	-3.804%	-1.72	-0.473%	-0.844%	-1.83
-5	0.187%	2.512%	0.54	-0.554%	-4.358%	-1.01	-0.163%	-1.007%	-0.63
-4	-0.590%	1.921%	-1.70	1.065%	-3.293%	1.95	-0.051%	-1.058%	-0.20
-3	-0.075%	1.847%	-0.21	-0.025%	-3.318%	-0.05	0.032%	-1.026%	0.12
-2	0.193%	2.039%	0.55	-0.909%	-4.227%	-1.66	0.491%	-0.535%	1.90
-1	0.084%	2.123%	0.24	1.497%	-2.730%	2.74	0.103%	-0.432%	0.40
0	**0.983%**	**3.106%**	**2.83**	**0.075%**	**-2.655%**	**0.14**	**-0.850%**	**-1.281%**	**-3.29**
1	0.141%	3.247%	0.41	0.517%	-2.138%	0.95	-0.562%	-1.844%	-2.18
2	-0.683%	2.563%	-1.97	-1.010%	-3.148%	-1.85	-0.036%	-1.879%	-0.14
3	0.234%	2.798%	0.67	-0.306%	-3.454%	-0.56	-0.113%	-1.992%	-0.44
4	-0.750%	2.048%	-2.16	-0.265%	-3.719%	-0.48	-0.286%	-2.278%	-1.11
5	-0.052%	1.995%	-0.15	-0.920%	-4.638%	-1.68	-0.235%	-2.514%	-0.91
6	0.092%	2.088%	0.27	-0.257%	-4.895%	-0.47	-0.425%	-2.938%	-1.64
7	-0.318%	1.769%	-0.92	0.401%	-4.494%	0.73	-0.166%	-3.105%	-0.64
8	0.211%	1.980%	0.61	0.091%	-4.403%	0.17	0.224%	-2.881%	0.87
9	0.052%	2.032%	0.15	0.862%	-3.541%	1.58	0.134%	-2.747%	0.52
10	0.762%	2.794%	2.19	-1.049%	-4.590%	-1.92	-0.125%	-2.871%	-0.48
11	-0.227%	2.567%	-0.65	0.849%	-3.740%	1.56	0.123%	-2.748%	0.48
12	0.308%	2.875%	0.89	-1.017%	-4.757%	-1.86	-0.188%	-2.936%	-0.73
13	0.379%	3.254%	1.09	0.152%	-4.605%	0.28	0.209%	-2.727%	0.81
14	-0.288%	2.966%	-0.83	-0.689%	-5.294%	-1.26	0.061%	-2.667%	0.23
15	0.006%	2.972%	0.02	-0.141%	-5.435%	-0.26	0.217%	-2.449%	0.84
16	0.037%	3.008%	0.11	0.934%	-4.501%	1.71	0.132%	-2.317%	0.51
17	-0.228%	2.780%	-0.66	-2.470%	-6.971%	-4.52	-0.524%	-2.842%	-2.03
18	-0.130%	2.651%	-0.37	0.722%	-6.249%	1.32	-0.152%	-2.994%	-0.59
19	0.287%	2.937%	0.82	-0.272%	-6.520%	-0.50	-0.156%	-3.150%	-0.60
20	-0.584%	2.353%	-1.68	-0.656%	-7.177%	-1.20	0.049%	-3.101%	0.19
CAR			*1.06*			*-2.05*			*-1.87*
σ			0.3477			0.5462			0.2584

Appendix D: Results, Sample According to Industry Groups

Tables of abnormal returns, cumulative abnormal returns and values of θ_1 for the 10 industry group samples. The θ_1 value is the test parameter for the null hypothesis that the event has zero effect on returns on the given day. The one-day standard deviations are listed at the bottom of the table.

D1. Consumer Discretionary Sample

	Good News			No News			Bad News		
Day	AR	CAR	θ_1	AR	CAR	θ_1	AR	CAR	θ_1
-20	0.296%	0.296%	0.58	0.510%	0.510%	0.48	-1.073%	-1.073%	-2.25
-19	-0.104%	0.192%	-0.20	-0.791%	-0.281%	-0.74	0.113%	-0.960%	0.24
-18	-0.291%	-0.099%	-0.57	0.625%	0.345%	0.58	-0.321%	-1.281%	-0.67
-17	-0.166%	-0.265%	-0.33	-0.610%	-0.265%	-0.57	-0.732%	-2.013%	-1.53
-16	-0.304%	-0.570%	-0.60	-0.565%	-0.830%	-0.53	-0.137%	-2.150%	-0.29
-15	0.095%	-0.475%	0.19	0.180%	-0.650%	0.17	-0.406%	-2.556%	-0.85
-14	-0.004%	-0.479%	-0.01	-1.137%	-1.786%	-1.06	-1.027%	-3.584%	-2.15
-13	-0.339%	-0.818%	-0.66	-0.006%	-1.792%	-0.01	0.181%	-3.402%	0.38
-12	-0.154%	-0.973%	-0.30	0.158%	-1.634%	0.15	0.851%	-2.551%	1.78
-11	-0.249%	-1.222%	-0.49	1.663%	0.029%	1.55	-0.706%	-3.258%	-1.48
-10	0.926%	-0.296%	1.81	2.917%	2.945%	2.73	1.038%	-2.219%	2.17
-9	0.491%	0.195%	0.96	1.594%	4.540%	1.49	0.167%	-2.052%	0.35
-8	0.319%	0.515%	0.63	0.580%	5.120%	0.54	-0.159%	-2.211%	-0.33
-7	0.190%	0.705%	0.37	0.446%	5.566%	0.42	0.571%	-1.640%	1.20
-6	0.057%	0.762%	0.11	0.086%	5.651%	0.08	-0.706%	-2.346%	-1.48
-5	0.453%	1.215%	0.89	0.327%	5.978%	0.31	-0.587%	-2.933%	-1.23
-4	0.461%	1.677%	0.90	-0.988%	4.990%	-0.92	0.194%	-2.739%	0.41
-3	-0.395%	1.281%	-0.77	-1.652%	3.339%	-1.54	0.165%	-2.574%	0.35
-2	-0.035%	1.246%	-0.07	-0.110%	3.229%	-0.10	1.101%	-1.473%	2.30
-1	0.506%	1.752%	0.99	1.348%	4.577%	1.26	-0.550%	-2.024%	-1.15
0	**1.308%**	**3.060%**	**2.56**	**-1.540%**	**3.037%**	**-1.44**	**-2.234%**	**-4.258%**	**-4.68**
1	0.024%	3.085%	0.05	-0.577%	2.460%	-0.54	-0.152%	-4.409%	-0.32
2	0.344%	3.429%	0.67	-0.321%	2.139%	-0.30	-0.578%	-4.987%	-1.21
3	-0.222%	3.207%	-0.43	1.736%	3.874%	1.62	-0.371%	-5.358%	-0.78
4	-0.361%	2.845%	-0.71	1.098%	4.972%	1.03	-0.695%	-6.053%	-1.45
5	0.231%	3.076%	0.45	1.009%	5.981%	0.94	0.089%	-5.965%	0.19
6	-0.179%	2.897%	-0.35	-0.393%	5.588%	-0.37	-0.582%	-6.547%	-1.22
7	-0.330%	2.568%	-0.65	1.706%	7.294%	1.59	0.241%	-6.306%	0.50
8	-0.224%	2.344%	-0.44	-0.877%	6.417%	-0.82	-0.056%	-6.362%	-0.12
9	0.221%	2.565%	0.43	-1.121%	5.295%	-1.05	0.437%	-5.925%	0.92
10	0.206%	2.771%	0.40	-0.928%	4.367%	-0.87	-0.570%	-6.494%	-1.19
11	0.152%	2.923%	0.30	1.379%	5.746%	1.29	-0.438%	-6.933%	-0.92
12	-0.213%	2.710%	-0.42	-1.834%	3.912%	-1.71	-0.024%	-6.957%	-0.05
13	0.314%	3.024%	0.61	0.457%	4.369%	0.43	0.207%	-6.750%	0.43
14	-0.504%	2.520%	-0.99	-2.083%	2.286%	-1.95	0.655%	-6.094%	1.37
15	0.080%	2.600%	0.16	-0.234%	2.052%	-0.22	0.022%	-6.073%	0.05
16	0.135%	2.735%	0.26	-1.601%	0.452%	-1.50	0.371%	-5.701%	0.78
17	0.210%	2.945%	0.41	-1.564%	-1.113%	-1.46	-0.665%	-6.367%	-1.39
18	-0.155%	2.789%	-0.30	-0.462%	-1.575%	-0.43	0.006%	-6.361%	0.01
19	0.002%	2.791%	0.00	0.119%	-1.456%	0.11	1.954%	-4.407%	4.09
20	-0.396%	2.396%	-0.77	-0.457%	-1.913%	-0.43	-0.124%	-4.531%	-0.26
CAR			*0.73*			*-0.28*			*-1.48*
σ			0.5109			1.0702			0.4775

