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The effects of financial crime on firm performance: evidence from Norway

Navn: Madeleine Stenerud, Karoline Høgalmen

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Karoline Granli Høgalmen

Madeleine Stenerud

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Siv Jønland Staubo

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Abstract

The purpose of this thesis is to investigate the effect of criminal activity, namely corruption, on firm performance for Norwegian firms. We investigate whether the announcement and conviction of corruption has affected the stock prices negatively, by computing abnormal returns. In addition, we examine a longer-term effect of corruption on firm performance measured by Return on Assets (ROA). The stock price reactions reveal minor significant abnormal returns related to the announcement of corruption, but show overall significant negative abnormal returns related to the conviction. Furthermore, in our accounting-based method, we also find evidence of a diminished firm performance of the corrupt companies after the conviction. We conclude that financial crime does have an effect on firm performance and identify the effect as negative.

Keywords

Financial crime, corruption, CSR, corporate social responsibility, firm performance, stock performance, event study, Return on Assets, ROA.

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1 Introduction

In this paper we investigate the relationship between financial crime and firm performance. Norway is one of the least corrupt countries in the world (Transparency International, 2017), and possibly with the least amount of financial crime in general. Still, the number of reports of economic offenses has increased by 34,9% from 2014 to 2018 according to Politidirektoratet and riksadvokaten (2018). The penalties for these crimes have also been increasing over the past years (PwC Global, 2019). We investigate what impact this increasing trend might have by studying the question of how financial crime affects performance in Norwegian firms. More specifically, the focus is on firms with involvement in corruption cases convicted by the Norwegian court in the period between 2003 and 2017, where the firm names has been official to the public. The primary method for addressing the question in this study is an event study methodology on the listed companies in our dataset. The event study consists of computing abnormal returns of stock prices related to the *announcement* of the corrupt action in the media and to the *conviction* of the corrupt action in a court case. The intention of this study is to capture a possible negative effect from corruption on stock prices, and also to capture *when* the effect is most apparent. The two hypotheses that is formally tested in the event study is:

Hypothesis 1: Announcement of corruption will generate negative reactions in the stock price.

Hypothesis 2: Conviction in a corruption case will generate negative reactions in the stock price.

Lastly, as a secondary method, we address the question in study by following an accounting-based approach. By including the accounting-based measure of Return on Assets (ROA), we attempt to capture a longer-term effect of corruption on firm performance, as well as reasserting the results from our primary method. We compare ROA from the year before corruption was announced with ROA in the two years after the firms were convicted for the crime. In order to strengthen the analysis, we also compare the average ROA of the corrupt firms with the average ROA of firms in the same industry, leverage, size and age range (peers). The final

hypothesis to be formally tested in this thesis is:

Hypothesis 3: Corruption will have a negative effect on firm performance measured as ROA.

The rationale behind utilizing an event study as our *primary* method is due to the research literatures' strong beliefs and arguments of this method being the best approach when capturing the effect from an event like the announcement and conviction of financial crime. Still, we include an accounting-based measure as a *secondary* method to investigate possible long-term effects, and to get a more versatile and robust study.

1.1 Financial crime and sustainability

As mentioned above, the number of reports of economic offenses in Norway has increased by 34,9% from 2014 to 2018 (Politidirektoratet & riksadvokaten, 2018). An intriguing conundrum, is whether the increase in reports can be explained by criminal activities escalating or by the enhanced focus on corporate social responsibilities. According to Nelling and Webb (2009), the focus on corporate social responsibility (CSR) has expanded noteworthy, both in business and in academic press. Financial crime is a substantial part of a firm's CSR today. CSR activities around the world is shaped by economic, political and social factors (Baughn, Bodie & McIntosh, 2007). Consequently, the growth of CSR in business may be the explanatory factor of the sharp increase in amount of financial crime reports in Norway over the past 5 years. If so, is it mutilating the companies by reducing their reputation and firm performance, when an offense is recognized by the market? Furthermore, the impact of corruption in this thesis is of high importance for Norwegian firms and also other scandinavian firms as companies will benefit from knowing how much impact financial crime could have on their firm performance, and when the impact is the most substantial.

1.2 Corruption in Norway

Norwegian law on corruption was revised in 2003 and characterizes corruption as "claiming, receiving or accepting, giving or offering any unwarranted advantage in respect of position, office or assignment". As Transparency International (2017, p.1) expresses; the term "unwarranted advantage" is vague and the actions covered

by the concept of corruption depend on a careful assessment. The judicial decision in corruption cases are therefore important in order to clarify what constitutes as "unwarranted advantage" and thus corruption in the sense of the Norwegian law. In this thesis we include cases where a person acting as an functionary of the firm was convicted or where the firm itself has been convicted of corruption by the court. In this way the assessment of "unwarranted advantage" has been conducted by the court, and the firms included in this study have, evidently, been involved in corruption.

According to Transparency International (2017), Norway is ranked third of countries with the least amount of corruption. For the fact that Norway has a small degree of corrupt activities compared to most countries in the world, it would be reasonable to believe that publicly known financial crime in a firm would have a significant effect on reputation and firm performance. Williams and Barrett (2000) found evidence that criminal activity affects firm reputation in a negative way, and as stated by Botelho (2004, rendered in Sims 2009, p.455) "Executives say it takes 20 years to build a positive reputation, but you can destroy it in 30 seconds". How long this effect last, and to what extent, depend on the management's ability to handle the situation, according to Sims and Brinkmann (2003). This is one of the reasons why looking at the effects both short- and long-term is useful in our analysis. In most cases corporate wrongdoing known to the public should decrease a firm's reputation somewhat (Williams and Barrett, 2000). The extent of this effect is unclear, but may be measured by looking at the stock market reaction of financial crime in a firm (Karpoff, Lott & Wehrly, 2005), and also by studying accounting numbers (Rose & Thomsen, 2004)

1.3 Contributions to current research

Our study contributes to the literature in several ways. Firstly, CSR has grown to be a hot topic and there seem to be an intense focus on how positively associated actions could impact the firm. In other words, a focus on whether spending time and money on CSR activities would increase a firm's performance. We have chosen to take a different approach to the topic, where we would like to investigate what impact negatively associated actions could have on firm performance. This approach has merely been tackled by scholars and researchers in comparison. Moreover, the studies that has tackled this approach, are performed before the 21st century and did not distinguishing between short-term

and long-term effects of financial crime on performance. Furthermore, we contribute to current research by investigating if the effects differ short- and long-term by looking at both market-based (stock prices) and accounting-based measures (ROA) in our study. The second contribution is that our research is updated to the 21st century. Furthermore, in addition to looking at the effect *announcement of a corrupt action* (hereafter referred to as announcement) has on firm performance, we also seek to obtain potential effects related to the *conviction in a corruption case* (hereafter referred to as conviction). This allow us to investigate at what time/event the effects of the criminal activity appear which provides the third contribution to current research. Finally, we contribute to current research by studying financial crime in Norway specifically. Most studies on the topic of financial crime and firm performance are conducted in other continents and other countries than Norway. For instance, Ayaydin and Hayaloglu (2014) found a significantly positive relation between corruption level and firm growth, but highlight that this could be do to corruption speeding up the wheels of commerce and could therefore have a positive impact on firm development. It is likely that the effect of corruption on Norwegian firms will differ from the effect of corruption on firms operating in countries where corruption is more common. Consequently, our findings also add to existing research when it comes to the location of the study.

1.4 Results and implications

The results derived from the marked-based and primary part of our study, revealed minor impact on stock performance from the announcement of corrupt activities in a firm. On the contrary, when investigating the effect of conviction in a corruption court case on stock performance, our results show an overall negative effect, with an average cumulative abnormal return of -2,16% in the main event window, statistically significant at the 10% level. From the accounting-based measure and secondary study of this paper, we found that when comparing the corrupt companies with their peers one year after conviction, the corrupt firms obtain a ROA 5,24 percentage point lower than their peers, a difference that appears significant at the 10% level. When comparing a firm by it selves, ROA is lower both one year and two years after the conviction compared to before the announcement of the corrupt activity. Moreover, the results from two years after conviction show a decrease of 7,15 percentage points and is proved statistically significant at the 5% level.

Our results may indicate that the Norwegian Stock Market does not react to wrongdoing before the claims are proven to be correct by the Norwegian court. Given these points, the implications for firms involved in financial crime is that their stock prices suffer if/when the firm is convicted for the offense. Longer-term, the effect from financial crime seem to be present as well. A firm convicted for an economic offense should expect their financial performance to be diminished after the conviction. Furthermore, the implication for Norwegian firms in general is that most companies will benefit from upholding the law on financial crime.

The rest of the thesis is organized as follows. Chapter 2 consists of a literature review, where we analyse and assess the research and findings of other articles attempting to examine the effects of CSR and financial crime on firm performance. We discuss the methodological differences of the existing research, and identify possible gaps in the literature. Chapter 3 presents and explains the main theories related to the question in study, together with the methodologies implemented to investigate the issue as well as directives on how to interpret the results obtained. Chapter 4 consists of a description of all the data used in our empirical study, while Chapter 5 provides the obtained results from the methodologies implemented. In Chapter 6 we conclude, and presents our recommendation for future research.

2 Literature review

In this chapter we seek to assess literature on how financial crime affects firm performance. Our intention is to build a summary consisting of some of the main findings conducted by scholars researching this subject.

2.1 CSR activities and firm performance

As mentioned in the introduction, previous literature on CSR and firm performance has mostly focused on whether spending time and money on CSR activities will increase a firm's performance. On this subject there has been an enormous amount of research. To cite some of them, Hillman and Keim (2001) found evidence that increased CSR activities leads to enhanced financial performance. This conclusion is consistent with several other researchers and studies on this topic, for instance Waddock and Graves (1997), who found that corporate social performance is positively associated with future financial performance. One example of researchers who does not agree with this result is Nelling and Webb (2009). These authors investigated the causal relation between corporate social responsibility and financial performance, and found a weaker relationship between the two, than what previous studies reported. From this, we can conclude that there seems to be conflicting results from previous studies regarding the impact CSR activities has on firm performance, but if an effect is present, it will most likely appear positive.

2.2 Consequences of financial crime on stock performance

Previous researches have examined market reactions in the form of stock price changes to alleged crime, claiming that efficient markets regulate rapidly to new and unanticipated information (Baucus & Baucus, 1997). Academics have shown that stock performance tend to weaken by the announcement of corporate illegalities. For instance, Strachan, Smith and Beedles (1983) found evidence that allegations of corporate crime have a negative effect on performance, as the firm's stock price is negatively affected the day prior to and the day of the announcement. Further, Randall and Neuman (1979) also discovered a fall in stock prices with the detection of crime made by the firm, and claim that stock prices tend to fall in the week following an announcement of government prosecutions for antitrust activities. Cox and Weirich (2002) investigated the stock market reaction to fraudulent financial reporting, and detected strong negative

announcement effects the day before and the day of the announcement. Furthermore, Gunthorpe (1997) examined if public corporations is penalized for unethical business practices, such as racketeering, patent infringements or fraud, using an event study methodology. The author found evidence of a statistically significant abnormal return of -1.32% (on average) the day when announcing the illegal behavior. Gunthorpe evidently concluded that firms *are* penalized for operating unethical. Baucus and Baucus (1997:131) concludes that there exist clear evidence that “stock markets react emphatically in the short term to information concerning prosecution and penalties for wrongdoing”.

An inconsistent result from the above mentioned studies appears in a study by Bromley and Marcus (1989), where they discovered few negative abnormal returns in the immediate period after an announcement of a dubious behavior. On the other hand, they reported that 40 percent of the firms in their sample actually experienced positive abnormal returns after a recall. In addition, Rao (1996 and 1997) found no significant effects in the stock prices related to an announcement of a financial crime, and further no evidence of an efficient market. In conclusion, there seem to be some disagreement in the literature concerning the effect of financial crime on stock performance.

There seems to be several gaps in the research literature, regarding market reactions/stock performance. Firstly, most of the studies we have found are performed before the 21st century. We find this strange due to the increasing trend of financial crimes and penalties (PwC Global, 2019) as mentioned in the introduction. Secondly, there is a lack of studies investigating the stock price reaction after *conviction* of a criminal activity in a court case, as most studies tend look at the *announcement* of the crime (first mentioned in the media). Lastly, we have not found any studies looking at how criminal activity affect firm performance in Norway or similar scandinavian countries. We aim towards filling these gaps by studying stock prices from 2003 up until today, both during announcement and the conviction of the crime. Also, our study consist of Norwegian firms to fill the above mentioned gap.

2.3 Consequences of financial crime on financial performance

The previous studies mentioned cover the effects of financial crime on firm performance in terms of market-based measures where the short-term effect is captured. These studies are based on the assumption of an efficient market. However, according to Marcus and Goodman (1991), the market does not react significantly to misconduct, and they further believe it may take years after an announcement of a crisis before the true impact of the scandal can be understood. Additionally, Rao (1996) and Rao (1997) discovered inefficiencies in the stock market, and claimed that the stock market does not react efficiently when a firm announces activities of environmental pollution, bribery, scandal, white-collar crime and illegal payment. Yet, there seem to be a deficiency of studies covering long-term effects of financial crime or studies looking at accounting numbers in relation. One study we found on the topic is related to a study made by Davidson and Worrell (1988), where they found evidence of a significant negative stock market reaction related to the announcement of corporate criminal activity. In a test with the same sample, they were not able to find any effect of the corporate illegalities on accounting data (Davidson & Worrell, 1990). A contradictory evidence was found by Baucus and Baucus (1997). These researchers also investigated the long-term performance after a corporate illegality and claim that long-term performance better capture the relationship between the wrongdoing and performance. Their results show lower accounting returns (ROA and ROS) over the five years following a conviction of illegal corporate behavior. The conclusion was that convicted firms are suffering prolonged damage, possibly from stakeholders exiting the firms. Also they found evidence that the convicted firms experienced reduced sales growth in the period three through five years after a conviction. This in fact, may indicate that it takes a longer time for a customer to show its reaction to the crime made by the firm relative to the firms' other stakeholders. Another study assessing accounting numbers and financial crime is Gaviria (2002) who found evidence that corruption tend to substantially reduce firm competitiveness, measured in sales growth. However, the study conducted by Gaviria is done in Latin America, an area where corruption is a widespread phenomena according to the Corruption Perception Index by Transparency International (2017). The market effect on the companies' competitiveness could potentially differ from the effect of corruption committed in Norwegian

companies operating in Norway, where corruption is more socially unaccepted and uncommon. There has not been any similar studies in Norway or similar scandinavian countries. In our study, we aim to fill this gap by using firms operating in Norway.

3 Methodology

Assessing the effect financial crime has on performance is of high interest, as the performance shows if the operations of the firm is as efficient and effective as possible (Tayeh, Al-Jarrah & Tarhini, 2015). There are several ways to measure performance in a firm, one can either use market- or accounting-based estimates. As a primary method in our study, we will look at the effect of corruption on stock performance, which methodology is covered in chapter 3, part 1. Further, we will assess an accounting-based measure of firm performance as a secondary method, where the methodology is covered in chapter 3, part 2.

3.1 Event study

3.1.1 Stock price reactions; theory and hypothesis

For a firm listed on a stock exchange, an unanticipated event may create reactions in the market and thus changes in the stock price. In financial theory, bad news are expected to create a downward movement in the stock price, as investors believe the price should be lower than it was and is willing to sell the stock at a lower price. More sellers than buyers of a stock will lessen the value in an efficient and open market. According to McWilliams and Siegel (1997), stock prices reflects the true value of a firm, as the price is assumed to reflect all future cash flows discounted and also to incorporate all relevant information. A firm involved in corruption activities where the news has become public for the first time may therefore see such a downward movement in stock prices. The first hypothesis to be tested in this study is:

Hypothesis 1: Announcement of corruption will generate negative reactions in the stock price.

Further, we will investigate whether conviction in the corruption cases is affecting the stock prices. The conviction dates appear after the announcement date in all of the cases included in our study. The second hypothesis to be tested in this study is:

Hypothesis 2: Conviction in a corruption case will generate negative reactions in the stock price.

3.1.2 Event study

In order to capture market reactions and test the hypotheses, we need to implement a method for measuring the impact of the two events on stock prices. The objective of an event study methodology is to assess the impact of a particular event on the stock prices, and is an empirical technique that is frequently used in financial research (Bodie, Kane & Marcus, 2014).

The event study methodology presented by McWilliams and Siegel (1997) will be used on all listed firms in our dataset. According to McWilliams and Siegel (1997), applying an event study methodology is appropriate in cases where an unanticipated event is likely to have a financial impact and to provide the market with new information. Further, using an event study methodology based on stock price reactions will measure the financial impact of changes in corporate policy, as stock prices are assumed to reflect the present value of all future cash flows.

In our study, the first event refers to the particular announcements of an alleged corporate criminal activity, namely corruption. This event represent when the news of the crime is known to the public for the first time. The second event is when the firm or the person acting as a functionary of the firm has been convicted of corruption in a court case..

3.1.3 Defining the event- and estimation window

According to McWilliams and Siegel (1997), a short event window (1 to 2 days) is appropriate to use for clearly unanticipated events. Using a short event window will strengthen the power of the test statistic, Z_t (Brown & Warner, 1985), and further capture the significant effect of the events (Ryngaert & Netter, 1990). In the case of a leak in information, the news might have been known to the public a day before the announcement occur. However, if the announcement or news regarding the conviction is published after the arrival of the closing price, the effect will not be observed until the day after the event day (MacKinlay, 1997). Presuming the information has reached investors the day after the events, and that there is a possibility of a leak in the day before, a 3-day event window will be applied as the main approach in our study - which is the day after the events and the day prior to them, on the condition that these are trading days. To enrich our analysis, other event windows will also be included and analyzed.

The event window does not typically overlap the estimation window (MacKinlay, 1997) in order to exclude potential effects from the event when estimating the normal return process. According to MacKinlay (1997), the length of a trading year is commonly used as an estimation window in financial research. Therefore, an estimation window of 250 days is used in our models.

3.1.4 Research design

To estimate the impact of the events, we will compute the abnormal returns by following the method of McWilliams and Siegel (1997). First of all, we need to estimate normal performance. We will start by running a separate regression for each company using all data within the two estimation windows. That is, 250 days prior to the event window for the announcement, and for the conviction. The rate of return on the share price of company i on day t is expressed as:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}, \quad (1)$$

where R_{mt} is the return on the market on day t and ε_{it} is the error term with $E(\varepsilon_{it})=0$.

Estimates of the intercept (α_i) and the coefficient of the independent variable (β_i) will be used in order to predict normal performance. Further, we will be able to compute abnormal returns by adjusting the return of the share price by the predicted return for each company on each day in the event windows. Hence, abnormal returns (AR) for each company i will be computed using the following equation:

$$AR_{it} = R_{it} - (a_i + b_i R_{mt}), \quad (2)$$

where a_i and b_i are the OLS parameter estimates obtained from equation 1. The computed abnormal returns will represent each company's obtained return after we have adjusted for a "normal" return process. Therefore, a return differing from the "normal", will be is considered an abnormal return.

We compute the cumulative abnormal return (CAR) over the event windows consisting of k days:

$$CAR_i = \sum_{t=1}^k AR_{it} \quad (3)$$

Eventually, we will be able to test the hypothesis and the significance of both of the events. An assumption is that the values of the cumulative abnormal returns are independent and identically distributed. Due to our small sample size, we are not able to assume normality. Therefore, in order to make identically distributed variables we will divide the CAR_i by the standard deviation of abnormal returns when testing for significance.

$$Z = \frac{CAR_i}{\frac{k}{SD_i}} \times k^{0,5} \quad (4)$$

By using this method, we should be able to capture the potential stock market reaction to the arrival of new information, namely to capture the effect of the announcement and the conviction of corruption on stock performance.

Additionally, in order to analyse the total impact of the new information provided by both the announcement and the conviction, we will compute an average cumulative abnormal return (ACAR), and test for significance across all companies using a t-test:

$$ACAR = \frac{1}{n} \sum_{i=1}^n CAR_i, \quad t = \frac{ACAR}{Robust\ Standard\ Error} \quad (5, 6)$$

3.1.5 Interpretation

McWilliams and Siegel (1997) state that a conclusion drawn from an event study conclusion is only valid when the markets are efficient, the event was unanticipated, and that there were no confounding effects. Confounding effects appear when other significant events like declaration of dividends, change in key management, filing large damage suit etc, occurs during the event window (McWilliams & Siegel, 1997). The efficient market hypothesis is a central concept in the event study methodology, and implies that all relevant information is incorporated in the price of the security (Aguzzoni, Langus & Motta, 2013). Thus, this hypothesis assumes that any new information will immediately be reflected in the stock price. In belief that the market efficient hypothesis holds for the Norwegian stock market, and to avoid confounding effects in the event window, a

short event window is used in our analysis.

By carefully implementing the method, considering whether the events were unanticipated, and by making sure that there are no confounding effects present, we will receive results that can be interpreted with confidence. In order to interpret what effect the announcement and the conviction of the corruption has on the stock performance, we will turn to the cumulative abnormal returns. Test statistics greater than 2.58, 1.96 or 1.64 will leave us in conclusion that the cumulative abnormal returns are significantly different from zero at 1%, 5% or 10% level respectively. Any significant cumulative abnormal return related to the announcement would imply a relationship between the announcement of the corruption and the stock price change. Similarly, any significant cumulative abnormal return related to the conviction will imply a relationship between the conviction of the corruption and the stock price movements. Finally, in order to interpret the total effect of corruption, we calculate and test the significance of the average cumulative abnormal returns related to both the announcement and the conviction. Two-tailed p-values of less than 0,01, 0,05 or 0,10 will leave us in conclusion that the average cumulative abnormal returns are significantly different from zero at 1%, 5% or 10% level respectively. Abnormal returns >0 implies a positive relationship between the event and stock performance, while abnormal returns <0 imply that the events has had a negative effect on the stock prices.

3.2 Return on Assets

Performing *only* an event study based on market reactions or analyzing *just* the accounting based numbers, may not be sufficient to determine a firm's performance. We believe that to capture the full effect of a corrupt activity on firm performance, one needs to assess both these matters and interpret the results all together.

3.2.1 Accounting vs. market-based measures of firm performance

An accounting-based measure of firm performance would incorporate a larger scope of how the firm is impacted by the action of corruption, but may also capture other effects not related to the that event. Benston (1982), stresses that accounting-based measures of profit might not be the best indicators of the true performance of the firms, which is one reason why event studies have become popular to use for these types of cases. One example mentioned by Benston

(1982) is manipulation of accounting profits as the managers can choose accounting procedures themselves. According to McWilliams and Siegel (1996), event studies alone may be inadequate because, at best, they provide estimates of the short-term impact on shareholders solely, and not necessarily on other corporate stakeholders. Furthermore, event study findings are sensitive to even small changes in research design. McWilliams and Siegel (1996) recommend taking further methodological approaches to examine how firm performance is affected. Due to these reasons as well as points previously discussed in this paper, we have chosen to assess both market reactions as well as accounting-based measures when assessing the effect corruption has had on firm performance.