D2. Consumer Staples Sample

	Good News			No News			Bad News		
Day	AR	CAR	θ_1	AR	CAR	θ_1	AR	CAR	θ_1
-20	-0.504%	-0.504%	-1.11	0.583%	0.583%	0.64	0.580%	0.580%	1.32
-19	-0.306%	-0.810%	-0.68	0.564%	1.147%	0.62	0.118%	0.698%	0.27
-18	0.914%	0.104%	2.02	-0.560%	0.587%	-0.62	-0.151%	0.546%	-0.34
-17	0.274%	0.379%	0.61	-0.006%	0.581%	-0.01	0.411%	0.958%	0.93
-16	0.210%	0.589%	0.46	-0.734%	-0.153%	-0.81	-0.118%	0.840%	-0.27
-15	0.174%	0.763%	0.39	0.058%	-0.095%	0.06	0.220%	1.060%	0.50
-14	-0.117%	0.646%	-0.26	0.269%	0.173%	0.30	-0.746%	0.314%	-1.69
-13	-0.033%	0.614%	-0.07	-1.310%	-1.137%	-1.44	0.206%	0.520%	0.47
-12	0.207%	0.821%	0.46	0.412%	-0.725%	0.45	-0.061%	0.459%	-0.14
-11	0.435%	1.256%	0.96	-0.891%	-1.616%	-0.98	0.126%	0.585%	0.29
-10	0.375%	1.631%	0.83	0.176%	-1.440%	0.19	0.124%	0.709%	0.28
-9	0.233%	1.864%	0.52	-0.066%	-1.506%	-0.07	-0.047%	0.663%	-0.11
-8	-0.174%	1.690%	-0.38	-0.538%	-2.044%	-0.59	-0.257%	0.406%	-0.58
-7	0.216%	1.906%	0.48	-0.181%	-2.225%	-0.20	0.633%	1.039%	1.44
-6	-0.882%	1.024%	-1.95	-0.606%	-2.831%	-0.67	0.624%	1.663%	1.42
-5	0.391%	1.416%	0.87	1.015%	-1.817%	1.12	-0.184%	1.479%	-0.42
-4	0.292%	1.708%	0.65	1.111%	-0.706%	1.22	-0.084%	1.395%	-0.19
-3	0.365%	2.073%	0.81	0.522%	-0.184%	0.58	-0.361%	1.034%	-0.82
-2	0.234%	2.307%	0.52	1.430%	1.246%	1.58	0.332%	1.366%	0.75
-1	0.920%	3.227%	2.03	-0.220%	1.026%	-0.24	-0.026%	1.339%	-0.06
0	**0.972%**	**4.199%**	**2.15**	**1.494%**	**2.520%**	**1.65**	**-1.259%**	**0.080%**	**-2.86**
1	-0.244%	3.955%	-0.54	0.584%	3.104%	0.64	-0.437%	-0.357%	-0.99
2	0.187%	4.142%	0.41	0.031%	3.136%	0.03	0.106%	-0.251%	0.24
3	0.074%	4.216%	0.16	1.142%	4.277%	1.26	-0.197%	-0.448%	-0.45
4	-0.340%	3.876%	-0.75	0.953%	5.231%	1.05	-0.606%	-1.055%	-1.37
5	0.136%	4.012%	0.30	2.304%	7.534%	2.54	0.150%	-0.905%	0.34
6	-0.246%	3.766%	-0.54	-1.566%	5.969%	-1.73	-0.042%	-0.946%	-0.09
7	0.014%	3.780%	0.03	-0.034%	5.935%	-0.04	0.554%	-0.393%	1.26
8	-0.186%	3.594%	-0.41	-0.636%	5.298%	-0.70	0.202%	-0.191%	0.46
9	-0.111%	3.483%	-0.25	0.250%	5.548%	0.28	0.176%	-0.015%	0.40
10	-0.439%	3.045%	-0.97	0.081%	5.629%	0.09	-0.177%	-0.193%	-0.40
11	0.411%	3.455%	0.91	-0.432%	5.197%	-0.48	0.650%	0.458%	1.48
12	-0.744%	2.712%	-1.65	-0.278%	4.919%	-0.31	0.599%	1.056%	1.36
13	-0.038%	2.673%	-0.08	0.082%	5.001%	0.09	-0.416%	0.640%	-0.94
14	-0.577%	2.096%	-1.28	0.208%	5.209%	0.23	1.076%	1.716%	2.44
15	0.253%	2.349%	0.56	0.204%	5.413%	0.22	0.562%	2.278%	1.28
16	0.510%	2.859%	1.13	0.097%	5.510%	0.11	0.809%	3.087%	1.84
17	-0.018%	2.841%	-0.04	0.739%	6.249%	0.81	-0.697%	2.390%	-1.58
18	0.515%	3.356%	1.14	0.509%	6.758%	0.56	-0.399%	1.991%	-0.91
19	-0.746%	2.610%	-1.65	-0.650%	6.108%	-0.72	-0.615%	1.377%	-1.39
20	-0.068%	2.542%	-0.15	-0.079%	6.029%	-0.09	0.294%	1.671%	0.67
CAR			*0.87*			*1.04*			*0.59*
σ			0.4521			0.9068			0.44

D3. Energy Sample

	Good News			No News			Bad News		
Day	AR	CAR	θ_1	AR	CAR	θ_1	AR	CAR	θ_1
-20	0.092%	0.092%	0.41	-0.290%	-0.290%	-0.41	-0.121%	-0.121%	-0.56
-19	-0.103%	-0.011%	-0.46	-0.001%	-0.291%	0.00	0.250%	0.128%	1.15
-18	-0.094%	-0.105%	-0.42	0.493%	0.203%	0.70	0.524%	0.653%	2.42
-17	0.001%	-0.103%	0.01	-0.517%	-0.314%	-0.73	0.191%	0.844%	0.88
-16	-0.264%	-0.367%	-1.18	-0.526%	-0.840%	-0.74	-0.245%	0.600%	-1.13
-15	0.131%	-0.236%	0.59	-0.272%	-1.113%	-0.39	-0.149%	0.450%	-0.69
-14	-0.202%	-0.439%	-0.91	1.271%	0.158%	1.80	-0.306%	0.145%	-1.41
-13	0.062%	-0.377%	0.28	0.957%	1.115%	1.35	-0.229%	-0.085%	-1.06
-12	-0.008%	-0.384%	-0.03	0.153%	1.268%	0.22	0.340%	0.256%	1.57
-11	0.219%	-0.165%	0.98	0.653%	1.921%	0.92	0.091%	0.347%	0.42
-10	-0.156%	-0.321%	-0.70	-0.381%	1.541%	-0.54	0.034%	0.381%	0.16
-9	-0.288%	-0.609%	-1.29	-0.916%	0.625%	-1.30	-0.176%	0.205%	-0.81
-8	0.163%	-0.446%	0.73	0.069%	0.693%	0.10	0.036%	0.242%	0.17
-7	0.082%	-0.364%	0.37	0.728%	1.421%	1.03	0.075%	0.317%	0.35
-6	-0.125%	-0.489%	-0.56	1.126%	2.547%	1.59	-0.152%	0.165%	-0.70
-5	-0.032%	-0.521%	-0.15	-1.038%	1.509%	-1.47	-0.124%	0.041%	-0.57
-4	0.164%	-0.358%	0.73	0.041%	1.550%	0.06	-0.328%	-0.287%	-1.51
-3	-0.089%	-0.447%	-0.40	-0.040%	1.510%	-0.06	0.170%	-0.117%	0.78
-2	0.542%	0.096%	2.43	-0.629%	0.880%	-0.89	-0.390%	-0.507%	-1.80
-1	0.252%	0.348%	1.13	1.144%	2.024%	1.62	0.312%	-0.194%	1.44
0	**0.092%**	**0.440%**	**0.41**	**-0.024%**	**2.000%**	**-0.03**	**-0.970%**	**-1.165%**	**-4.48**
1	0.004%	0.444%	0.02	0.567%	2.568%	0.80	-0.630%	-1.795%	-2.91
2	-0.124%	0.320%	-0.56	0.339%	2.906%	0.48	0.058%	-1.737%	0.27
3	-0.171%	0.149%	-0.77	0.415%	3.321%	0.59	-0.184%	-1.921%	-0.85
4	-0.081%	0.068%	-0.37	0.964%	4.285%	1.36	-0.168%	-2.089%	-0.78
5	0.345%	0.413%	1.55	-1.224%	3.062%	-1.73	-0.366%	-2.455%	-1.69
6	-0.215%	0.198%	-0.96	0.018%	3.080%	0.03	-0.233%	-2.688%	-1.08
7	-0.205%	-0.007%	-0.92	-0.197%	2.883%	-0.28	-0.254%	-2.942%	-1.17
8	-0.147%	-0.154%	-0.66	0.560%	3.444%	0.79	0.524%	-2.419%	2.42
9	-0.018%	-0.171%	-0.08	-0.499%	2.945%	-0.71	0.138%	-2.281%	0.64
10	0.002%	-0.169%	0.01	0.350%	3.295%	0.50	-0.061%	-2.342%	-0.28
11	0.020%	-0.149%	0.09	0.465%	3.760%	0.66	0.560%	-1.783%	2.58
12	0.200%	0.050%	0.90	-1.216%	2.544%	-1.72	-0.370%	-2.152%	-1.71
13	0.193%	0.243%	0.87	-0.730%	1.814%	-1.03	-0.320%	-2.472%	-1.47
14	-0.131%	0.113%	-0.59	-0.274%	1.539%	-0.39	0.204%	-2.268%	0.94
15	-0.074%	0.039%	-0.33	-0.408%	1.131%	-0.58	0.226%	-2.042%	1.04
16	0.458%	0.497%	2.06	-0.656%	0.475%	-0.93	0.102%	-1.939%	0.47
17	-0.048%	0.449%	-0.21	-0.143%	0.332%	-0.20	-0.149%	-2.088%	-0.69
18	-0.160%	0.289%	-0.72	0.585%	0.917%	0.83	-0.257%	-2.345%	-1.18
19	-0.126%	0.164%	-0.56	0.344%	1.261%	0.49	-0.270%	-2.615%	-1.25
20	0.040%	0.204%	0.18	-0.227%	1.034%	-0.32	0.102%	-2.513%	0.47
CAR			*0.14*			*0.23*			*-1.81*
σ			0.2228			0.7069			0.2168

D4. Financials Sample

	Good News			No News			Bad News		
Day	AR	CAR	θ_1	AR	CAR	θ_1	AR	CAR	θ_1
-20	0.126%	0.126%	0.33	-0.917%	-0.917%	-1.29	0.484%	0.484%	1.36
-19	0.103%	0.228%	0.27	0.908%	-0.008%	1.28	0.126%	0.610%	0.36
-18	0.439%	0.667%	1.15	-0.417%	-0.426%	-0.59	0.134%	0.745%	0.38
-17	-0.428%	0.239%	-1.12	-1.209%	-1.635%	-1.70	-0.406%	0.339%	-1.14
-16	0.915%	1.154%	2.39	0.535%	-1.100%	0.75	-0.695%	-0.357%	-1.96
-15	-0.023%	1.131%	-0.06	0.259%	-0.841%	0.36	0.176%	-0.181%	0.49
-14	0.049%	1.180%	0.13	0.050%	-0.791%	0.07	-0.117%	-0.298%	-0.33
-13	0.303%	1.483%	0.79	-0.098%	-0.889%	-0.14	-0.053%	-0.351%	-0.15
-12	-0.097%	1.386%	-0.25	-0.356%	-1.244%	-0.50	0.132%	-0.219%	0.37
-11	0.401%	1.787%	1.05	0.873%	-0.371%	1.23	0.233%	0.014%	0.66
-10	-0.185%	1.602%	-0.48	0.810%	0.439%	1.14	0.306%	0.320%	0.86
-9	0.781%	2.382%	2.04	1.086%	1.525%	1.53	-0.008%	0.311%	-0.02
-8	0.196%	2.579%	0.51	-1.646%	-0.121%	-2.31	0.474%	0.785%	1.34
-7	-0.847%	1.732%	-2.21	0.009%	-0.112%	0.01	-0.223%	0.563%	-0.63
-6	-0.224%	1.508%	-0.58	-0.524%	-0.636%	-0.74	0.251%	0.813%	0.71
-5	0.666%	2.174%	1.74	0.777%	0.141%	1.09	-0.362%	0.451%	-1.02
-4	-0.356%	1.818%	-0.93	-0.193%	-0.053%	-0.27	0.085%	0.536%	0.24
-3	-0.212%	1.606%	-0.55	0.863%	0.810%	1.21	-0.087%	0.449%	-0.24
-2	-0.060%	1.546%	-0.16	0.349%	1.159%	0.49	0.338%	0.787%	0.95
-1	0.453%	1.999%	1.18	-0.174%	0.986%	-0.24	-0.064%	0.723%	-0.18
0	**0.901%**	**2.900%**	**2.36**	**0.161%**	**1.146%**	**0.23**	**0.117%**	**0.840%**	**0.33**
1	0.060%	2.960%	0.16	-0.216%	0.930%	-0.30	-0.027%	0.812%	-0.08
2	0.153%	3.113%	0.40	-1.007%	-0.077%	-1.41	0.117%	0.929%	0.33
3	-0.276%	2.837%	-0.72	-0.074%	-0.151%	-0.10	0.321%	1.250%	0.90
4	0.133%	2.970%	0.35	0.220%	0.069%	0.31	0.156%	1.406%	0.44
5	0.568%	3.538%	1.48	0.328%	0.397%	0.46	-0.292%	1.114%	-0.82
6	-0.198%	3.340%	-0.52	-0.460%	-0.063%	-0.65	0.165%	1.279%	0.46
7	0.271%	3.612%	0.71	-0.193%	-0.256%	-0.27	-0.217%	1.062%	-0.61
8	0.007%	3.619%	0.02	0.219%	-0.038%	0.31	-0.378%	0.684%	-1.06
9	-0.581%	3.037%	-1.52	0.070%	0.032%	0.10	-0.360%	0.324%	-1.01
10	0.595%	3.632%	1.56	-0.169%	-0.137%	-0.24	-0.053%	0.271%	-0.15
11	0.120%	3.753%	0.31	0.319%	0.182%	0.45	-0.285%	-0.014%	-0.80
12	-0.527%	3.226%	-1.38	-1.187%	-1.004%	-1.67	0.337%	0.323%	0.95
13	0.044%	3.270%	0.12	0.835%	-0.169%	1.17	-0.156%	0.167%	-0.44
14	0.118%	3.388%	0.31	0.108%	-0.061%	0.15	-0.567%	-0.400%	-1.60
15	-0.001%	3.387%	0.00	-0.213%	-0.273%	-0.30	-0.092%	-0.491%	-0.26
16	-0.582%	2.805%	-1.52	-0.926%	-1.199%	-1.30	-0.068%	-0.560%	-0.19
17	0.247%	3.052%	0.65	-0.245%	-1.444%	-0.34	-0.658%	-1.217%	-1.85
18	0.036%	3.088%	0.09	0.884%	-0.560%	1.24	0.118%	-1.100%	0.33
19	0.359%	3.447%	0.94	-0.584%	-1.144%	-0.82	-0.306%	-1.406%	-0.86
20	-0.250%	3.197%	-0.65	0.234%	-0.910%	0.33	-0.515%	-1.921%	-1.45
CAR			*1.31*			*-0.20*			*-0.85*
σ			0.3825			0.7118			0.3549