3.2.2 Impact on financial performance; theory and hypothesis

When it is known to the public that a firm has engaged in unethical and illegal behaviour, one may expect the financial performance to diminish as a consequence. There are several reasons for why this may happen. One obvious explanation may be the loss of firm reputation that comes with the announcement and conviction of the criminal activity. Rose and Thomsen (2004) addresses the relation a firm's reputation has to corporate financial performance. The authors emphasizes how a strong corporate reputation may serve positively in a competitive market as rivals will find it more difficult to replicate characteristics of a firm with a superior image, which again will give a competitive advantage and lead to stronger financial performance. Williamson (1989) focuses on how good reputation may lower transaction costs as suppliers and contractors have less reason to question the firms creditworthiness. In this way it is easier to generate suppliers and contractors, and the amount of time reassuring the trustworthiness (through contracts and monitoring activities) of the firm may also be lowered, which again would leave a positive effect on firm performance. The trustworthiness should also be seen in relation to customers, as well as the amount of pleasing PR a firm with a good reputation receives. Lastly, when a firm has a diminished reputation it may affect people's desires to work for the firm, which again makes it more difficult and costly to find eligible employees. Changes in accounting numbers and a firm's performance may happen as a result. A firm involved in and convicted for corruption activities may obtain reduced accounting numbers for all the reasons mentioned above. Therefore, the third hypothesis to be tested in this study is:

Hypothesis 3: Corruption will have a negative effect on firm performance measured as ROA.

3.2.3 Approach

For the secondary part of our study, we measure firm performance using Return on Assets (ROA). Using ROA as a measure of firm performance reflects how much income is earned through the firms assets, and will demonstrate the efficiency of a firm's operations (Tayeh, Al-Jarrah & Tarhini, 2015). Further, it will present a long-term view of the performance of the firm according to Vijayakumar and Devi (2011).

Davidson and Worrell (1990) compare results from their event study on corporate crime and stock price changes (Davidson & Worrell, 1988), with results from studying the effect corporate criminal activity has on accounting-based measures. The authors use different accounting-based measures, including ROA. They conclude that accounting measures in general will not capture the effect as well as event studies on stock prices, due to the nature of accounting procedures. Still, Davidson and Worrell (1990) points out ways of controlling for these issues when using accounting measures. More specifically, when comparing accounting measures over different years, inflation needs to be controlled for so that the results are comparable. Furthermore, when comparing accounting measures for the firms involved in financial crime with their peers who have not been involved in financial crime; leverage, age, industry and size needs to be controlled for as these factors influence the accounting measures.

We will follow the method illustrated by Davidson and Worrell (1990), but with adjustments to produce a more adequate outcome. Firstly, we will compute ROA for each firm in our dataset following the equation below:

$$ROA = \frac{EBIT}{Total\ Assets} \quad (7)$$

where, *EBIT* is operating earnings before interest and tax. For intercomparison across years, nominell ROA will be adjusted for inflation by the well known Fisher formula, so that we obtain real ROA:

$$ROA^* = \frac{ROA - i}{1 + i} \quad (8)$$

where ROA^* represents real ROA, and inflation is noted as i .

Davidson and Worrell (1990) compare ROA from the year of the announcement with the year before. However, as we are looking at the long-term effect of corruption where we capture both the effect from announcement and conviction, we will compare the average ROA^* in the year before the announcement with the average ROA^* in the two years following the conviction. An alternative method could have been to separate the effect of announcement from the effect of conviction as performed in the event study. However, this is not an option in our case, as announcement and conviction often appear during the same accounting year, and we operate with yearly data. Furthermore, all conviction dates appear after the announcement date or within the same year, and looking at the average ROA^* after conviction compared to before announcement is likely to capture the impact from the financial crime in general. The average ROA for all firms in our dataset will be computed by the following equation:

$$\overline{ROA^*} = \frac{\sum_{k=1}^n ROA^*_k}{n} \quad (9)$$

Further, the differences in average ROA^* will be calculated as:

$$\Delta \overline{ROA^*} = \overline{ROA^*}_{c+1} - \overline{ROA^*}_{a-1} \quad (10)$$

and

$$\Delta \overline{ROA^*} = \overline{ROA^*}_{c+2} - \overline{ROA^*}_{a-1} \quad (11)$$

where c and a represents each corrupt firm's conviction date and announcement date, respectively. We refer to this method as "Delta analysis".

In order to test the significance we will use a two sample t-test, which compares the difference in the averages, and test the hypothesis of equal means in two populations. The Welch's t-test assumes unequal variances and will be used due to

our data not being pooled. This test represents a more conservative method compared to a test assuming equal variances (Ruxton, 2006). The test statistics will be calculated following this formula:

$$t = \frac{\overline{ROA}_{1*} - \overline{ROA}_{2*}}{\sqrt{s_1^2 \left(\frac{1}{n_1}\right) + s_2^2 \left(\frac{1}{n_2}\right)}} \quad (12)$$

where s^2 is the variance of the different ROA*s.

Lastly, in order to strengthen our analysis we will conduct a peer analysis, where comparing the average ROA* of the companies in our dataset with the average ROA* of their peers in the year after conviction. By comparing the average ROA* of the corrupt companies with the average ROA* of their carefully elected peers, we are investigating whether the corrupt companies have obtained abnormal ROA* relative to their comparable companies. We will draw out peers by controlling for industry, leverage, age and size. The peer average will be computed following equation 9. Furthermore, the difference between these averages will be calculated as:

$$\Delta \overline{ROA} * = \overline{ROA} *_{\text{corrupt companies}} - \overline{ROA} *_{\text{peers}} \quad (13)$$

Finally, the test statistic will be calculated following equation 12.

3.2.4 Interpretation

In order to interpret if (and how) the financial crime has affected the accounting-based measure of performance, ROA, we will compare the averages described in the above section. A statistically significant difference in the averages over the different years allows us to reject the null hypothesis of zero effect. T-statistics, with a corresponding two-tailed p-value of less than 0,01, 0,05 or 0,10 will leave us concluding that the difference between the averages is significantly different from zero at 1%, 5% or 10% level respectively. A significant difference > 0 implies that corruption has affected firm performance positively. A significant difference < 0 implies a negative relationship between corruption and firm performance.

In order to control for other factors affecting accounting measure, we turn to the difference between the corrupt companies' average ROA* and the peer average ROA* in the year after the conviction. Any significant difference from zero obtained using the same method as described above, implies a relationship between the corruption and firm performance. A relationship that simply cannot be explained by industry-specific factors.

4 Data and analysis

Transparency International has provided a chronological list of all corruption cases in Norway from 2003 to 2017. The total number of corruption cases convicted by the Norwegian court in the period is 51. The firms to be examined in our analysis is based on this list. Due to the fact that the reported firms have been convicted for corruption, there is no doubt on the relevance of including them in our study. Our dataset includes the cases where either a firm is convicted or where an employee is convicted personally, but was acting as a functionary of the firm.

4.1 Event study

4.1.1. Sample

For our primary method, the event study, the sample consists of all listed firms in our dataset. Seven of the firms in the dataset were listed at the time when the illegality became known to the public, but one of the companies had to be excluded as there were too few observations to perform an event study. Two of the companies in the dataset have been convicted two times which gives a sample of eight. The sample period is from the first trading day in year 2000 which is 03.01.2000 or when companies first became listed. As mentioned in the introduction, the Norwegian law of corruption was revised in 2003, a fact that could potentially influence our events' identification and results. However, all firms included in our dataset is convicted based on the new law of 2003, which eliminates all problems related to the law revision. All weekends and red days are not included in the sample as these are non-trading days. The sample period ends on the last trading day available upon collection or the last day the stock was traded on the exchange. The data was collected at the 11th of march 2019.

4.1.2 Data collection

The end of day stock prices for the firms in our sample was collected from Thomson Reuters Eikon where we later calculated daily returns based on the prices. The daily market return was calculated based on end of day prices from the OBX index, consisting of the 25 most liquid stocks on Oslo Stock Exchange. In order to capture the real market reaction to the arrival of new information, identifying the correct time of first publication in the media is important. By using Retriever database "Atekst" to conduct a thorough analyses of media coverage of

the firms, we were able to identify the announcement date of the corruption case which is used as one of the event dates in this study. More specifically, the first event of this study is the first day the act of corruption is mentioned in the media or the first trading day after it was first mentioned in the media. The search engine Google was used to validate these findings. Worth mentioning, is that in some cases there were very few articles about the instances, which leaves us wondering whether the assumption of market efficiency will hold.

The second event date used in the event study is the day the firm or the person acting as a functionary of the firm was convicted in a court case. The date of conviction is retrieved from lovdata.no. Some of the firms in our dataset appealed after they were first convicted, which resulted in some firms going through several trials. All firms included in this study were found guilty at the end of the trials. For this study, we have used the first conviction date for the reason that we are capturing the market reaction to the new information.

4.1.3 Descriptive statistics

Table 1 provides the summary statistics over the sample period including the number of observations, mean, standard deviation, and the minimum and maximum values for the daily returns for all the companies as well as for the market.

Return	Obs.	Mean	Std. Dev.	Min	Max
Market	4818	0,000459	0,0149	-0,1066	0,1165
Company 1	3053	0,000031	0,0556	-0,6474	0,6783
Company 2	4817	0,000768	0,0208	-0,1766	0,1901
Company 3	4817	0,000768	0,0208	-0,1766	0,1901
Company 4	4566	0,000313	0,2157	-0,1708	0,2407
Company 5	4453	0,000404	0,1890	-0,1092	0,1359
Company 6	4453	0,000404	0,1890	-0,1092	0,1359
Company 7	4715	0,000602	0,0210	-0,1531	0,1579
Company 8	3759	0,000791	0,0239	-0,1710	0,1646

Table 1 includes summary statistics for the daily observations in our data set. The sample period is January 3rd 2000 to March 11th 2019, and includes the daily returns for eight companies as well as the OBX index from Oslo Stock Exchange. The summary statistics provided include the mean, standard deviation, and the minimum and maximum values for the eight companies and the market in the sample period. As two of the companies have multiple events, company 2 and 3 are the same in the dataset. This also applies for company 5 and 6.

The dataset includes a reasonably large amount of observations for each company and for the market. The standard deviation of the returns is used as a measure of risk which describes the volatility in the stock returns. The higher value, the more risky stock. As we can see from the descriptive statistics, market has the lowest volatility. This does not come as a surprise as it consist of the 25 most liquid stocks on Oslo Stock Exchange, based on sales over a period of six months. The index should be less risky due to diversification generated from consisting of

several stocks and that the stocks in the index is sufficiently liquid. For the companies, company four has highest volatility while company two/three has the lowest. Looking at the average returns we notice company one to stand out from the rest. Also, when studying minimum and maximum returns, company one exceeds the others by far. One of the reasons behind this may be that the company is on the smaller side.

4.1.4 Confounding events and outliers

According to Brown and Warner (1985), including daily stock returns in a study will imply a significant presence of outliers for the fact that daily stock returns are characterized by non-normality. Such outliers may in fact impact the conclusions drawn from the study. For this reason, an important step during the collection of the event dates, was to check for confounding effects during each firms event window. We used Retriever database “Atekst” to check whether other events could affect the companies during both the event window or estimation period, where McWilliams and Siegel (1997) specifies that the event window is more sensitive to confounding effects than the estimation period. In our research, no outliers were found to be present during the event windows. However, a few was discovered within the estimation periods. Dealing with this problem could be done by either ignoring, removing or winsorizing the outliers, according to Sorokina, Booth and Thornton (2013). Furthermore, the authors claim that eliminating extreme values in the statistical data leads to a loss of valuable information, and that winsorizing the data by adding incorrect observations, will lead to false inferences. Removing companies with confounding effects in the estimation window is not a viable option as it would give a weaker analysis than ignoring them. For this reasons we choose the option Sorokina, Booth and Thornton (2013) suggests, namely to ignore the outliers that appeared in the estimation windows.

4.1.5 Stationarity

By working with returns, the variables are most likely stationary. Nevertheless, if non-stationarity would occur, it could strongly affect the behaviour and properties of the data through trends or other forms of non-stationarity. Ultimately, we decided to test for stationarity through an augmented Dickey-Fuller test. This test follows a unit-root process, where the null hypothesis is that the variable contains a unit root and the alternative is that the variable is stationary.

The test was performed on all the variables including the market. The results of the augmented Dickey-Fuller test revealed test statistics that was well beyond the critical values for all variables (see Appendix 2). This led us to reject the null hypothesis, and to conclude that the variables was generated by a stationary process.

4.1.6 Suggestive results

To get a proficient overview of the data, we have graphed the stock prices for the different companies around the time of their estimation window. Plotting the daily prices may give an indication of the effect the announcement/conviction has had on stock prices, as it visualizes the changes in the prices. The small blue aerie marks the time around the announcement/conviction. Enlarged illustration of these figures can be found in appendix 5.

Announcement of corrupt activity

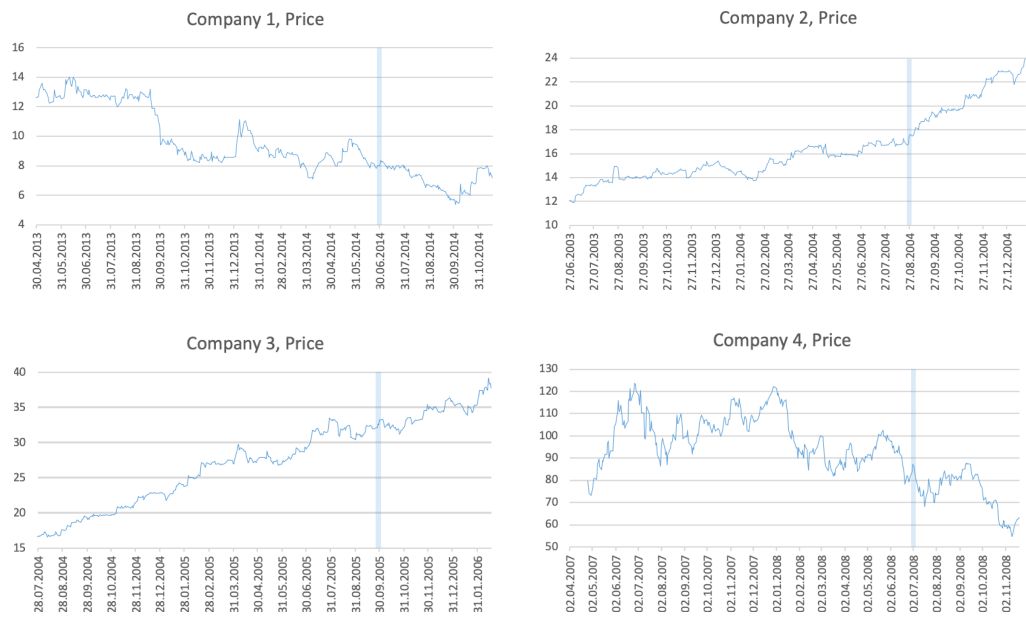


Figure 1 illustrates the stock prices for company 1, 2, 3 and 4 around the time of their estimation window. The small blue aerie marks the time around the announcement of the corruption for each company.

By looking at the first four graphs, there are ambiguous signs. For company 1, the price exhibited a downward trend for the graphed period, but no obvious effect can be seen right after the announcement date. For company 2, it may look like the price display an upward trend over the graphed period, but also in this case we can see no crucial indication of a price drop at the time of the announcement. The

same applies for company 3. On the other hand, company 4 has a noticeably drop in the stock price right around the announcement date, but it is difficult to say whether this is an “abnormal” drop, compared to the rest of the graphed aerie and also whether a significant drop will appear within the period of the 3-day event window.

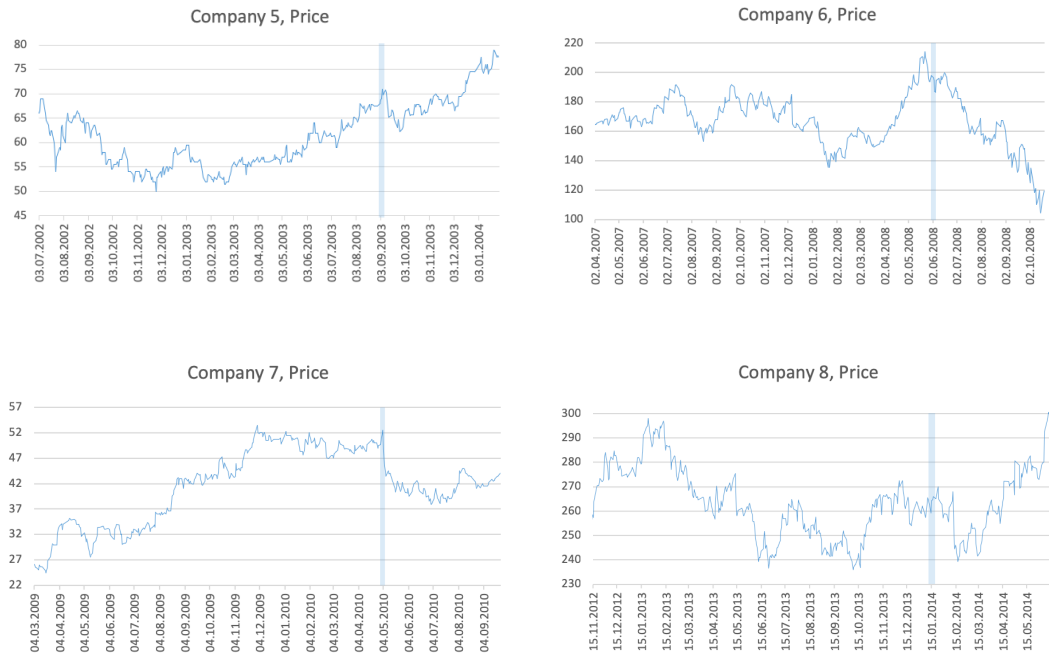


Figure 2 illustrates the stock prices for company 5, 6, 7 and 8 around the time of their estimation window. The small blue aerie marks the time around the announcement of the corruption for each company.

When it comes to the stock price of company 5, there is no apparent change in the price around the time of announcement. Surprisingly, it looks like the price hikes before it present a drop several days after the announcement. We notice a sharp drop in the stock price of company 6 around the announcement date, before an increase appears over the following days. The same applies for the stock price of company 8, but it looks like the price exhibits a drop at a later point in time. Therefore, it is uncertain whether the event study will capture this effect, as the event study focus on the days right around the announcement. On the other hand, company 7 stands out as there is a clear drop that shifts the curve downwards right around the announcement date.

For most of the companies graphed above, it may seem like the market has not reacted notably. We would expect the market to react to such news by willingly

selling their assets at lower prices, where the demand for these stocks were lower. For a couple of the companies it does seem like there is an effect on the stock price around the announcement date, but whether the effect is significant is difficult to state before performing the event study methodology.

Conviction of corruption

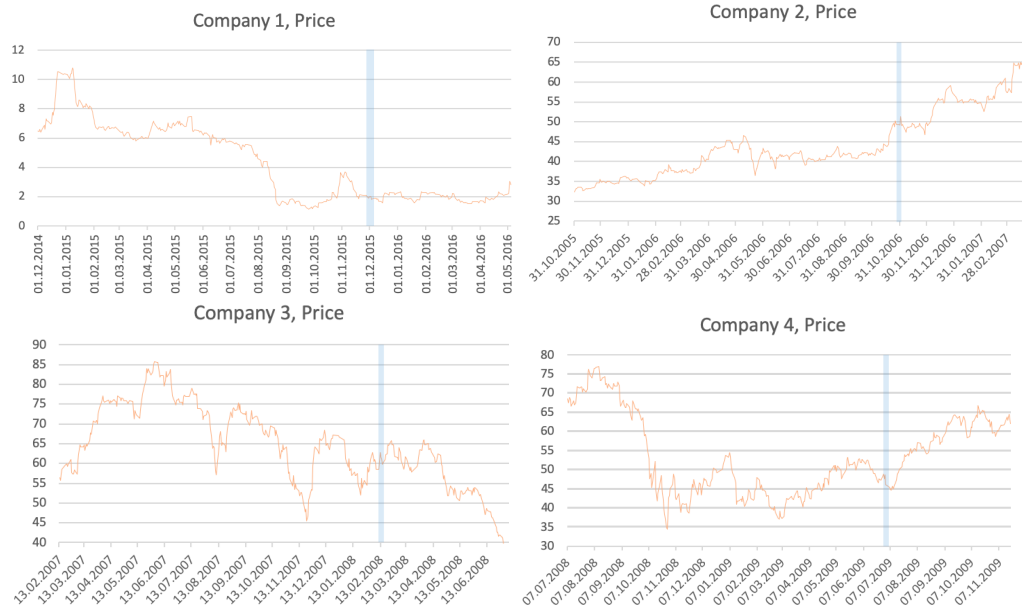


Figure 3 illustrates the stock prices for company 1, 2, 3 and 4 around the time of their estimation window. The small blue aerie marks the time around the conviction of the corruption for each company.

By analysing the first four graphs, no obvious stock price change is visual in the days surrounding the conviction of corruption. The stock price for company 1 might exhibit a small drop after the event, but this effect seems vague from just looking at the graph. The graphed stock price of company 2 indicates a dim upwards trend, and there is no sign of a reaction from the market around the time of the event. The prices for company 3 seems highly volatile. A drop is present around the time of the event, but due to the volatility it is hard to identify whether this is abnormal or not. Looking at the prices for company 4, it also looks quite turbulent, but opposed to the others there seem to be a clear reaction to the conviction of corruption in the stock price.

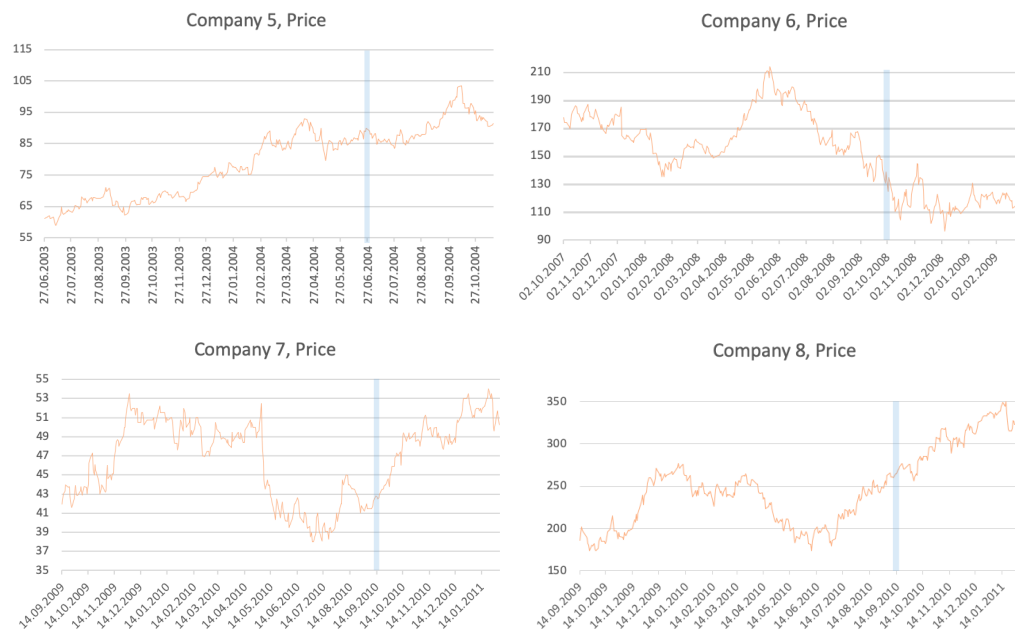


Figure 4 illustrates the stock prices for company 5, 6, 7 and 8 around the time of their estimation window. The small blue aerie marks the time around the conviction of corruption for each company.

A graphical analysis for the stock price for company 5 show an upward trend, but it seems to exhibit a small decrease around the time of the conviction. For company 6, a clear drop around the time of the event is visual, but as the price is already on a downwards trend it is hard to state if an abnormal return is present. By looking at the stock prices for company 7, one can notice a slight drop in the price around the event, but taking the stock price level into account, this return does not look very sizable. For company 8, no sign of a negative stock price reaction to the conviction of corruption appears by looking at the graph.