D5. Health Care Sample

	Good News			No News			Bad News		
Day	AR	CAR	θ_1	AR	CAR	θ_1	AR	CAR	θ_1
-20	0.605%	0.605%	0.90	-0.929%	-0.929%	-0.73	-0.706%	-0.706%	-1.37
-19	0.556%	1.161%	0.82	1.762%	0.833%	1.38	-0.409%	-1.115%	-0.79
-18	-0.895%	0.266%	-1.33	0.119%	0.953%	0.09	-0.003%	-1.118%	-0.01
-17	0.034%	0.300%	0.05	-0.754%	0.199%	-0.59	-0.407%	-1.525%	-0.79
-16	-0.428%	-0.128%	-0.63	-0.690%	-0.492%	-0.54	0.595%	-0.930%	1.15
-15	0.817%	0.689%	1.21	0.315%	-0.176%	0.25	0.747%	-0.183%	1.45
-14	0.339%	1.028%	0.50	-0.744%	-0.921%	-0.58	-0.248%	-0.431%	-0.48
-13	-1.145%	-0.117%	-1.70	-1.012%	-1.932%	-0.79	0.145%	-0.286%	0.28
-12	0.364%	0.247%	0.54	-0.076%	-2.009%	-0.06	-0.404%	-0.690%	-0.78
-11	-0.711%	-0.464%	-1.05	-0.666%	-2.675%	-0.52	0.242%	-0.449%	0.47
-10	-0.571%	-1.035%	-0.85	0.556%	-2.119%	0.44	0.086%	-0.362%	0.17
-9	-0.064%	-1.100%	-0.09	1.091%	-1.028%	0.85	-0.600%	-0.962%	-1.16
-8	-0.366%	-1.466%	-0.54	-0.265%	-1.293%	-0.21	0.442%	-0.520%	0.86
-7	1.518%	0.052%	2.25	0.239%	-1.054%	0.19	-0.896%	-1.416%	-1.74
-6	-0.570%	-0.518%	-0.84	-2.710%	-3.763%	-2.12	0.413%	-1.002%	0.80
-5	0.846%	0.328%	1.25	-2.515%	-6.279%	-1.97	-0.440%	-1.443%	-0.85
-4	-1.027%	-0.699%	-1.52	4.218%	-2.060%	3.30	-0.170%	-1.613%	-0.33
-3	0.259%	-0.441%	0.38	-0.047%	-2.107%	-0.04	0.199%	-1.413%	0.39
-2	-0.526%	-0.967%	-0.78	-0.835%	-2.942%	-0.65	0.796%	-0.617%	1.54
-1	0.893%	-0.074%	1.32	0.102%	-2.840%	0.08	1.632%	1.015%	3.16
0	**2.036%**	**1.962%**	**3.01**	**0.187%**	**-2.653%**	**0.15**	**-2.502%**	**-1.488%**	**-4.85**
1	-1.332%	0.631%	-1.97	-1.003%	-3.656%	-0.79	-0.755%	-2.242%	-1.46
2	-0.463%	0.168%	-0.69	-1.312%	-4.968%	-1.03	-0.027%	-2.269%	-0.05
3	-0.477%	-0.310%	-0.71	1.441%	-3.527%	1.13	-0.058%	-2.327%	-0.11
4	0.201%	-0.108%	0.30	-1.468%	-4.995%	-1.15	0.215%	-2.113%	0.42
5	-0.033%	-0.142%	-0.05	2.691%	-2.303%	2.11	-0.521%	-2.634%	-1.01
6	-0.391%	-0.533%	-0.58	-1.183%	-3.487%	-0.93	-1.156%	-3.790%	-2.24
7	-0.136%	-0.669%	-0.20	3.092%	-0.395%	2.42	-0.828%	-4.618%	-1.61
8	0.185%	-0.484%	0.27	0.024%	-0.371%	0.02	-0.165%	-4.783%	-0.32
9	-0.152%	-0.636%	-0.22	-0.142%	-0.513%	-0.11	-0.285%	-5.068%	-0.55
10	-0.212%	-0.848%	-0.31	-0.892%	-1.405%	-0.70	0.359%	-4.710%	0.70
11	-0.283%	-1.131%	-0.42	0.281%	-1.124%	0.22	-0.011%	-4.721%	-0.02
12	1.175%	0.044%	1.74	0.011%	-1.113%	0.01	-0.659%	-5.381%	-1.28
13	-0.714%	-0.670%	-1.06	-1.163%	-2.276%	-0.91	-0.306%	-5.686%	-0.59
14	0.184%	-0.486%	0.27	0.384%	-1.892%	0.30	0.422%	-5.264%	0.82
15	0.463%	-0.023%	0.69	-1.315%	-3.207%	-1.03	0.759%	-4.505%	1.47
16	-0.600%	-0.623%	-0.89	-0.353%	-3.560%	-0.28	-0.040%	-4.545%	-0.08
17	-0.549%	-1.172%	-0.81	-1.574%	-5.134%	-1.23	-0.494%	-5.039%	-0.96
18	0.648%	-0.524%	0.96	-1.702%	-6.836%	-1.33	-0.737%	-5.775%	-1.43
19	-0.213%	-0.737%	-0.32	-1.337%	-8.173%	-1.05	0.572%	-5.203%	1.11
20	-0.462%	-1.199%	-0.68	0.613%	-7.560%	0.48	0.557%	-4.645%	1.08
CAR			*-0.28*			*-0.92*			*-1.41*
σ			0.6754			1.2769			0.5158

D6. Industrials Sample

	Good News			No News			Bad News		
Day	AR	CAR	θ_1	AR	CAR	θ_1	AR	CAR	θ_1
-20	0.123%	0.123%	0.39	-0.646%	-0.646%	-0.68	-0.090%	-0.090%	-0.32
-19	0.263%	0.386%	0.83	-0.524%	-1.170%	-0.55	-0.183%	-0.273%	-0.64
-18	0.057%	0.443%	0.18	0.688%	-0.482%	0.72	0.356%	0.083%	1.25
-17	-0.595%	-0.153%	-1.88	-1.370%	-1.851%	-1.44	-0.450%	-0.367%	-1.58
-16	0.493%	0.341%	1.56	-0.645%	-2.496%	-0.68	0.424%	0.057%	1.49
-15	0.270%	0.611%	0.86	-1.025%	-3.521%	-1.08	-0.073%	-0.016%	-0.26
-14	0.352%	0.963%	1.11	0.268%	-3.253%	0.28	-0.019%	-0.035%	-0.07
-13	0.253%	1.216%	0.80	-0.061%	-3.314%	-0.06	0.171%	0.136%	0.60
-12	-0.144%	1.073%	-0.45	-0.692%	-4.006%	-0.73	0.055%	0.190%	0.19
-11	-0.118%	0.954%	-0.37	-0.266%	-4.272%	-0.28	-0.047%	0.143%	-0.17
-10	0.136%	1.090%	0.43	0.292%	-3.981%	0.31	0.136%	0.278%	0.48
-9	0.087%	1.177%	0.28	-0.150%	-4.131%	-0.16	-0.346%	-0.068%	-1.21
-8	-0.140%	1.037%	-0.44	0.621%	-3.510%	0.65	0.066%	-0.002%	0.23
-7	-0.262%	0.776%	-0.83	-0.617%	-4.128%	-0.65	-0.143%	-0.144%	-0.50
-6	-0.467%	0.308%	-1.48	-0.768%	-4.896%	-0.81	0.115%	-0.030%	0.40
-5	0.010%	0.318%	0.03	-0.688%	-5.584%	-0.72	-0.216%	-0.246%	-0.76
-4	-0.305%	0.013%	-0.97	0.262%	-5.322%	0.28	0.163%	-0.083%	0.57
-3	-0.006%	0.007%	-0.02	-0.500%	-5.822%	-0.53	-0.316%	-0.399%	-1.11
-2	0.321%	0.328%	1.02	0.778%	-5.044%	0.82	0.023%	-0.375%	0.08
-1	0.542%	0.870%	1.71	0.865%	-4.180%	0.91	-0.128%	-0.503%	-0.45
0	**0.402%**	**1.273%**	**1.27**	**1.225%**	**-2.955%**	**1.29**	**-1.255%**	**-1.758%**	**-4.40**
1	-0.602%	0.671%	-1.90	-0.388%	-3.343%	-0.41	-0.249%	-2.007%	-0.87
2	-0.202%	0.468%	-0.64	-0.151%	-3.493%	-0.16	-0.456%	-2.463%	-1.60
3	0.221%	0.689%	0.70	-0.211%	-3.704%	-0.22	0.081%	-2.382%	0.28
4	-0.470%	0.219%	-1.49	0.683%	-3.022%	0.72	0.379%	-2.002%	1.33
5	-0.445%	-0.226%	-1.41	-0.298%	-3.320%	-0.31	-0.120%	-2.122%	-0.42
6	0.038%	-0.188%	0.12	0.025%	-3.294%	0.03	-0.472%	-2.595%	-1.66
7	0.021%	-0.167%	0.07	-0.960%	-4.254%	-1.01	0.038%	-2.556%	0.13
8	0.338%	0.171%	1.07	0.874%	-3.380%	0.92	-0.273%	-2.829%	-0.96
9	-0.160%	0.011%	-0.51	0.894%	-2.486%	0.94	-0.029%	-2.858%	-0.10
10	0.420%	0.431%	1.33	-0.773%	-3.259%	-0.81	0.014%	-2.844%	0.05
11	-0.821%	-0.390%	-2.60	0.484%	-2.775%	0.51	-0.451%	-3.295%	-1.58
12	-0.208%	-0.598%	-0.66	1.061%	-1.714%	1.12	0.455%	-2.840%	1.60
13	0.350%	-0.248%	1.11	-0.198%	-1.911%	-0.21	-0.095%	-2.935%	-0.33
14	0.021%	-0.227%	0.07	-0.287%	-2.198%	-0.30	0.034%	-2.901%	0.12
15	-0.388%	-0.615%	-1.23	-0.984%	-3.182%	-1.03	-0.222%	-3.122%	-0.78
16	0.260%	-0.355%	0.82	0.126%	-3.056%	0.13	-0.055%	-3.177%	-0.19
17	-0.409%	-0.764%	-1.29	-1.283%	-4.339%	-1.35	-0.411%	-3.588%	-1.44
18	-0.015%	-0.780%	-0.05	0.605%	-3.734%	0.64	0.089%	-3.500%	0.31
19	0.061%	-0.719%	0.19	-0.467%	-4.202%	-0.49	0.074%	-3.426%	0.26
20	0.015%	-0.704%	0.05	0.172%	-4.030%	0.18	-0.029%	-3.454%	-0.10
CAR			*-0.35*			*-0.66*			*-1.89*
σ			0.3160			0.9509			0.2850