Similar to the event of announcement, this graphical analysis of stock prices show ambiguous signs of the effect corruption has on stock performance. For some of the companies, it might look like there is a negative reaction. For others it seems very small and unclear. Nonetheless, just examining the graphed prices is not sufficient for evaluating whether or not there is an abnormal return at the time of announcement of corruption or at the time of conviction in the corruption cases. We will perform the event study methodology described in chapter 3, where the return of these stock prices and the market will be used to detect abnormal changes. In the result section in chapter 5, we will present whether the event study catches an effect or not.

4.2 Return on Assets

4.2.1 Sample

In Transparency International's chronological list of all corruption cases in Norway from 2003 to 2017, the total number of corruption cases convicted by the Norwegian court is 51. After carefully examination of the list we were able to extract 34 relevant companies to include in our analysis.

4.2.2 Data collection

For this part of the study, the data was collected from the Center for Corporate Governance Research (CCGR). The data received includes accounting numbers for most companies in Norway from 2003 to 2017, as well as their organization number, industry and founding year. From the data we were able to extract most of the firms' accounting numbers by using their organization number. For some of the companies, no accounting numbers were available from CCGR. For others we did not have accounting numbers in the specific years we were going to examine. Therefore, they were excluded from our analysis. After removal we ended up with a sample of 26 corrupt companies for the *delta analysis* which compares the average ROA* in the year before announcement with the average ROA* in the two years after conviction. For the *peer analysis*, consisting of comparing the average ROA* of the corrupt companies with the average ROA of their peers in the year after conviction, we ended up with a total of 27 corrupt companies and 382 peers.

4.2.3 Data trimming for peer analysis

When comparing average ROA* of the corrupt companies with the average ROA* of their peers, we had to make sure to only include peers that were comparable with our corrupt companies. We started out with an enormous amount of data from CCGR, and sorted the companies so that we had a sufficient sample of peers for each of the 27 corrupt companies. To ensure comparability we controlled for industry, age, size and leverage as these are factors that are highly influential on accounting measures.

Industry

To attain comparable firms for our analysis, we retrieved accounting numbers for the companies that were operating in the same industry as our corrupt companies.

The industry codes for the corrupt companies in the year after conviction, was assigned by CCGR. For the companies that were registered with several industry codes, we used the average ROA for their peers in all of the stated industries. Some of the convicted companies was not given an industry code, but for a few of them there was industry codes assigned in previous accounting years. To be able to include them in our analysis, we used the industry codes from these years to obtain peers. For the companies who did not have any industry codes available, we unfortunately had to exclude them from this part of the study. Further, some of the companies did not have any peers operating in the same industry in the desired year. Also in these cases we used industry codes from previous accounting years if available, or had to exclude them.

Age

For the next part of the trimming process, we sorted out the companies within the industries that were around the same age as each corrupt firm. Due to the fact that all of the companies in our data set were over five years old in the year after conviction except company 3, we started out by extracting accounting numbers for peers with age above five years at their respective time of conviction in order to make sure to get a sufficient number of peers. For company 3, which was founded only three years before the conviction, we extracted peers with age over three years. Further, we also set upper age limits for some of the peers.

Size

According to Dang, Li and Yang (2018), no firm size measure capture all the characteristics of “firm size”, and all comes with advantages and disadvantages in their usefulness. However, their empirical study concludes “total sales” to be the best measure to include if the aim of the study is to control for the firm “size” in its market, which is one of the reasons why we have chosen this as our measure of size. Firstly, the size restriction consisted of deleting all potential peers with negative sales and no sales at all. We eliminated these companies from our peer analysis for comparable reasons as all of our convicted companies had sales greater than NOK 1 million in the year after conviction. Secondly, we evaluated the sales and leverage for the convicted companies in the year after the conviction, and thereby created restrictions for their peers. The selection of peers was done manually, and the restrictions were adjusted while doing so to ensure that we

ended up with highly comparable firms while also having a sufficient number of peers at the end.

Leverage

In our peer analysis we chose to apply the common leverage ratio in financial research, total debt-to-total assets (D/A), which defines the total amount of the firm's debt relative to its assets. We calculated all of the convicted companies' leverage in the year after the conviction. As all of our corrupt companies had highly various leverage ratios, we performed the sampling process by making specific restrictions for all of the companies depending on their respective leverage, sales and their number of peers available as describes in the section above.

4.2.4 Descriptive statistics

Delta analysis

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
<i>ROA* a-1</i>	26	0,0865	0,0183	0,0935	0,0487	0,1242
<i>ROA* c+1</i>	26	0,0691	0,0292	0,1488	0,0090	0,1292
<i>ROA* c+2</i>	26	0,0149	0,0276	0,1409	-0,0420	0,0719

Table 2 includes summary statistics for the yearly observations of Return on Assets (ROA) for the 26 corrupt companies in our data set, convicted somewhere in the sample period between 2003-2017. The summary statistics provided include the mean, standard error, standard deviation, and the 95% confidence intervals. *a* and *c* represents the announcement year and conviction year respectively.

Table 2 presents the descriptive statistics for ROA* for the companies in the year before the announcement of their corrupt involvement and in the two years after their conviction. The table provides summary statistics including the mean, standard error, standard deviation, and the 95% confidence intervals for the average ROA* in all of the years. Most importantly, we notice that the ROA* on average decreases drastically over the years from 8,65% in the year before announcement to 1,49% two years after conviction. Looking at the standard deviation we notice the volatility in the data set to increase over the years, which

might indicate that some of the companies have experienced a drastic reduction in firm performance, which further forces the large decrease in the average ROA*.

Peer analysis

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
ROA* corrupt companies	27	0,0756	0,0275	0,1427	0,0191	0,1321
ROA* peers	382	0,1280	0,0111	0,2168	0,1062	0,1498

Table 3 includes summary statistics for the yearly observations of Return on Assets (ROA) for the 27 corrupt companies and their 382 peers included in our data set. Corrupt companies are convicted somewhere in the sample period between 2003-2017. The summary statistics provided include the mean, standard error, standard deviation, and the 95% confidence intervals. *a* and *c* represents the announcement year and conviction year respectively.

Table 3 presents the descriptive statistics for the corrupt companies' ROA* in the year after their conviction together with the ROA* for their carefully elected peers in the same year. The average ROA* of the corrupt companies was 7,56% in the year after the conviction, while the average ROA* of their peers amounted to 12,80%. Conclusively, both of the descriptive statistics from the delta analysis and peer analysis provide implications that the corruption might have affected the firm performance of these companies negatively. However, we will perform a deeper investigation of these differences before drawing any conclusions.

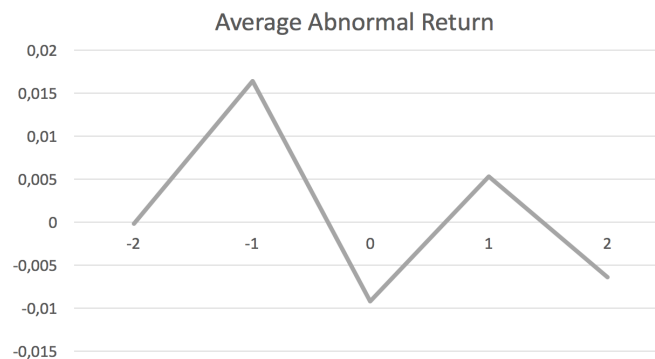
5 Result and analysis

5.1 Event study

In this section we will present the results from our primary study; the event study methodology by McWilliams and Siegel (1997), shown in the methodology part of this thesis. Whether the announcement or conviction of corruption will generate negative reactions in the stock prices, are the two hypotheses that has been tested. Any obtained abnormal return significantly different from zero would imply a relationship between the announcement/conviction of the corruption and the stock price change.

5.1.1 Average Abnormal Returns

Before we present the cumulative abnormal returns conducted in our study, we will present the average abnormal returns calculated. Graph 1 shows the average abnormal return across the eight companies over the two days before and after the *announcement* of corrupt activity for the companies.

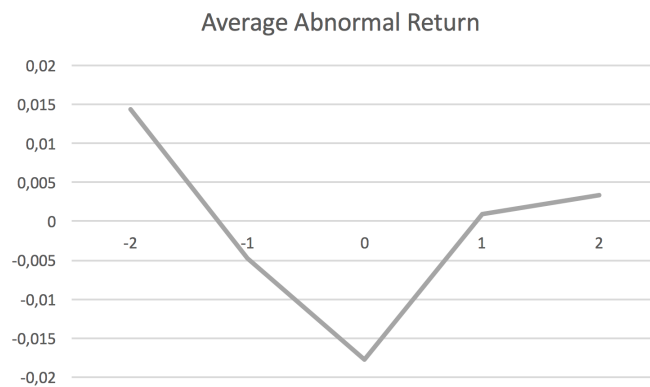


Graph 1 illustrates the average abnormal of eight companies related to announcements of corruption somewhere in the sample period from January 3rd 2000 to March 11th 2019. The graph shows the average abnormal returns obtained from two days prior to the announcement to two days after the announcement.

Looking at the graph we notice that the average abnormal return varies over the days surrounding the announcement day. On average, the companies experience an increase in the abnormal return before the announcement, then a decrease at the announcement day, and further an increase the day after. However, the average abnormal return decreases again from the day after the announcement to the following day (from 1 to 2) and it is therefore hard to say anything about whether the fluctuations are due to the announcements or not. Also, as seen in appendix 4

the average abnormal return of 1,65% on the day prior to the announcement day (-1) is the only result that is statistically significant at a 5% level.

Next, we will present the calculated average abnormal returns related to the *conviction* in a court case. Graph 2 shows the average abnormal return across the eight companies over the two days before and after their conviction.



Graph 2 illustrates the average abnormal return of eight companies convicted for corruption somewhere in the sample period from January 3rd 2000 to March 11th 2019. The graph shows the average abnormal returns obtained from two days prior to the conviction to two days after the conviction.

On average, the companies experience a decrease in the abnormal return two days prior to the conviction day, and an increase over the two days following the conviction. Comparing this result to the average abnormal return surrounding the announcement day, we see less fluctuation. A clear dip is evident in the average abnormal return at the conviction day, which gives us stronger reasons to believe that a negative relationship between the conviction of corruption and the stock price change exists. Also, as seen in appendix 4 an average abnormal return of -1,77% at the announcement day (0) is statistically significant at the 10% level.

5.1.2 Cumulative Abnormal Returns (CAR)

In order to capture the potential stock market reaction to the arrival of new information, namely to capture the effect of the announcement and the conviction of corruption on stock performance, we have accumulated the abnormal returns. Table 4 presents the cumulative abnormal returns (CARs) for all of the companies, calculated as the sum of the abnormal returns in the event windows, together with the the test statistics used for significance analysis. In chapter 3, we discussed why an event window of the day before and the day after the

announcement (-1 to 1 days) is the most appropriate for our study. Still we also present results from shorter event windows to get a more versatile insight.

	Event Window	Event Date	CAR	Z	N
Company 1	<i>-1 to 0</i>	30.06.2014	0,0231	1,16	250
	<i>-1 to 1</i>	30.06.2014	0,0673*	1,82	250
	<i>0 to 1</i>	30.06.2014	0,0457	1,07	250
Company 2	<i>-1 to 0</i>	27.08.2004	0,0475**	2,32	250
	<i>-1 to 1</i>	27.08.2004	0,0363	0,93	250
	<i>0 to 1</i>	27.08.2004	0,0020	0,08	250
Company 3	<i>-1 to 0</i>	28.09.2005	0,0082	0,66	250
	<i>-1 to 1</i>	28.09.2005	-0,0001	-0,01	250
	<i>0 to 1</i>	28.09.2005	0,0020	0,11	250
Company 4	<i>-1 to 0</i>	02.07.2008	-0,0238	-0,50	250
	<i>-1 to 1</i>	02.07.2008	0,0245	0,34	250
	<i>0 to 1</i>	02.07.2008	0,0126	0,15	250
Company 5	<i>-1 to 0</i>	03.09.2003	0,0126	0,89	250
	<i>-1 to 1</i>	03.09.2003	0,0390*	1,66	250
	<i>0 to 1</i>	03.09.2003	0,0255	0,94	250
Company 6	<i>-1 to 0</i>	02.06.2008	-0,0012	-0,55	250
	<i>-1 to 1</i>	02.06.2008	-0,0195	-0,89	250
	<i>0 to 1</i>	02.06.2008	-0,0262**	-2,52	250
Company 7	<i>-1 to 0</i>	04.05.2010	-0,0110	-0,09	250
	<i>-1 to 1</i>	04.05.2010	-0,0482	-0,45	250
	<i>0 to 1</i>	04.05.2010	-0,1017***	-3,78	250
Company 8	<i>-1 to 0</i>	15.01.2014	0,0028	0,18	250
	<i>-1 to 1</i>	15.01.2014	0,0015	0,11	250
	<i>0 to 1</i>	15.01.2014	0,0080	0,77	250

Table 4 illustrates the regression results for each company. The population period is January 3rd 2000 to March 11th 2019, where the announcements for each firm is made on different times across the population period. The estimation window consists of 250 days prior to the event window, resulting in a sample size of all together 2000 observations across 8 firms. Variables used in the regression consist of daily observations. The table presents cumulative abnormal returns, standard deviations and the test statistics for each company and for three different event windows, where the announcement date is the event date. *** implies $p < 0.01$ and represents a statistical significance at a 1% level, ** implies $p < 0.05$ and represents a statistical significance at a 5% level, and * implies $p < 0.1$ and represents statistical significance at a 10% level.

Some significant results have been discovered in all of the different event windows. Starting with the main event window, two companies experienced an average abnormal return significantly different from zero at a 10% level. Company 1 and company 5 experienced cumulative abnormal returns of 6,73% and 3,90% respectively. The more interesting part of these findings is the sign of

the abnormal returns. These companies have actually experienced significantly positive average abnormal returns in relation to the announcement of the corruption. The hypothesis presented under chapter 3 of this study, was that the announcement of corruption would generate negative returns in the stock price. Further, no significant negative abnormal returns were found in the event window of -1 to 1. When looking at the 2-day event window, including the announcement day and the day before (-1 to 0), only one company experienced a significant average abnormal return. That is, company 2 experienced a positive significant average abnormal return at a 5% level, and a cumulative abnormal return of 4,75%. Also this result is inconsistent with our hypothesis.

Lastly, we included an event window consisting of the announcement day and the following day (0 to 1), for the reason that announcements after the arrival of the closing price should not be observed before the day after the event day. Our result shows negative average abnormal returns significantly different from zero at the 5% level for two companies. That is, company 6 and company 7 experienced cumulative abnormal returns of -2,62% and -10,17% respectively. These findings are consistent with our hypothesis that the announcement of corruption would generate negative reactions in the stock price.

In the study using conviction date as the event date, we have obtained cumulative abnormal returns significantly different from zero in all of the different event windows. Furthermore, our results show some *negative* average abnormal returns significantly different from zero at the 1% level in each event window. See table 5 for a presentation of the cumulative abnormal returns (CARs) obtained by all of the companies together with the test statistics used for significance analysis.

	Event Window	Event Date	CAR	Z	N
Company 1	-1 to 0	03.12.2015	-0,0758	-0,93	250
	-1 to 1	03.12.2015	-0,0327	-0,30	250
	0 to 1	03.12.2015	-0,0363	-0,30	250
Company 2	-1 to 0	27.10.2006	0,0017	0,04	250
	-1 to 1	27.10.2006	0,0076	0,22	250
	0 to 1	27.10.2006	-0,0128	-0,52	250
Company 3	-1 to 0	14.02.2008	-0,0643***	-3,26	250
	-1 to 1	14.02.2008	-0,0802***	-3,39	250
	0 to 1	14.02.2008	-0,0576**	-2,20	250
Company 4	-1 to 0	03.07.2009	-0,0339	-0,91	250
	-1 to 1	03.07.2009	-0,0133	-0,27	250
	0 to 1	03.07.2009	0,0228	1,20	250
Company 5	-1 to 0	29.06.2004	-0,0086***	-11,08	250
	-1 to 1	29.06.2004	-0,0203***	-2,76	250
	0 to 1	29.06.2004	-0,0165**	-2,38	250
Company 6	-1 to 0	01.10.2008	0,0014	0,36	250
	-1 to 1	01.10.2008	-0,0003	-0,08	250
	0 to 1	01.10.2008	-0,0030***	-6,34	250
Company 7	-1 to 0	14.09.2010	0,0049	1,06	250
	-1 to 1	14.09.2010	0,0028	0,47	250
	0 to 1	14.09.2010	-0,0019	-0,87	250
Company 8	-1 to 0	07.07.2015	-0,0048	-0,62	250
	-1 to 1	07.07.2015	-0,0364	-1,22	250
	0 to 1	07.07.2015	-0,0300	-0,91	250

Table 5 illustrates the regression results for each company. The population period is January 3rd 2000 to March 11th 2019, where each firm is convicted on different times across the population period. The estimation window consists of 250 days prior to the event window, resulting in a sample size of all together 2000 observations across 8 firms. Variables used in the regression consist of daily observations. The table presents cumulative abnormal returns, standard deviations and the test statistics for each company and for three different event windows, where the conviction date is the event date. *** implies $p < 0.01$ and represents a statistical significance at a 1% level, ** implies $p < 0.05$ and represents a statistical significance at a 5% level, and * implies $p < 0.1$ and represents statistical significance at a 10% level.

In all of the different event windows, company 3 and company 5 have experienced significant negative average abnormal returns. In the main event window (-1 to 1), company 3 and company 5 experienced cumulative abnormal returns of -8,02% and -2,03% respectively, a result significantly different from zero at the 1% level. Furthermore, in the event window including the conviction date and the day prior to the conviction date (-1 to 0), company 3 and company 5 yielded cumulative abnormal returns of -6,43% and -0,86% respectively. The average abnormal returns are significant at the 1% level in this event window as

well. Lastly, looking at the event window consisting of the conviction date and the day after the conviction date (0 to 1) we also have obtained a slight significant average abnormal return at the 1% level. That is, company 6 experiences a cumulative abnormal return of -0,3%. In this event window, company 3 and company 5 experienced more decisive average abnormal returns, with cumulative abnormal returns of -5,76% and -1,65% respectively, significantly different from zero at the 5% level.

5.1.3 Average Cumulative Abnormal Returns (ACAR)

In addition to computing the cumulative abnormal return for each company, we calculated the average cumulative abnormal return for all companies treated as a group, so that we can analyse the total impact of the new information provided by the announcement. The output from the regression analysis in all three different event windows is presented in table 6.

Event Window	ACAR	Robust Std.Errors	t	P > t 	N
<i>-1 to 0</i>	0,0073	0,0077	0,95	0,374	8
<i>-1 to 1</i>	0,0126	0,0130	0,97	0,363	8
<i>0 to 1</i>	-0,0040	0,0157	-0,26	0,806	8

Table 6 illustrates the average cumulative abnormal returns for all of the companies treated as a group. The population period is January 3rd 2000 to March 11th 2019, where each firm has made announcements on different times across this population period. The table presents average cumulative abnormal returns (ACAR), robust standard errors, test statistics and p-value for three different event windows, where the event date is the announcement date. *** implies $p < 0.01$ and represents a statistical significance at a 1% level, ** implies $p < 0.05$ and represents a statistical significance at a 5% level, and * implies $p < 0.1$ and represents statistical significance at a 10% level.

No significant abnormal return in either of the event windows is found. Looking at the t-statistics, which shows whether the coefficient is significantly different from zero, we are not able to reject the null hypothesis of zero relationship between the announcement of corruption and stock price movements. Using the p-value presented provides an even more robust regression analysis as it allows the use of robust standard errors. For both the t-statistic and the p-value, the significance in the results are the same. That is, no significant average abnormal return is found when testing across all companies, treating them as a group.

By analysing the total impact of the announcement of the corrupt activity, where the companies are treated as a group, we are not able to reject the null hypothesis of zero relationship between the announcement of corruption and the stock price change. This result is not consistent with the previous studies of Strachan, Smith and Beedles (1983), Cox and Weirich (2002) and Gunthorpe (1997), which all found significant evidence that stock performance tend to weaken by the announcement of corporate illegalities. However, some of our results are in fact consistent with the studies, as two of the companies experienced negative cumulative abnormal returns, significantly different from zero at the 5% level. On the other hand, our results show that two companies in the sample actually experienced a positive average abnormal return significant at a 10% level in our main event window. This result is consistent with the study of Bromley and Marcus (1989), reporting that 40 percent of the firms in their sample experienced significant positive abnormal returns after an announcement of a dubious behavior. Lastly, our result of no significant evidence of a negative abnormal return in the main event window is consistent with the studies by Rao (1996 and 1997), which was not able to find any significant effects in the stock prices related to an announcement of a financial crime, and further no evidence of an efficient market.

For the second event date, namely the conviction date, we have also computed the average cumulative abnormal return in all event windows for the eight companies treated as a group. The results are presented in table 7.

Event Window	ACAR	Robust Std.Errors	t	P > t 	N
<i>-1 to 0</i>	-0,0225*	0,0113	-1,99	0,087	8
<i>-1 to 1</i>	-0,0216*	0,0101	-2,13	0,070	8
<i>0 to 1</i>	-0,0169*	0,0087	-1,95	0,092	8

Table 7 illustrates the average cumulative abnormal returns for all of the companies treated as a group. The population period is January 3rd 2000 to March 11th 2019, where each firm has been convicted on different times across this population period. The table presents average cumulative abnormal returns (ACAR), robust standard errors, test statistics and p-value for three different event windows, where the event date is the conviction date. *** implies $p < 0.01$ and represents a statistical significance at a 1% level, ** implies $p < 0.05$ and represents a statistical significance at a 5% level, and * implies $p < 0.1$ and represents statistical significance at a 10% level.

A significant negative ACAR is found in all of the event windows. In the main event window, from the day before the conviction to the day after conviction (-1 to 1), the companies on average experience a cumulative abnormal return of -2,16%. In the event window of (-1 to 0) and (0 to 1), the companies experience ACARs of -2,25% and -1,69% respectively. The ACARs in all event windows are statistically significant at the 10% level. Hence, we are able to reject the null hypothesis of zero relationship between the conviction of corruption and stock price movements at the 90% confidence level.

The most interesting part in the findings from this event study using conviction rather than announcement as the event date is the sign of the abnormal returns. In fact, all of the significant average abnormal returns appear negative related to the conviction. This result is consistent with the findings of Randall and Neuman (1979), which discovered a fall in stock prices in the week following an announcement of government prosecutions for antitrust activities. This is also consistent with our hypothesis that the conviction in a corruption court case will generate negative reactions in the stock price. Further, our results show that the effects of conviction of corruption on stock performance is more significant compared to the stock effects of the first announcement, which is inconsistent with the findings of previous studies (Strachan, Smith & Beedles 1983, Cox and Weirich 2002 and Gunthorpe 1997). Implications of this result will be discussed under chapter 5.1, part 5.