D7. Information Technology Sample

	Good News			No News			Bad News		
Day	AR	CAR	θ_1	AR	CAR	θ_1	AR	CAR	θ_1
-20	0.069%	0.069%	0.17	-0.643%	-0.643%	-1.08	0.033%	0.033%	0.08
-19	0.709%	0.778%	1.76	-0.374%	-1.017%	-0.63	0.235%	0.267%	0.60
-18	-0.267%	0.511%	-0.67	-0.087%	-1.104%	-0.15	-0.361%	-0.094%	-0.93
-17	1.296%	1.807%	3.23	-0.478%	-1.582%	-0.81	0.853%	0.758%	2.20
-16	0.353%	2.160%	0.88	-0.044%	-1.626%	-0.07	-0.004%	0.755%	-0.01
-15	0.191%	2.351%	0.48	0.189%	-1.437%	0.32	-0.304%	0.451%	-0.78
-14	0.027%	2.378%	0.07	-0.226%	-1.663%	-0.38	0.000%	0.451%	0.00
-13	0.677%	3.055%	1.69	0.422%	-1.241%	0.71	0.023%	0.474%	0.06
-12	-0.409%	2.646%	-1.02	-0.508%	-1.749%	-0.86	0.002%	0.476%	0.00
-11	0.744%	3.390%	1.85	1.216%	-0.533%	2.05	0.313%	0.789%	0.81
-10	0.345%	3.735%	0.86	-0.411%	-0.944%	-0.69	-0.272%	0.517%	-0.70
-9	0.354%	4.089%	0.88	-0.306%	-1.250%	-0.52	-0.188%	0.329%	-0.48
-8	-0.494%	3.595%	-1.23	0.871%	-0.379%	1.47	-0.169%	0.160%	-0.44
-7	0.486%	4.081%	1.21	0.126%	-0.252%	0.21	-0.310%	-0.150%	-0.80
-6	0.459%	4.540%	1.14	0.778%	0.526%	1.31	-0.124%	-0.274%	-0.32
-5	0.363%	4.902%	0.90	-0.622%	-0.097%	-1.05	-0.173%	-0.448%	-0.45
-4	0.018%	4.920%	0.04	0.084%	-0.013%	0.14	0.395%	-0.052%	1.02
-3	-0.275%	4.645%	-0.68	0.435%	0.422%	0.73	0.028%	-0.024%	0.07
-2	0.948%	5.593%	2.36	-0.168%	0.254%	-0.28	0.333%	0.308%	0.86
-1	0.765%	6.358%	1.90	1.610%	1.864%	2.72	0.297%	0.605%	0.76
0	**0.032%**	**6.390%**	**0.08**	**-0.462%**	**1.402%**	**-0.78**	**-2.939%**	**-2.334%**	**-7.57**
1	-0.218%	6.171%	-0.54	-1.282%	0.120%	-2.16	-0.087%	-2.421%	-0.22
2	-0.647%	5.524%	-1.61	0.168%	0.288%	0.28	-0.771%	-3.191%	-1.98
3	-0.502%	5.021%	-1.25	-0.283%	0.004%	-0.48	-0.602%	-3.793%	-1.55
4	0.572%	5.594%	1.43	-2.059%	-2.055%	-3.47	-0.463%	-4.256%	-1.19
5	0.828%	6.422%	2.06	-0.764%	-2.819%	-1.29	0.014%	-4.242%	0.04
6	0.034%	6.456%	0.09	-0.912%	-3.731%	-1.54	-0.324%	-4.566%	-0.83
7	0.342%	6.798%	0.85	0.608%	-3.123%	1.03	0.258%	-4.308%	0.66
8	0.422%	7.220%	1.05	-0.606%	-3.729%	-1.02	0.073%	-4.235%	0.19
9	-0.440%	6.780%	-1.10	0.076%	-3.654%	0.13	-0.115%	-4.350%	-0.30
10	0.172%	6.952%	0.43	-0.455%	-4.109%	-0.77	-0.185%	-4.535%	-0.48
11	-0.504%	6.448%	-1.25	-1.451%	-5.560%	-2.45	0.054%	-4.481%	0.14
12	-0.205%	6.243%	-0.51	0.292%	-5.268%	0.49	-0.115%	-4.596%	-0.30
13	0.385%	6.628%	0.96	0.471%	-4.797%	0.80	0.289%	-4.306%	0.75
14	-0.221%	6.408%	-0.55	-0.146%	-4.942%	-0.25	-0.143%	-4.449%	-0.37
15	-0.368%	6.040%	-0.92	0.272%	-4.671%	0.46	-0.314%	-4.763%	-0.81
16	-0.105%	5.935%	-0.26	1.638%	-3.033%	2.76	-0.268%	-5.031%	-0.69
17	-0.283%	5.652%	-0.70	-0.794%	-3.827%	-1.34	-0.230%	-5.262%	-0.59
18	0.718%	6.370%	1.79	0.921%	-2.906%	1.55	0.015%	-5.246%	0.04
19	0.311%	6.681%	0.77	-1.479%	-4.385%	-2.50	-0.262%	-5.508%	-0.67
20	-0.241%	6.440%	-0.60	-0.812%	-5.197%	-1.37	0.399%	-5.110%	1.03
CAR			*2.50*			*-1.37*			*-2.06*
σ			0.4016			0.5926			0.3883

D8. Materials Sample

	Good News			No News			Bad News		
Day	AR	CAR	θ_1	AR	CAR	θ_1	AR	CAR	θ_1
-20	-0.245%	-0.245%	-0.49	7.034%	7.034%	4.41	-0.634%	-0.634%	-1.32
-19	-0.217%	-0.462%	-0.43	3.508%	10.542%	2.20	-0.392%	-1.027%	-0.82
-18	0.099%	-0.362%	0.20	-3.373%	7.169%	-2.11	-0.207%	-1.234%	-0.43
-17	-0.259%	-0.622%	-0.51	0.449%	7.618%	0.28	-0.137%	-1.370%	-0.28
-16	-0.178%	-0.800%	-0.35	0.484%	8.102%	0.30	-0.214%	-1.584%	-0.45
-15	0.871%	0.071%	1.73	0.055%	8.158%	0.03	0.447%	-1.137%	0.93
-14	-0.516%	-0.445%	-1.03	1.825%	9.983%	1.14	-0.362%	-1.499%	-0.75
-13	1.537%	1.092%	3.05	-1.148%	8.835%	-0.72	0.887%	-0.612%	1.85
-12	-0.192%	0.900%	-0.38	-0.878%	7.956%	-0.55	0.440%	-0.172%	0.92
-11	-0.690%	0.210%	-1.37	0.635%	8.592%	0.40	0.292%	0.120%	0.61
-10	-0.092%	0.118%	-0.18	-1.218%	7.373%	-0.76	-0.087%	0.033%	-0.18
-9	-0.132%	-0.013%	-0.26	1.978%	9.351%	1.24	0.010%	0.043%	0.02
-8	0.320%	0.307%	0.64	-1.464%	7.887%	-0.92	-0.700%	-0.657%	-1.46
-7	0.000%	0.306%	0.00	0.761%	8.647%	0.48	0.228%	-0.428%	0.48
-6	-0.030%	0.277%	-0.06	-1.947%	6.701%	-1.22	-0.469%	-0.898%	-0.98
-5	0.043%	0.320%	0.09	0.174%	6.874%	0.11	-0.439%	-1.337%	-0.92
-4	0.179%	0.499%	0.36	1.747%	8.621%	1.10	0.340%	-0.998%	0.71
-3	0.131%	0.630%	0.26	1.506%	10.127%	0.94	0.824%	-0.174%	1.72
-2	-0.097%	0.533%	-0.19	2.824%	12.951%	1.77	-0.107%	-0.280%	-0.22
-1	-0.168%	0.365%	-0.33	-1.159%	11.791%	-0.73	-0.036%	-0.316%	-0.07
0	**-0.653%**	**-0.288%**	**-1.30**	**-3.968%**	**7.823%**	**-2.49**	**-1.957%**	**-2.274%**	**-4.08**
1	-0.333%	-0.621%	-0.66	-2.969%	4.854%	-1.86	-1.242%	-3.516%	-2.59
2	0.070%	-0.552%	0.14	1.520%	6.374%	0.95	0.066%	-3.450%	0.14
3	-0.641%	-1.193%	-1.27	-1.507%	4.867%	-0.94	-0.049%	-3.499%	-0.10
4	0.893%	-0.300%	1.77	-1.534%	3.333%	-0.96	-0.236%	-3.735%	-0.49
5	-0.100%	-0.400%	-0.20	0.976%	4.309%	0.61	0.251%	-3.484%	0.52
6	0.206%	-0.194%	0.41	-0.284%	4.025%	-0.18	-0.344%	-3.829%	-0.72
7	-0.247%	-0.441%	-0.49	1.209%	5.235%	0.76	-0.329%	-4.157%	-0.68
8	0.271%	-0.170%	0.54	-1.118%	4.117%	-0.70	1.027%	-3.130%	2.14
9	-0.189%	-0.358%	-0.37	-2.275%	1.842%	-1.43	-1.270%	-4.400%	-2.65
10	0.472%	0.114%	0.94	2.046%	3.888%	1.28	-0.728%	-5.128%	-1.52
11	0.082%	0.196%	0.16	-0.827%	3.061%	-0.52	1.679%	-3.449%	3.50
12	0.545%	0.741%	1.08	0.017%	3.077%	0.01	-0.830%	-4.279%	-1.73
13	0.069%	0.810%	0.14	-1.162%	1.915%	-0.73	0.415%	-3.863%	0.87
14	-1.120%	-0.310%	-2.22	-0.103%	1.813%	-0.06	0.150%	-3.713%	0.31
15	0.464%	0.154%	0.92	-1.482%	0.331%	-0.93	-0.355%	-4.068%	-0.74
16	0.284%	0.437%	0.56	1.614%	1.945%	1.01	-0.119%	-4.188%	-0.25
17	0.552%	0.989%	1.10	0.441%	2.385%	0.28	-0.208%	-4.396%	-0.43
18	0.315%	1.304%	0.63	-0.336%	2.049%	-0.21	-0.342%	-4.738%	-0.71
19	0.033%	1.337%	0.07	-1.475%	0.574%	-0.92	-0.224%	-4.962%	-0.47
20	0.131%	1.468%	0.26	-2.049%	-1.475%	-1.28	1.100%	-3.862%	2.29
CAR			*0.45*			*-0.14*			*-1.26*
σ			0.5035			1.5951			0.4799

D9. Telecom Sample

	Good News			No News			Bad News		
Day	AR	CAR	θ_1	AR	CAR	θ_1	AR	CAR	θ_1
-20	0.587%	0.587%	0.40	0.035%	0.035%	0.04	0.335%	0.335%	0.53
-19	-0.132%	0.455%	-0.09	-1.639%	-1.605%	-1.66	0.136%	0.470%	0.21
-18	-0.537%	-0.082%	-0.36	3.792%	2.187%	3.83	-0.158%	0.312%	-0.25
-17	4.146%	4.064%	2.80	-1.390%	0.797%	-1.40	-0.198%	0.114%	-0.31
-16	1.987%	6.052%	1.34	-0.518%	0.279%	-0.52	-0.646%	-0.532%	-1.02
-15	0.819%	6.870%	0.55	0.034%	0.313%	0.03	-0.428%	-0.960%	-0.68
-14	2.235%	9.105%	1.51	-0.932%	-0.619%	-0.94	0.966%	0.006%	1.53
-13	-3.423%	5.682%	-2.31	-1.697%	-2.315%	-1.71	-0.132%	-0.126%	-0.21
-12	0.356%	6.038%	0.24	-0.030%	-2.346%	-0.03	0.363%	0.237%	0.57
-11	0.019%	6.057%	0.01	-0.535%	-2.881%	-0.54	-0.554%	-0.316%	-0.87
-10	0.248%	6.305%	0.17	-0.042%	-2.923%	-0.04	0.129%	-0.187%	0.20
-9	-0.072%	6.233%	-0.05	0.371%	-2.552%	0.37	-0.314%	-0.501%	-0.50
-8	2.317%	8.550%	1.56	-1.814%	-4.366%	-1.83	-1.035%	-1.536%	-1.63
-7	-1.090%	7.460%	-0.74	0.540%	-3.826%	0.54	-0.038%	-1.574%	-0.06
-6	0.623%	8.083%	0.42	0.281%	-3.545%	0.28	0.166%	-1.409%	0.26
-5	-0.018%	8.065%	-0.01	-0.004%	-3.549%	0.00	-0.243%	-1.652%	-0.38
-4	0.154%	8.219%	0.10	0.106%	-3.443%	0.11	0.154%	-1.498%	0.24
-3	-0.892%	7.327%	-0.60	-0.679%	-4.123%	-0.69	0.174%	-1.324%	0.27
-2	-0.008%	7.319%	-0.01	0.265%	-3.858%	0.27	-1.021%	-2.345%	-1.61
-1	0.125%	7.445%	0.08	0.360%	-3.498%	0.36	0.424%	-1.921%	0.67
0	**0.167%**	**7.611%**	**0.11**	**-0.936%**	**-4.434%**	**-0.94**	**-2.415%**	**-4.337%**	**-3.81**
1	2.457%	10.068%	1.66	1.072%	-3.362%	1.08	0.406%	-3.930%	0.64
2	-1.177%	8.891%	-0.79	-0.449%	-3.811%	-0.45	0.316%	-3.614%	0.50
3	1.033%	9.924%	0.70	0.087%	-3.724%	0.09	-0.109%	-3.724%	-0.17
4	-1.841%	8.083%	-1.24	-0.013%	-3.738%	-0.01	0.779%	-2.945%	1.23
5	-0.772%	7.310%	-0.52	0.194%	-3.544%	0.20	1.410%	-1.535%	2.23
6	0.251%	7.561%	0.17	-0.781%	-4.325%	-0.79	-0.132%	-1.666%	-0.21
7	1.698%	9.259%	1.14	0.893%	-3.431%	0.90	-0.004%	-1.670%	-0.01
8	-1.524%	7.735%	-1.03	-0.551%	-3.983%	-0.56	-0.310%	-1.980%	-0.49
9	-0.272%	7.463%	-0.18	-0.412%	-4.394%	-0.42	0.255%	-1.725%	0.40
10	0.249%	7.712%	0.17	0.068%	-4.327%	0.07	-0.655%	-2.380%	-1.03
11	-0.043%	7.670%	-0.03	-0.368%	-4.695%	-0.37	0.167%	-2.213%	0.26
12	-0.321%	7.349%	-0.22	0.766%	-3.929%	0.77	0.436%	-1.777%	0.69
13	0.488%	7.837%	0.33	-0.909%	-4.838%	-0.92	0.359%	-1.418%	0.57
14	1.617%	9.454%	1.09	1.131%	-3.707%	1.14	0.800%	-0.619%	1.26
15	0.666%	10.119%	0.45	1.231%	-2.476%	1.24	0.265%	-0.354%	0.42
16	-1.660%	8.460%	-1.12	-0.814%	-3.290%	-0.82	-0.541%	-0.895%	-0.85
17	-1.228%	7.232%	-0.83	0.678%	-2.612%	0.68	-0.570%	-1.465%	-0.90
18	1.354%	8.586%	0.91	-0.442%	-3.054%	-0.45	-0.151%	-1.616%	-0.24
19	-2.974%	5.612%	-2.00	0.516%	-2.538%	0.52	-0.110%	-1.726%	-0.17
20	1.048%	6.660%	0.71	-1.194%	-3.732%	-1.21	0.215%	-1.510%	0.34
CAR			*0.70*			*-0.59*			*-0.37*
σ			1.4832			0.9906			0.6331

D10. Utilities Sample

	Good News			No News			Bad News		
Day	AR	CAR	θ_1	AR	CAR	θ_1	AR	CAR	θ_1
-20	0.693%	0.693%	1.33	0.480%	0.480%	0.26	-0.246%	-0.246%	-0.36
-19	0.087%	0.780%	0.17	-0.825%	-0.345%	-0.45	-0.136%	-0.382%	-0.20
-18	-0.449%	0.331%	-0.86	0.770%	0.425%	0.42	0.564%	0.182%	0.82
-17	0.349%	0.680%	0.67	0.727%	1.152%	0.40	-0.291%	-0.109%	-0.42
-16	-0.968%	-0.288%	-1.85	-0.008%	1.143%	0.00	-0.196%	-0.305%	-0.28
-15	-0.248%	-0.536%	-0.47	1.411%	2.555%	0.77	0.345%	0.040%	0.50
-14	0.147%	-0.389%	0.28	-0.776%	1.778%	-0.43	0.019%	0.059%	0.03
-13	0.641%	0.252%	1.23	-3.048%	-1.269%	-1.67	-0.434%	-0.375%	-0.63
-12	-0.912%	-0.660%	-1.75	3.019%	1.749%	1.66	0.846%	0.470%	1.22
-11	0.388%	-0.272%	0.74	0.075%	1.825%	0.04	-1.583%	-1.113%	-2.29
-10	-0.375%	-0.647%	-0.72	0.090%	1.914%	0.05	0.156%	-0.957%	0.23
-9	0.231%	-0.415%	0.44	-0.188%	1.726%	-0.10	0.210%	-0.747%	0.30
-8	-0.655%	-1.070%	-1.25	-1.074%	0.652%	-0.59	0.221%	-0.526%	0.32
-7	-0.001%	-1.071%	0.00	0.478%	1.130%	0.26	0.501%	-0.025%	0.73
-6	0.447%	-0.624%	0.86	0.105%	1.235%	0.06	-0.222%	-0.247%	-0.32
-5	-0.623%	-1.247%	-1.19	-0.495%	0.740%	-0.27	0.477%	0.230%	0.69
-4	0.843%	-0.405%	1.61	-0.158%	0.582%	-0.09	-0.280%	-0.050%	-0.40
-3	-0.235%	-0.639%	-0.45	1.246%	1.829%	0.68	0.400%	0.351%	0.58
-2	0.091%	-0.549%	0.17	-1.160%	0.669%	-0.64	-0.873%	-0.522%	-1.26
-1	0.402%	-0.147%	0.77	-0.222%	0.447%	-0.12	1.098%	0.576%	1.59
0	**0.285%**	**0.138%**	**0.55**	**0.113%**	**0.560%**	**0.06**	**-0.632%**	**-0.056%**	**-0.92**
1	-0.605%	-0.467%	-1.16	0.025%	0.585%	0.01	-0.086%	-0.143%	-0.13
2	-0.591%	-1.058%	-1.13	1.850%	2.435%	1.01	-0.373%	-0.516%	-0.54
3	-0.269%	-1.327%	-0.52	-2.152%	0.282%	-1.18	0.566%	0.050%	0.82
4	0.613%	-0.714%	1.17	-0.616%	-0.334%	-0.34	-0.222%	-0.172%	-0.32
5	0.164%	-0.550%	0.31	-1.393%	-1.727%	-0.76	-0.360%	-0.532%	-0.52
6	-0.312%	-0.861%	-0.60	1.852%	0.125%	1.02	-1.052%	-1.583%	-1.52
7	0.415%	-0.446%	0.80	-0.671%	-0.546%	-0.37	-0.988%	-2.571%	-1.43
8	0.169%	-0.277%	0.32	0.079%	-0.467%	0.04	0.255%	-2.316%	0.37
9	0.137%	-0.140%	0.26	1.880%	1.413%	1.03	-1.451%	-3.767%	-2.10
10	0.071%	-0.070%	0.14	-0.956%	0.457%	-0.52	0.822%	-2.944%	1.19
11	-0.732%	-0.802%	-1.40	-0.015%	0.441%	-0.01	0.430%	-2.514%	0.62
12	-0.051%	-0.853%	-0.10	-0.164%	0.278%	-0.09	0.523%	-1.991%	0.76
13	-0.681%	-1.533%	-1.30	0.218%	0.496%	0.12	-1.018%	-3.008%	-1.47
14	0.186%	-1.347%	0.36	0.834%	1.329%	0.46	0.993%	-2.016%	1.44
15	1.172%	-0.175%	2.24	2.182%	3.511%	1.20	-0.994%	-3.009%	-1.44
16	0.029%	-0.146%	0.06	2.206%	5.717%	1.21	0.023%	-2.986%	0.03
17	-0.155%	-0.301%	-0.30	-2.282%	3.435%	-1.25	0.046%	-2.939%	0.07
18	-0.585%	-0.886%	-1.12	0.250%	3.685%	0.14	0.500%	-2.440%	0.72
19	-0.339%	-1.225%	-0.65	0.728%	4.412%	0.40	-0.887%	-3.327%	-1.28
20	-0.392%	-1.617%	-0.75	1.187%	5.599%	0.65	0.518%	-2.809%	0.75
CAR			*-0.48*			*0.48*			*-0.64*
σ			0.5220			1.8235			0.6907

Appendix E: Results, Sample According to Time Period

Tables of abnormal returns, cumulative abnormal returns and values of θ_1 for the four annual samples, plus the Q3-2008 to Q1-2009 sample. The θ_1 value is the test parameter for the null hypothesis that the event has zero effect on returns on the given day. The one-day standard deviations are listed at the bottom of the table.