5.1.4 Robustness analysis

A notable shortcoming in the event study is a possible diminished robustness related to the small sample size in the study. Our study focuses on Norway, and very few listed Norwegian companies have been convicted of corruption after the Norwegian law was updated in 2003. This left us with a small sample, consisting of less than ten companies. We also had to drop some of the companies due to substantially infrequent data on stock prices. According to Lichtenberg and Siegel (1991), a small sample size in a study is problematic for the reason that dominant outliers could potentially impact the results to a large extent, and differences in the sample will lead to differences in the results. This applies for confounding effects which may also have a larger influence on the result (McWilliams, Siegel & Teoh, 1999). As stated under chapter 4.1, part 4, some confounding effects were found during the estimation window, but for reasons discussed we chose to

ignore this issue. As McWilliams and Siegel (1997) states, the most important part is controlling for confounding effects during the *event* window, and neither extreme outliers nor confounding effects were found in the event windows of all the companies in our sample.

A small sample size also contributes to the issue of being able to assume normality in distribution, which further leaves the asymptotic distribution of conventional test statistics inadequate (Kramer, 2001). In order to achieve asymptotic standard normality, and to deal with this problem, we have normalized the test statistics by the theoretical standard deviation as shown in chapter 3.1, part 4. According to Kramer (2001), this alternative testing procedure is more appropriate for conducting hypothesis tests, and will increase the robustness of our analysis.

Another shortcoming of our analysis might be related to company 3, 4 and 6 experiencing events during the financial crisis of 2008, as shown in table 4 and table 5. This could in fact lead to false inferences about the abnormal returns related to the events, as the true explanation of the abnormal returns might stem from the effects of the 2008 subprime financial crisis (Gresse, 2011). However, by looking at the volatility of the daily returns in each of the estimation windows (shown in figure 1, 2, 3 and 4), the volatility of the returns in the estimation windows that appear during the financial crisis of 2008, does not seem excessive compared to the others.

5.1.5 Alternative explanations

The results from using announcement date as event date, showed no significant negative abnormal returns in the main event window. A possible explanation of the lack of significance, could be due to inefficiency in the market. As mentioned in chapter 3.1, part 5, market efficiency implies that stock prices incorporate all relevant information that is available to market traders (Aguzzoni, Langus & Motta, 2013), and efficient markets regulate rapidly to new and unanticipated information (Baucus & Baucus, 1997). An example of an inefficient market is when information slowly catches up to the investors over a period of time, and as our event study includes one day before and one day after, the period might not cover the market reactions impact on stock prices. Events like the announcement of corruption in a firm is considered new relevant information, and should

therefore potentially negatively affect the stock performance of a firm in an efficient market. Consequently, the lack of significance may be due to poor market efficiency.

An explanation as to why there are clear effects for some companies, while there are almost no effects for other companies could be due to the degree of seriousness in the corruption activity, or where a person was acting in clear violation of firm policies. Controlling for these factors could be a suggestion for further studies. Another interesting finding is that our results show that two companies in the sample actually experienced positive average abnormal return significant at a 10% level when the announcement of the corrupt activity first occurred. One explanation for this may be that the saying “all PR is good PR” has something to it. In addition this might be companies that committed less severe crimes.

As highlighted under chapter 5, part 1.3, the results in this study show that the effects on stock performance, when a firm is convicted in a corruption court case, is more significant compared to the effects of the announcement of the crime. An explanation of this may be that the market does not consider the information relevant when it is first announced due to the news being more hypothetical in the beginning. According to previous studies (Strachan, Smith & Beedles 1983, Cox and Weirich 2002 and Gunthorpe 1997) one should assume the stock prices to experience a decline related to the announcement of the corruption, and that the information regarding the corruption should already be incorporated into the stock price at the time of conviction. Our results are not consistent with this theory. Accordingly, this may show that the Norwegian Stock Market does not react to wrongdoing before the claims are proven to be correct by the Norwegian court.

5.2 Return on Assets

In this section we will present results from our accounting-based method, obtained by following the methodology presented by Davidson and Worrell (1990). The hypothesis that has been tested both in the delta analysis and the peer analysis is whether corruption will have a negative effect on firm performance measured as ROA. Any significant difference in the averages either over the different years or between the corrupt companies and their peers, would imply a relationship between corruption and firm performance.

5.2.1 Delta analysis

In order to interpret if (and how) the financial crime has affected the accounting-based measure of performance, ROA, on a long-term basis, we have compared the average ROA* for the corrupt companies in the year before the announcement with the average ROA* in the two years after the conviction. Only 26 companies did have accounting numbers available for all the respective years we wanted to include in our analysis. The result is shown in table 8.

	Diff	t Stat	P(T<=t) two-tail	t Critical two-tail (5%)
Diff = mean(ROA* c+1) - mean(ROA* a-1)	-0,0173	-0,5034	0,6173	2,0181
Diff = mean(ROA* c+2) - mean(ROA* a-1)	-0,0715**	-2,1563	0,0367	2,0167

Table 8 presents the differences in the average ROA* from the year before the announcement (a) of corruption to the two years after the conviction (c). The data provided applies for the 26 corrupt companies in our data set, that was convicted somewhere in the sample period between 2003-2017. The table provides the test statistics, corresponding two-tail p-value, together with the t-critical two-tail value at 5% level. *** implies p < 0.01 and represents a statistical significance at a 1% level, ** implies p < 0.05 and represents a statistical significance at a 5% level, and * implies p < 0.1 and represents statistical significance at a 10% level.

As stated in the descriptive statistics (chapter 4.2, part 4), the average ROA* in the year before the companies' announcement was 8,65%. In the year after their conviction, the companies on average obtained ROA* of 6,91%, which result in a reduced ROA* on average of 1,73 percentage points. However, by looking at the test statistics together with the two tail p-value this result appear insignificant. The average ROA* two years after conviction was 1,49%, as identified in the descriptive statistics. Comparing this to the average ROA* in the year before announcement corresponds to a reduction of 82,77% (7,15 percentage points) in the ROA* over the years. The test statistic obtained from the Welch test is 2,1563 with a corresponding two tail p-value of 0,0367. A critical two tail value of 2,0167, allows us to reject the null hypothesis of zero effect at the 5% level. The statistically significant difference in the averages further implies that the corruption has affected the firm performance negatively.

5.2.2 Peer analysis

In order control for other factors affecting the accounting numbers and to investigate whether the corrupt companies have obtained abnormal ROA* relative to their comparable companies in the year after conviction, we have conducted a peer analysis. The results from comparing the average ROA* of the convicted companies with the average ROA* of their peers is presented in table 9.

	Diff	t Stat	P(T<=t) two-tail	t Critical two- tail (10%)
Diff = mean(ROA* corrupt companies) - mean(ROA* peers)	-0,0524*	-1,7696	0,0855	1,6896

Table 9 presents the difference in the average ROA* of the corrupt companies and the average RPA* of their peers in the year after the conviction of the corrupt companies. The data provided applies for the 27 corrupt companies in our data set, that was convicted somewhere in the sample period between 2003-2017, and their 382 peers. The table provides the test statistics, corresponding two-tail p-value, together with the t-critical two-tail value at 10% level. *** implies $p < 0.01$ and represents a statistical significance at a 1% level, ** implies $p < 0.05$ and represents a statistical significance at a 5% level, and * implies $p < 0.1$ and represents statistical significance at a 10% level.

As highlighted in the descriptive statistics, the average ROA* for the convicted companies in the year after conviction was 7,56%, whereas the average ROA for their peers amounted to 12,8%. Clearly, the convicted companies included in this study obtained lower ROA* on average, compared to their peers, with a difference of -5,24 percentage points. Testing the significance of the difference in the two averages, using the Welch test, we obtain a T-statistics with a corresponding two-tailed p-value of less than 0,10. Conclusively, we are able to reject the null hypothesis of zero mean-difference, and claim that the negative relationship between corruption and firm performance is independent of industry-specific factors.

By comparing our results with the studies of Davidson and Worrell (1988, 1990), we find contradictory evidence. Their results show significant negative stock returns after an announcement of corporate criminal activity (Davidson & Worrell, 1988), which are consistent with our findings from the event study presented in chapter 5, part 1. However, when using the same sample and testing the effect of the corporate illegalities on accounting data they found no relationship between corporate crime and firm performance (Davidson & Worrell, 1990). This result is not consistent with our findings of a significant lower average

ROA* related to the corporate crime, as shown both in our delta analysis and in the peer analysis.

On the other hand, our findings of lower average ROA* after the conviction compared to the year before the announcement of the corruption is somewhat consistent with the findings of Baucus and Baucus (1997). They investigated the long-term performance of corporate illegality, and showed lower accounting return (ROA and ROS) over the five years following a conviction of illegal corporate behavior. Our findings also showed lower return on assets in the year after conviction, but not as low as they appeared two years after conviction. This may indicate that the ROA* is in a decreasing trend and it would be interesting to take this thesis further and investigate the ROA* behaviour of the corrupt companies also in the following years after the conviction. Looking at the evidence from the peer analysis, we see lower accounting returns for the corrupt companies compared to their peers, and are able to conclude with a relationship that cannot be explained by industry-specific factors. Furthermore, the peer analysis is only conducted in the year after conviction, and as we have seen in the delta analysis, the effect of corruption on ROA* were not evident before in two years after the conviction. These findings is consistent with the findings of Marcus and Goodman (1991) claiming that it may take years after an announcement of a crises before the true impact of the scandal can be understood. Therefore, a peer analysis comparing the average ROA* also two years after the conviction, could potentially have provided even stronger negative relationship between corruption and firm performance, and proven further independency of industry-specific factors.

In our Study we had to exclude some of the companies due to their accounting data not being available. After careful investigation we found that the data was unavailable due to the firm/entity going bankrupt, changed their organization number by e.g. merging with another entity, or replaced the entity related to the corruption with a new one. We suspect these instances to be a result of the corrupt activity. If the companies had maintained their organization number, we could have included them in our study which might have led to a stronger relationship between the financial crime and firm performance.

6 Conclusion

Summarize and results

The question addressed by this study is if and how financial crime affects firm performance. In this paper, financial crime is defined as corrupt activities and all firms in the study operates in Norway. To measure firm performance we have used different techniques based on stock prices and return on assets, concentrated on the former. To include both a market-based measure and an accounting-based measure enables us to cover various aspects of firm performance. For the market-based measure, we have isolated the effects of announcement of the corrupt activity from the effects of conviction in a the court case. Compared to the market-based measure, longer-term effects have been examined by the techniques used on the accounting measure.

For the primary study, the event study on stock price reactions, the results revealed minor impact from the *announcement* of corrupt activities in the companies. On the contrary, when investigating the effect of *conviction* in a corruption court case, our results show a negative effect on stock performance, with an average cumulative abnormal return of -2,16% in the main event window, statistically significant at the 10% level. For the secondary and longer-term study, comparing a firm by it selves (Delta analysis), ROA is lower both one year and two years after conviction compared to before the announcement of the corrupt activity, but the former is not significant at any level. Moreover, the results from two years after conviction show a decrease of 7,15 percentage points and is proved statistically significant at the 5% level. When comparing the performance of the corrupt companies with their peers (Peer analysis) one year after conviction, it shows that the corrupt firms does have an average ROA* 5,24 percentage points lower than the peer average, a result proven to be statistically significant at the 10% level.

Given these results, we conclude that financial crime does have an effect on firm performance, and identify the effect as negative. Short-term and based on stock price reactions, the effects are overall negative only in relation of the *conviction* in a court case. For the longer-term and accounting based measure, firm performance has shown to be significantly negatively impacted both one and two years after conviction.

Impact

As discussed in the introduction, the number of reports of economic offenses in Norway has increased by 34,9% from 2014 to 2018 (Politidirektoratet & riksadvokaten, 2018). Regardless of whether firms commit more financial crime or whether this is due to the increased focus on CSR, the reported offenses will still have an impact on firm performance. We have shown that negatively associated actions in conjunction to CSR reduces firm performance. From our results, the impact on stock prices hits when the companies have been convicted for the offense. For reported firms, this shows that as long as they are not convicted, there might not be a short-term effect on stock prices. Longer-term, the effect from announcement of the crime could not be separated from conviction of the crime. Nevertheless, firms convicted in court cases should expect their financial results to be negatively affected. Overall, Norwegian firms and firms in similar countries with similar laws, should refrain from engaging in financial crime as there is a possibility that their firm performance will diminish, particularly when convicted for the crime.