E1. 2007 Sample

	Good News			No News			Bad News		
Day	AR	CAR	θ_1	AR	CAR	θ_1	AR	CAR	θ_1
-20	-0.033%	-0.033%	-0.19	0.302%	0.302%	0.75	-0.110%	-0.110%	-0.65
-19	0.184%	0.150%	1.03	-0.188%	0.114%	-0.47	0.065%	-0.046%	0.38
-18	-0.445%	-0.295%	-2.49	0.303%	0.417%	0.76	0.079%	0.033%	0.46
-17	0.316%	0.021%	1.77	-0.507%	-0.090%	-1.27	-0.093%	-0.060%	-0.55
-16	0.119%	0.140%	0.66	-0.584%	-0.673%	-1.46	-0.022%	-0.082%	-0.13
-15	-0.178%	-0.038%	-1.00	0.267%	-0.406%	0.67	0.054%	-0.028%	0.31
-14	0.061%	0.023%	0.34	0.065%	-0.341%	0.16	-0.138%	-0.166%	-0.81
-13	0.227%	0.251%	1.27	-0.713%	-1.054%	-1.78	0.163%	-0.003%	0.96
-12	-0.377%	-0.126%	-2.11	-0.193%	-1.247%	-0.48	-0.048%	-0.050%	-0.28
-11	0.344%	0.218%	1.92	0.116%	-1.132%	0.29	-0.179%	-0.229%	-1.05
-10	-0.088%	0.130%	-0.49	-0.586%	-1.718%	-1.46	0.153%	-0.076%	0.90
-9	0.236%	0.365%	1.32	0.321%	-1.397%	0.80	-0.294%	-0.370%	-1.73
-8	-0.028%	0.337%	-0.16	-0.117%	-1.513%	-0.29	-0.095%	-0.465%	-0.56
-7	-0.127%	0.210%	-0.71	0.055%	-1.458%	0.14	0.075%	-0.390%	0.44
-6	-0.399%	-0.189%	-2.23	-0.084%	-1.542%	-0.21	-0.045%	-0.434%	-0.26
-5	0.110%	-0.079%	0.61	-0.465%	-2.007%	-1.16	-0.247%	-0.681%	-1.45
-4	0.161%	0.082%	0.90	0.386%	-1.621%	0.96	-0.008%	-0.689%	-0.05
-3	-0.047%	0.035%	-0.26	0.541%	-1.081%	1.35	-0.196%	-0.886%	-1.15
-2	0.190%	0.225%	1.06	-0.025%	-1.106%	-0.06	0.224%	-0.662%	1.32
-1	0.486%	0.711%	2.72	0.492%	-0.614%	1.23	0.039%	-0.622%	0.23
0	**0.137%**	**0.848%**	**0.77**	**0.340%**	**-0.274%**	**0.85**	**-1.385%**	**-2.008%**	**-8.13**
1	-0.295%	0.553%	-1.65	-0.292%	-0.566%	-0.73	-0.635%	-2.643%	-3.73
2	-0.170%	0.382%	-0.95	-0.598%	-1.164%	-1.49	-0.188%	-2.831%	-1.10
3	-0.476%	-0.093%	-2.66	0.150%	-1.014%	0.37	0.029%	-2.802%	0.17
4	-0.373%	-0.466%	-2.08	-0.483%	-1.497%	-1.21	-0.333%	-3.135%	-1.96
5	-0.037%	-0.503%	-0.21	0.446%	-1.051%	1.11	0.029%	-3.106%	0.17
6	-0.013%	-0.515%	-0.07	-0.857%	-1.908%	-2.14	-0.481%	-3.587%	-2.82
7	-0.012%	-0.527%	-0.07	0.358%	-1.550%	0.89	0.286%	-3.301%	1.68
8	-0.143%	-0.670%	-0.80	0.214%	-1.336%	0.53	0.275%	-3.026%	1.61
9	-0.125%	-0.796%	-0.70	-0.277%	-1.613%	-0.69	-0.002%	-3.028%	-0.01
10	0.183%	-0.613%	1.02	-0.135%	-1.748%	-0.34	-0.156%	-3.184%	-0.91
11	-0.194%	-0.807%	-1.08	-0.799%	-2.547%	-1.99	-0.402%	-3.586%	-2.36
12	-0.112%	-0.919%	-0.63	0.325%	-2.221%	0.81	-0.326%	-3.912%	-1.91
13	-0.318%	-1.236%	-1.78	0.118%	-2.104%	0.29	-0.087%	-3.999%	-0.51
14	-0.439%	-1.675%	-2.45	0.088%	-2.015%	0.22	0.137%	-3.862%	0.80
15	-0.018%	-1.693%	-0.10	-0.456%	-2.472%	-1.14	-0.089%	-3.951%	-0.52
16	0.225%	-1.468%	1.26	0.012%	-2.460%	0.03	-0.059%	-4.010%	-0.34
17	-0.196%	-1.664%	-1.10	-0.737%	-3.196%	-1.84	-0.343%	-4.352%	-2.01
18	-0.312%	-1.976%	-1.74	-0.019%	-3.215%	-0.05	-0.208%	-4.560%	-1.22
19	-0.287%	-2.264%	-1.61	-0.344%	-3.558%	-0.86	-0.168%	-4.728%	-0.98
20	-0.012%	-2.276%	-0.07	-0.886%	-4.445%	-2.21	0.053%	-4.675%	0.31
CAR			*-1.99*			*-1.73*			*-4.28*
σ			0.1787			0.4005			0.1704

E2. 2008 Sample

	Good News			No News			Bad News		
Day	AR	CAR	θ_1	AR	CAR	θ_1	AR	CAR	θ_1
-20	0.298%	0.298%	1.14	-0.542%	-0.542%	-1.02	-0.025%	-0.025%	-0.11
-19	-0.054%	0.244%	-0.21	-0.114%	-0.656%	-0.21	0.047%	0.022%	0.21
-18	-0.325%	-0.081%	-1.25	-0.032%	-0.688%	-0.06	0.234%	0.256%	1.07
-17	0.799%	0.718%	3.07	-1.306%	-1.994%	-2.46	-0.266%	-0.010%	-1.22
-16	-0.037%	0.681%	-0.14	-0.650%	-2.644%	-1.23	-0.289%	-0.298%	-1.32
-15	0.148%	0.829%	0.57	-1.369%	-4.013%	-2.58	0.023%	-0.275%	0.11
-14	0.078%	0.906%	0.30	0.017%	-3.996%	0.03	-0.338%	-0.612%	-1.55
-13	-0.163%	0.743%	-0.63	0.243%	-3.753%	0.46	0.085%	-0.527%	0.39
-12	-0.287%	0.456%	-1.10	-0.454%	-4.208%	-0.86	0.087%	-0.440%	0.40
-11	-0.168%	0.289%	-0.64	1.097%	-3.111%	2.07	0.306%	-0.134%	1.40
-10	0.310%	0.599%	1.19	0.908%	-2.203%	1.71	0.170%	0.036%	0.78
-9	-0.088%	0.512%	-0.34	-1.132%	-3.335%	-2.14	0.181%	0.217%	0.83
-8	-0.173%	0.339%	-0.66	0.582%	-2.752%	1.10	-0.196%	0.022%	-0.90
-7	0.386%	0.725%	1.48	0.008%	-2.744%	0.02	-0.082%	-0.060%	-0.37
-6	-0.101%	0.624%	-0.39	-0.407%	-3.151%	-0.77	0.169%	0.108%	0.77
-5	0.418%	1.042%	1.61	-0.604%	-3.755%	-1.14	-0.397%	-0.289%	-1.82
-4	0.627%	1.669%	2.41	0.304%	-3.451%	0.57	-0.009%	-0.298%	-0.04
-3	-0.067%	1.602%	-0.26	-1.065%	-4.516%	-2.01	0.003%	-0.294%	0.02
-2	0.380%	1.982%	1.46	0.207%	-4.309%	0.39	0.013%	-0.282%	0.06
-1	0.545%	2.527%	2.09	2.111%	-2.198%	3.98	0.250%	-0.032%	1.14
0	**1.368%**	**3.894%**	**5.25**	**-0.108%**	**-2.306%**	**-0.20**	**-1.699%**	**-1.731%**	**-7.78**
1	-0.101%	3.794%	-0.39	0.050%	-2.256%	0.09	0.068%	-1.662%	0.31
2	-0.366%	3.427%	-1.41	0.232%	-2.024%	0.44	-0.317%	-1.980%	-1.45
3	-0.539%	2.888%	-2.07	-0.412%	-2.436%	-0.78	-0.034%	-2.014%	-0.16
4	0.426%	3.314%	1.63	-0.901%	-3.337%	-1.70	0.263%	-1.751%	1.20
5	0.306%	3.620%	1.18	-0.607%	-3.944%	-1.15	-0.202%	-1.953%	-0.92
6	-0.439%	3.181%	-1.69	-0.249%	-4.193%	-0.47	-0.155%	-2.108%	-0.71
7	0.109%	3.290%	0.42	-0.154%	-4.347%	-0.29	0.169%	-1.939%	0.78
8	0.491%	3.781%	1.89	-0.297%	-4.645%	-0.56	0.141%	-1.798%	0.65
9	-0.250%	3.531%	-0.96	0.191%	-4.454%	0.36	-0.296%	-2.094%	-1.36
10	-0.202%	3.330%	-0.77	-0.629%	-5.083%	-1.19	-0.189%	-2.283%	-0.86
11	-0.073%	3.256%	-0.28	0.313%	-4.769%	0.59	0.251%	-2.032%	1.15
12	0.106%	3.362%	0.41	-0.792%	-5.561%	-1.49	0.316%	-1.716%	1.45
13	0.289%	3.652%	1.11	-0.386%	-5.947%	-0.73	0.284%	-1.432%	1.30
14	-0.465%	3.187%	-1.79	-0.448%	-6.396%	-0.85	0.221%	-1.211%	1.01
15	0.006%	3.193%	0.02	-0.072%	-6.467%	-0.14	-0.270%	-1.481%	-1.24
16	-0.189%	3.004%	-0.73	0.174%	-6.293%	0.33	0.310%	-1.171%	1.42
17	-0.569%	2.435%	-2.19	-1.966%	-8.259%	-3.71	-0.484%	-1.655%	-2.22
18	-0.026%	2.408%	-0.10	0.667%	-7.592%	1.26	-0.590%	-2.245%	-2.70
19	-0.106%	2.303%	-0.41	-0.543%	-8.135%	-1.02	0.115%	-2.130%	0.53
20	-0.672%	1.631%	-2.58	0.052%	-8.083%	0.10	-0.029%	-2.159%	-0.13
CAR			*0.98*			*-2.38*			*-1.54*
σ			0.2604			0.5302			0.2184

E3. 2009 Sample

	Good News			No News			Bad News		
Day	AR	CAR	θ_1	AR	CAR	θ_1	AR	CAR	θ_1
-20	-0.006%	-0.006%	-0.02	0.204%	0.204%	0.26	0.204%	0.204%	0.65
-19	-0.006%	-0.012%	-0.02	0.490%	0.693%	0.63	-0.165%	0.039%	-0.53
-18	0.293%	0.281%	0.91	0.615%	1.308%	0.79	-0.015%	0.024%	-0.05
-17	-0.498%	-0.217%	-1.54	-0.535%	0.773%	-0.69	0.544%	0.568%	1.74
-16	0.082%	-0.136%	0.25	-0.124%	0.650%	-0.16	0.035%	0.603%	0.11
-15	0.320%	0.185%	0.99	0.316%	0.966%	0.41	0.251%	0.853%	0.80
-14	0.037%	0.222%	0.11	0.442%	1.408%	0.57	0.041%	0.895%	0.13
-13	0.512%	0.734%	1.59	0.528%	1.935%	0.68	-0.327%	0.567%	-1.05
-12	0.002%	0.736%	0.01	0.116%	2.051%	0.15	0.242%	0.809%	0.77
-11	0.489%	1.224%	1.51	0.432%	2.483%	0.55	0.425%	1.234%	1.36
-10	0.123%	1.347%	0.38	1.275%	3.758%	1.63	0.027%	1.261%	0.09
-9	0.186%	1.533%	0.58	1.112%	4.870%	1.42	-0.549%	0.712%	-1.75
-8	0.008%	1.542%	0.03	0.117%	4.987%	0.15	0.189%	0.901%	0.60
-7	0.206%	1.748%	0.64	0.055%	5.042%	0.07	0.025%	0.926%	0.08
-6	-0.206%	1.542%	-0.64	-0.051%	4.991%	-0.07	0.014%	0.940%	0.04
-5	0.449%	1.991%	1.39	-0.669%	4.322%	-0.86	0.083%	1.023%	0.27
-4	-0.268%	1.723%	-0.83	0.561%	4.883%	0.72	-0.044%	0.979%	-0.14
-3	0.150%	1.873%	0.47	0.532%	5.415%	0.68	0.361%	1.340%	1.15
-2	0.668%	2.541%	2.07	0.172%	5.587%	0.22	0.094%	1.433%	0.30
-1	0.628%	3.169%	1.94	0.314%	5.901%	0.40	0.539%	1.972%	1.72
0	**0.114%**	**3.283%**	**0.35**	**-0.585%**	**5.316%**	**-0.75**	**-1.451%**	**0.521%**	**-4.63**
1	-0.376%	2.907%	-1.16	-0.843%	4.473%	-1.08	-0.199%	0.322%	-0.63
2	-0.131%	2.776%	-0.41	0.187%	4.660%	0.24	-0.177%	0.145%	-0.57
3	0.224%	3.000%	0.69	0.927%	5.587%	1.19	-0.073%	0.072%	-0.23
4	0.143%	3.144%	0.44	1.070%	6.656%	1.37	-0.246%	-0.174%	-0.79
5	0.402%	3.546%	1.25	0.255%	6.912%	0.33	-0.215%	-0.389%	-0.69
6	0.149%	3.695%	0.46	-0.481%	6.431%	-0.62	-0.274%	-0.664%	-0.88
7	-0.008%	3.687%	-0.02	1.549%	7.979%	1.98	-0.476%	-1.140%	-1.52
8	0.294%	3.981%	0.91	-0.253%	7.727%	-0.32	0.095%	-1.045%	0.30
9	0.219%	4.200%	0.68	-0.065%	7.662%	-0.08	0.003%	-1.043%	0.01
10	0.531%	4.731%	1.64	-0.006%	7.656%	-0.01	-0.187%	-1.230%	-0.60
11	-0.261%	4.470%	-0.81	0.204%	7.860%	0.26	0.476%	-0.754%	1.52
12	-0.045%	4.425%	-0.14	0.019%	7.878%	0.02	0.082%	-0.671%	0.26
13	0.219%	4.644%	0.68	0.038%	7.916%	0.05	-0.301%	-0.972%	-0.96
14	0.167%	4.811%	0.52	-0.173%	7.742%	-0.22	0.064%	-0.908%	0.21
15	-0.179%	4.632%	-0.55	-0.377%	7.366%	-0.48	0.414%	-0.494%	1.32
16	0.289%	4.921%	0.89	0.102%	7.468%	0.13	-0.189%	-0.683%	-0.60
17	0.223%	5.144%	0.69	-0.052%	7.416%	-0.07	-0.440%	-1.123%	-1.40
18	0.421%	5.565%	1.31	0.698%	8.114%	0.89	0.663%	-0.460%	2.12
19	0.527%	6.092%	1.63	-0.647%	7.466%	-0.83	-0.022%	-0.482%	-0.07
20	0.157%	6.249%	0.49	-0.093%	7.373%	-0.12	0.483%	0.001%	1.54
CAR			*3.02*			*1.48*			*0.00*
σ			0.3229			0.7803			0.3131

E4. 2010 Sample

	Good News			No News			Bad News		
Day	AR	CAR	θ_1	AR	CAR	θ_1	AR	CAR	θ_1
-20	0.223%	0.223%	0.73	-0.691%	-0.691%	-0.48	-0.545%	-0.545%	-1.84
-19	0.503%	0.725%	1.66	0.117%	-0.574%	0.08	0.137%	-0.408%	0.46
-18	0.138%	0.863%	0.45	-0.026%	-0.599%	-0.02	0.168%	-0.239%	0.57
-17	-0.183%	0.680%	-0.60	-0.597%	-1.196%	-0.41	-0.219%	-0.458%	-0.74
-16	0.208%	0.888%	0.68	0.334%	-0.862%	0.23	0.251%	-0.207%	0.85
-15	0.618%	1.506%	2.04	0.182%	-0.680%	0.13	-0.363%	-0.570%	-1.22
-14	-0.051%	1.456%	-0.17	0.059%	-0.622%	0.04	-0.382%	-0.952%	-1.29
-13	0.110%	1.566%	0.36	0.162%	-0.459%	0.11	0.283%	-0.669%	0.96
-12	0.155%	1.721%	0.51	-0.457%	-0.916%	-0.32	0.356%	-0.314%	1.20
-11	-0.242%	1.479%	-0.80	0.076%	-0.841%	0.05	-0.329%	-0.643%	-1.11
-10	-0.049%	1.430%	-0.16	-0.386%	-1.227%	-0.27	0.034%	-0.609%	0.12
-9	0.046%	1.477%	0.15	0.595%	-0.632%	0.41	-0.192%	-0.800%	-0.65
-8	-0.090%	1.387%	-0.30	-0.358%	-0.990%	-0.25	0.158%	-0.642%	0.53
-7	0.024%	1.411%	0.08	0.597%	-0.393%	0.41	-0.308%	-0.950%	-1.04
-6	0.108%	1.519%	0.35	-0.093%	-0.486%	-0.06	-0.194%	-1.145%	-0.66
-5	-0.128%	1.391%	-0.42	-0.356%	-0.842%	-0.25	-0.372%	-1.517%	-1.26
-4	-0.546%	0.845%	-1.80	0.430%	-0.412%	0.30	0.240%	-1.276%	0.81
-3	-0.352%	0.493%	-1.16	-0.680%	-1.092%	-0.47	-0.060%	-1.336%	-0.20
-2	0.114%	0.607%	0.38	0.491%	-0.601%	0.34	0.176%	-1.159%	0.60
-1	0.342%	0.949%	1.13	-0.041%	-0.642%	-0.03	-0.003%	-1.162%	-0.01
0	**0.340%**	**1.290%**	**1.12**	**-0.038%**	**-0.680%**	**-0.03**	**-1.613%**	**-2.775%**	**-5.45**
1	-0.371%	0.919%	-1.22	-1.123%	-1.803%	-0.78	-0.782%	-3.557%	-2.64
2	-0.110%	0.809%	-0.36	0.181%	-1.622%	0.13	-0.265%	-3.822%	-0.90
3	-0.052%	0.758%	-0.17	0.389%	-1.233%	0.27	-0.426%	-4.248%	-1.44
4	-0.108%	0.649%	-0.36	0.724%	-0.509%	0.50	-0.049%	-4.298%	-0.17
5	0.117%	0.766%	0.38	-0.257%	-0.766%	-0.18	-0.172%	-4.470%	-0.58
6	-0.196%	0.570%	-0.65	0.532%	-0.234%	0.37	-0.580%	-5.049%	-1.96
7	-0.084%	0.485%	-0.28	-0.965%	-1.199%	-0.67	-0.343%	-5.392%	-1.16
8	-0.155%	0.330%	-0.51	0.752%	-0.447%	0.52	-0.170%	-5.562%	-0.57
9	-0.541%	-0.211%	-1.78	0.038%	-0.409%	0.03	-0.072%	-5.634%	-0.24
10	0.073%	-0.138%	0.24	-0.612%	-1.022%	-0.42	0.135%	-5.499%	0.45
11	-0.436%	-0.574%	-1.43	1.398%	0.376%	0.97	0.096%	-5.403%	0.32
12	0.010%	-0.563%	0.03	-0.625%	-0.249%	-0.43	-0.216%	-5.620%	-0.73
13	0.427%	-0.137%	1.41	-0.592%	-0.841%	-0.41	-0.274%	-5.894%	-0.93
14	-0.002%	-0.139%	-0.01	-1.021%	-1.862%	-0.71	0.104%	-5.790%	0.35
15	-0.046%	-0.184%	-0.15	-0.875%	-2.738%	-0.61	0.007%	-5.783%	0.02
16	0.116%	-0.068%	0.38	-0.315%	-3.052%	-0.22	-0.087%	-5.870%	-0.29
17	-0.093%	-0.161%	-0.31	0.324%	-2.729%	0.22	-0.186%	-6.056%	-0.63
18	0.435%	0.274%	1.43	-0.149%	-2.878%	-0.10	-0.230%	-6.286%	-0.78
19	-0.215%	0.059%	-0.71	-0.723%	-3.601%	-0.50	0.020%	-6.266%	0.07
20	-0.027%	0.032%	-0.09	0.510%	-3.091%	0.35	0.156%	-6.110%	0.53
CAR			*0.02*			*-0.34*			*-3.22*
σ			0.3036			1.4462			0.2960

E5. Q3-2008 to Q1-2009 Sample

	Good News			No News			Bad News		
Day	AR	CAR	θ_1	AR	CAR	θ_1	AR	CAR	θ_1
-20	0.413%	0.413%	1.12	-0.674%	-0.674%	-0.81	-0.037%	-0.037%	-0.12
-19	-0.311%	0.103%	-0.84	-0.101%	-0.775%	-0.12	0.491%	0.454%	1.65
-18	-0.523%	-0.420%	-1.42	0.419%	-0.357%	0.50	-0.090%	0.364%	-0.30
-17	1.025%	0.605%	2.78	-1.979%	-2.336%	-2.38	-0.347%	0.017%	-1.16
-16	0.565%	1.170%	1.53	-1.101%	-3.437%	-1.32	-0.858%	-0.841%	-2.87
-15	0.609%	1.779%	1.65	-1.302%	-4.739%	-1.57	0.224%	-0.617%	0.75
-14	0.534%	2.313%	1.45	-0.041%	-4.780%	-0.05	-0.453%	-1.070%	-1.52
-13	0.345%	2.658%	0.93	1.249%	-3.531%	1.50	-0.147%	-1.217%	-0.49
-12	-0.341%	2.316%	-0.93	-0.599%	-4.129%	-0.72	0.437%	-0.780%	1.47
-11	0.498%	2.815%	1.35	1.238%	-2.891%	1.49	0.495%	-0.285%	1.66
-10	0.318%	3.133%	0.86	0.932%	-1.960%	1.12	0.202%	-0.083%	0.68
-9	0.156%	3.289%	0.42	-1.920%	-3.880%	-2.31	-0.328%	-0.411%	-1.10
-8	0.185%	3.474%	0.50	-0.104%	-3.984%	-0.13	-0.079%	-0.490%	-0.26
-7	-0.012%	3.462%	-0.03	0.467%	-3.518%	0.56	0.430%	-0.060%	1.44
-6	-0.320%	3.141%	-0.87	-0.312%	-3.830%	-0.38	0.427%	0.367%	1.43
-5	-0.006%	3.135%	-0.02	-0.537%	-4.366%	-0.65	-0.144%	0.223%	-0.48
-4	0.411%	3.546%	1.11	0.430%	-3.937%	0.52	-0.045%	0.178%	-0.15
-3	0.389%	3.936%	1.06	-1.416%	-5.353%	-1.70	0.039%	0.217%	0.13
-2	1.145%	5.081%	3.10	0.109%	-5.244%	0.13	-0.190%	0.027%	-0.64
-1	0.545%	5.626%	1.48	2.483%	-2.761%	2.98	0.339%	0.366%	1.14
0	**0.634%**	**6.260%**	**1.72**	**-0.517%**	**-3.278%**	**-0.62**	**-1.736%**	**-1.370%**	**-5.82**
1	-0.115%	6.145%	-0.31	-0.789%	-4.067%	-0.95	0.559%	-0.811%	1.87
2	-0.130%	6.016%	-0.35	0.452%	-3.615%	0.54	-0.194%	-1.004%	-0.65
3	-0.097%	5.919%	-0.26	-0.582%	-4.197%	-0.70	0.399%	-0.606%	1.34
4	0.850%	6.769%	2.30	-0.198%	-4.395%	-0.24	0.782%	0.177%	2.62
5	0.248%	7.017%	0.67	-1.309%	-5.704%	-1.57	-0.154%	0.023%	-0.52
6	-0.027%	6.989%	-0.07	-0.461%	-6.165%	-0.55	-0.233%	-0.210%	-0.78
7	0.034%	7.023%	0.09	0.024%	-6.141%	0.03	0.214%	0.004%	0.72
8	0.468%	7.491%	1.27	-0.177%	-6.318%	-0.21	0.250%	0.254%	0.84
9	0.002%	7.493%	0.01	0.376%	-5.942%	0.45	-0.087%	0.166%	-0.29
10	0.870%	8.363%	2.36	-1.261%	-7.203%	-1.52	-0.299%	-0.132%	-1.00
11	-0.349%	8.014%	-0.95	1.283%	-5.920%	1.54	0.439%	0.307%	1.47
12	-0.071%	7.943%	-0.19	-0.871%	-6.791%	-1.05	0.462%	0.770%	1.55
13	0.961%	8.904%	2.61	-0.611%	-7.403%	-0.73	-0.044%	0.726%	-0.15
14	0.175%	9.079%	0.47	-0.818%	-8.221%	-0.98	0.119%	0.845%	0.40
15	-0.020%	9.059%	-0.05	-0.808%	-9.029%	-0.97	-0.144%	0.701%	-0.48
16	0.045%	9.104%	0.12	0.999%	-8.029%	1.20	0.783%	1.484%	2.63
17	-0.052%	9.052%	-0.14	-2.290%	-10.319%	-2.75	-0.815%	0.669%	-2.73
18	0.284%	9.336%	0.77	0.863%	-9.456%	1.04	-0.065%	0.604%	-0.22
19	0.202%	9.538%	0.55	0.189%	-9.267%	0.23	0.339%	0.943%	1.14
20	-0.613%	8.924%	-1.66	-0.190%	-9.457%	-0.23	0.312%	1.255%	1.04
CAR			*3.78*			*-1.78*			*0.32*
σ			0.3689			0.8321			0.2984

Appendix F: Sammendrag

I denne masteroppgaven studeres resultatkunngjøringer for et utvalg av 117 selskap i det norske aksjemarkedet, over tidsperioden 2007 til 2010. Studien tjener som en metode for å teste hvor *effisient* det norske kapitalmarkedet er, med bakgrunn i *markedseffisienshypotesen;* et begrep som har figurert i finanslitteraturen siden 1960-tallet. Begrepet ble først utviklet av Eugene Fama (se Fama, 1965, 1970, 1991). Essensen ligger i at markedet fanger opp ny informasjon raskt, slik at det ikke er mulig å oppnå risikojustert avkastning utover den som oppnås i det brede markedet. Hvis denne hypotesen holder, vil tid og penger benyttet til å lete etter informasjon om underprisede aksjer i markedet være bortkastet. En grunn til den brede forskning som har blitt nedlagt i hypotesen om effisiente markeder er trolig et ønske om å kartlegge hvorvidt fundamental aksjeanalyse gir belønning. Denne studien utføres som et *eventstudie.* En slik studie undersøker en spesifikk hendelse som forventes å gi informasjon til markedet, og studerer hvor vidt den fører til unormal avkastning. Studien bekrefter eller forkaster nullhypotesen om at hendelsen ikke har betydning for aksjeavkastningen.

Det meste av forskningen innen markedseffisiens kommer fra USA, og hypotesen har blitt solid bekreftet, men avvik, eller såkalte ”anomalier”, har også blitt avdekket. Blant annet har en vedvarende drift i avkastning i samme retning som resultatoverraskelsen blitt funnet i flere studier (for eksempel Ball og Brown, 1968, Brown og Kennelly, 1972, Foster, Olsen og Shevlin, 1984, Ball og Bartov, 1996). Denne refereres til som ”the post-earnings-announcement drift” i litteraturen. Et slikt fenomen står i direkte motsetning til hypotesen om effisiente markeder. Det har også i flere studier blitt bevist at en strategi som går ut på å utnytte denne driften er lønnsom, se for eksempel Shivakumar (2007), hvilket impliserer at i et marked som ikke er informasjonsmessig effisient, kan fundamental analyse gi store gevinster.

Det jeg ønsker å undersøke i min masteroppgave, er for det første om resultatkunngjøringer har informasjonsmessig verdi. For det andre, ønsker jeg å finne ut hvor raskt markedet er i stand til å inkorporere denne informasjonen; med andre ord hvor effisient det er. Til sist leter jeg etter tegn på den dokumenterte driften som beskrevet over. Metodemessig deles undersøkelsen i to. Den første delen går ut på å estimere markedets forventede resultater (her EPS) ved hjelp av en tidsseriemodell, mens den andre delen tar for seg estimeringen av de unormale avkastningene som følge av resultatkunngjøringen. Flere studier har dokumentert at

kvartalsvise resultattall kan estimeres via tidsseriemodeller (for eksempel Griffin, 1977, og Foster, 1977). I denne oppgaven bruker jeg en enkel sesongdifferensiert A.R.(1)-modell med drift for å finne et estimat på markedets forventning. Alle de kvartalsvise resultatene deles inn i tre grupper: positive resultatoverraskelser (”gode nyheter”), negative overraskelser (”dårlige nyheter”) og ingen overraskelse (”ingen nyheter”). Deretter estimeres selskapenes normale avkastning i perioden (”vinduet”) rundt resultatkunngjøringen (20 dager før og etter pluss dagen for kunngjøringen, totalt 41 dager) ved hjelp av en markedsmodell. Slik er det mulig å kartlegge den spesifikke hendelsens betydning for aksjeavkastningene i perioden rundt resultatkunngjøring.

Resultatene viser at datoen for resultatkunngjøring fører med seg statistisk signifikant unormal avkastning i kategoriene ”gode nyheter” og ”dårlige nyheter”, men ikke i ”ingen nyheter”-kategorien, i tråd med hva som bør forventes. Dette tolkes som at resultatannonseringer gir informasjonsmessig verdi til aktørene i markedet. Det understrekes også at nullhypotesen kan forkastes med bredere margin i kategorien ”dårlige nyheter”. I tillegg viser resultatene at den signifikante unormale avkastningen i ”dårlige nyheter”-gruppen strekker seg videre til dag 1 etter hendelsen. Dette indikerer en viss treghet i markedets fullstendige oppfatning av nyhetenes betydning for aksjeverdien. For de ”gode nyhetene” fantes signifikant unormal avkastning de to dagene før hendelsen, og negativ avkastning dagen etter. En mulig forklaring på det første kan være at informasjon som signaliserer økt inntjening lekkes ut til markedet i dagene før resultatet slippes. En mulig årsak til at dette fenomenet kun opptrådte i de positive tilfellene, kan være at selskap som er i ferd med å slippe dårlige resultat er mer forsiktige med hensyn til å signalisere dette til markedet i dagene før resultatet slippes. Den negative avkastningen dagen etter kan muligens forklares med en viss overreaksjon på positive resultatoverraskelser, som ”korrigeres” kort tid etter den initielle reaksjonen. Helhetlig tyder resultatene på at det norske aksjemarkedet er svært effisient, i og med at aksjekursene raskt reflekterer ny informasjon, men som nevnt har et par unntak blitt funnet, som indikerer overreaksjon på gode nyheter og underreaksjon på dårlige nyheter.

Utvalget av 1872 resultatkunngjøringer ble videre kategorisert etter tre kriterier, for å undersøke om enkelte faktorer påvirker resultatene. Denne underkategoriseringen ble utført etter 1) handelsfrekvens/likviditet, 2) bransje og 3) tidsperiode. I den første anvendelsen ble selskapene gruppert etter kategoriseringen på Oslo Børs: OBX, OB Match og OB Standard;

hvorav synkende likviditet. De klareste resultatene syntes i kategorien med de negative overraskelsene, der de indikerte at nyheter fanges raskere opp for de mest handlede aksjene, noe som gjerne relateres til at disse aksjene er de mest analyserte og overvåkte. I anvendelsen hvor aksjene ble gruppert etter de 10 bransjesektorer på Oslo Børs, var det vanskelig å trekke noen store konklusjoner, siden enkelte bransjer kun inneholder et par selskap, men undersøkelsen viste delvis hvilke bransjer som dro vekten i de signifikante positive og negative unormale avkastningene. Til sist, kategoriseringen av resultatkunngjøringene etter tidsperiode ble gjort for å avdekke om det er noen forskjeller i resultatannonseringenes effekter med hensyn til finanskrisen i 2008. Aksjemarkedet har i perioden 2007 til 2010 vært gjennom enorme omveltninger; dermed ville det være interessant å se om effektene av resultatoverraskelser endrer seg gjennom ulike makroøkonomiske tilstander. Først ble utvalget delt i fire, hver gruppe som ett år. I tillegg ble perioden 3. Kvartal 2008 til 1. Kvartal 2009 spesielt studert som et eget utvalg. Resultatene indikerer at negative resultatoverraskelser fanges raskere opp i "unormale" markedstider, men da det gjerne er mer støy i avkastninger forbundet med finanskriser, blir det vanskelig å dra generelle konklusjoner, da estimatene ikke er like sikre som ellers. I tillegg viser tidsperiodegrupperingen at de positive unormale avkastningene på kunngjøringsdatoen kun er signifikante i 2008, og ikke i verken 2007, 2009 eller 2010. Men igjen, støy i markedet gjør at resultatene ikke kan naivt aksepteres som konklusjoner.

Etter denne undersøkelsen, kan jeg i det store og hele konkludere med at det norske aksjemarkedet ser ut til å være effisient. Dette er intet overraskende funn, da vi lever i en høyteknologisk tid som gjør at informasjon sprer seg raskt og bredt. Grunnen til at enkelte avvik fra markedseffisiens har blitt avdekket i studien kan være usikkerhet blant markedsaktører om hva den nye informasjonen faktisk betyr for den sanne selskapsverdien, noe som gjør at det tar lenger tid å fullstendig inkorporere nyhetene i aksjekursene. Det kan også hende at ikke alle investorer har mulighet til å utnytte den nye informasjonen umiddelbart, men likevel ser det ut til at informasjon reflekteres relativt rakst i aksjekursene. Etter en dag eller to, når uenighet blant aktører løses opp, ser all unormal avkastning ut til å ha forsvunnet. Dermed har jeg ikke funnet noen tegn på "the post-earnings-announcement drift" som har blitt dokumentert i mange amerikanske studier. Resultatene peker heller mot at det norske aksjemarkedet, til tross for at det er lite i verdenssammenheng, består det av mange sofistikerte aktører og selskaper som overvåkes av intelligente analytikere, og dermed har de rette grunnpilarene på plass for å være informasjonsmessig effisient.