Future research

In this paper we have studied companies that have been convicted for a criminal activity, and not those that were exonerated at the end of the trial. A recommendation for future research is to include companies that were exonerated and study whether these experienced abnormal returns after the exoneration was published. In this study we have shown that the corrupt companies experienced negative abnormal return after conviction, and the hypothesis for future research would be that the exonerated firms experienced positive average abnormal return compared to those convicted. Another recommendation for future research would be to differentiate between the seriousness of the criminal activity conducted, and to test whether serious offenses is decisive for a diminished firm performance relative to the less severe crimes.

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Appendices

Appendix 1. Dataset corruption cases.

Dataset based on Transparency International list of corruption cases in Norway 2003-2018

Company id	Announcement date	Conviction date	Publicly listed firm (at event date)	Name of Case
1	28.06.2014	03.12.2015	Yes	INTEX-saken
2	27.08.2004	27.10.2006	Yes	Ullevål-Saken
3	28.09.2005	14.02.2008	Yes	Vannverk-saken
4	02.07.2008	03.07.2009	Yes	Siemens-saken
5	03.09.2003	29.06.2004	Yes	Statoil-Horton-Saken
6	02.06.2008	01.10.2008	Yes	Statoil-Melkøya-Saken
7	04.05.2010	10.09.2010	Yes	Veiprojekt i Lister-saken
8	15.01.2014	07.07.2015	Yes	YARA-saken
9	06.07.2005	26.04.2006	No	Onninen-Saken
10	26.07.2005	06.02.2007	No	SINTEF-Saken
11	05.06.2007	12.09.2007	No	Agder Energu-Saken
12	24.03.2006	03.07.2007	No	Undervisningsbygg-Saken
13	15.06.2006	27.09.2007	Yes, but not enough data	Fesil-Saken
14	05.02.2007	07.10.2008	No	Ligningsfunksjonær-saken
15	27.08.2004	27.10.2006	No	Ullevål-Saken
16	28.09.2006	30.09.2010	No	Screen Communications-saken
17	28.09.2005	14.02.2008	No	Vannverk-saken
18	28.09.2005	14.02.2008	No	Vannverk-saken
19	01.04.2011	13.05.2011	No	Arbeidsklær fra Kina-saken
20	26.11.2010	03.10.2011	No	Store Norske-saken
21	29.11.2010	03.10.2011	No	Store Norske-saken
22	12.02.2009	10.02.2011	No	Nor Lines-saken
23	05.03.2009	21.01.2010	No	Prosjektleder i Undervisningsbygg-saken
24	13.11.2008	21.11.2011	No	Mesta-saken
25	20.11.2009	15.07.2011	No	Norconsult-saken
26	01.11.2012	10.09.2012	No	From 2012 version: Unibuss-saken
27	01.11.2012	30.10.2012	No	From 2012 version: Unibuss-saken
28	16.08.2011	01.11.2011	No	Statoil konsulent-saken
29	27.06.2013	10.04.2014	No	Norsk Gjenvinning-saken
30	20.11.2012	13.12.2013	No	NAV-saken
31	15.05.2014	15.05.2014	No	Rederi-saken
32	17.03.2013	03.06.2014	No	Felleskjøpet-saken
33	12.09.2011	03.12.2014	No	Unibuss-saken
34	31.05.2012	08.06.2016	No	Jotun-saken

Appendix 2. Dickey-fuller tests.

Market (OBX):

```
.
. dfuller ret
```

Dickey-Fuller test for unit root		Number of obs = 3776	
Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-66.524	-3.430	-2.570

MacKinnon approximate p-value for Z(t) = 0.0000

Company 1:

Dickey-Fuller test for unit root			Number of obs	=	2387
		Interpolated Dickey-Fuller			
	Test	1% Critical	5% Critical	10% Critical	
	Statistic	Value	Value	Value	
Z(t)	-49.126	-3.430	-2.860	-2.570	
MacKinnon approximate p-value for Z(t) = 0.0000					

Company 2 and 3:

Dickey-Fuller test for unit root			Number of obs	=	3768
		Interpolated Dickey-Fuller			
	Test	1% Critical	5% Critical	10% Critical	
	Statistic	Value	Value	Value	
Z(t)	-63.011	-3.430	-2.860	-2.570	
MacKinnon approximate p-value for Z(t) = 0.0000					

Company 4:

. dfuller ret

Dickey-Fuller test for unit root			Number of obs	=	3841
		Interpolated Dickey-Fuller			
	Test	1% Critical	5% Critical	10% Critical	
	Statistic	Value	Value	Value	
Z(t)	-62.651	-3.430	-2.860	-2.570	
MacKinnon approximate p-value for Z(t) = 0.0000					

Company 5 and 6:

Dickey-Fuller test for unit root			Number of obs	=	3493
		Interpolated Dickey-Fuller			
	Test	1% Critical	5% Critical	10% Critical	
	Statistic	Value	Value	Value	
Z(t)	-62.080	-3.430	-2.860	-2.570	
MacKinnon approximate p-value for Z(t) = 0.0000					

Company 7:

```
. dfuller ret
```

Dickey-Fuller test for unit root		Number of obs = 3626		
Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value	
Z(t)	-29.768	-3.430	-2.860	-2.570

MacKinnon approximate p-value for Z(t) = 0.0000

Company 8:

```
. dfuller ret
```

Dickey-Fuller test for unit root		Number of obs = 2949		
Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value	
Z(t)	-52.922	-3.430	-2.860	-2.570

MacKinnon approximate p-value for Z(t) = 0.0000

Appendix 3. Stata Do-file for the event study

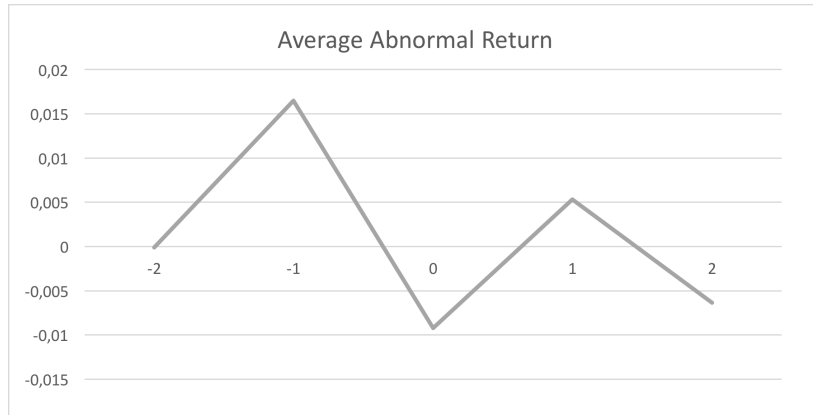
```

6      /* 1 Number of trading days */
7      sort company_id date
8      by company_id: gen datenum=_n
9      by company_id: gen target=datenum if date==event_date_public
10     egen td=min(target), by(company_id)
11     drop target
12     gen dif=datenum-td
13
14     /* 2 Creating estimation and event window */
15     by company_id: gen event_window=1 if dif>=-1 & dif<=1
16     egen count_event_obs=count(event_window), by(company_id)
17     by company_id: gen estimation_window=1 if dif<=-1 & dif>=-251
18     egen count_est_obs=count(estimation_window), by(company_id)
19     replace event_window=0 if event_window==.
20     replace estimation_window=0 if estimation_window==.
21
22     /* 3 Estimating Normal Performance */
23     set more off
24
25     gen predicted_return=.
26     egen id=group(company_id)
27
28     forvalues i=1(1)8 {
29         l id company_id if id==`i' & dif==0
30         reg ret market_return_obx if id==`i' & estimation_window==1
31         predict p if id==`i'
32         replace predicted_return = p if id==`i' & event_window==1
33         drop p
34     }
35
36     /* 4 Abnormal and Cumulative Abnormal Returns */
37     sort id date
38     gen abnormal_return=ret-predicted_return if event_window==1
39     by id: egen cumulative_abnormal_return = sum(abnormal_return)
40
41     /* 5 Testing for Significance */
42     sort id date
43     by id: egen ar_sd = sd(abnormal_return)
44     gen test =(1/sqrt(3)) * ( cumulative_abnormal_return /ar_sd)
45     list company_id cumulative_abnormal_return test if dif==0
46
47     /*Testing Across All Events*/
48     reg cumulative_abnormal_return if dif==0, robust

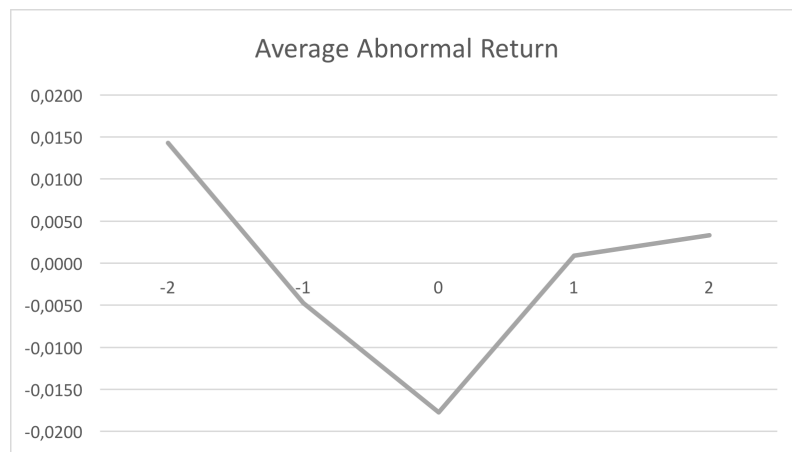
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Appendix 4. Average Abnormal Returns in the days surrounding Announcement/Conviction

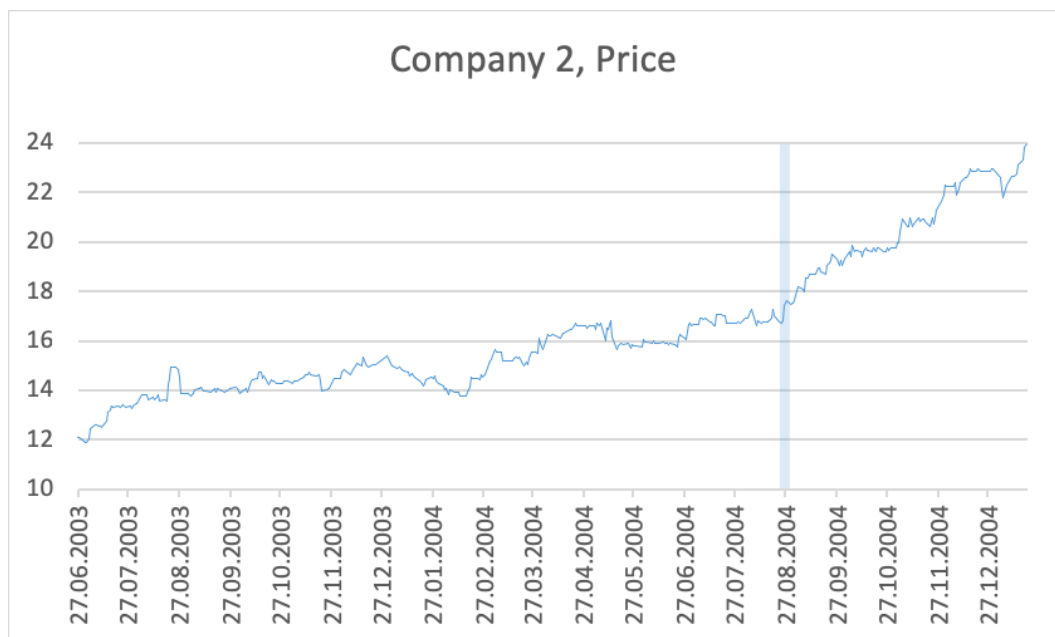
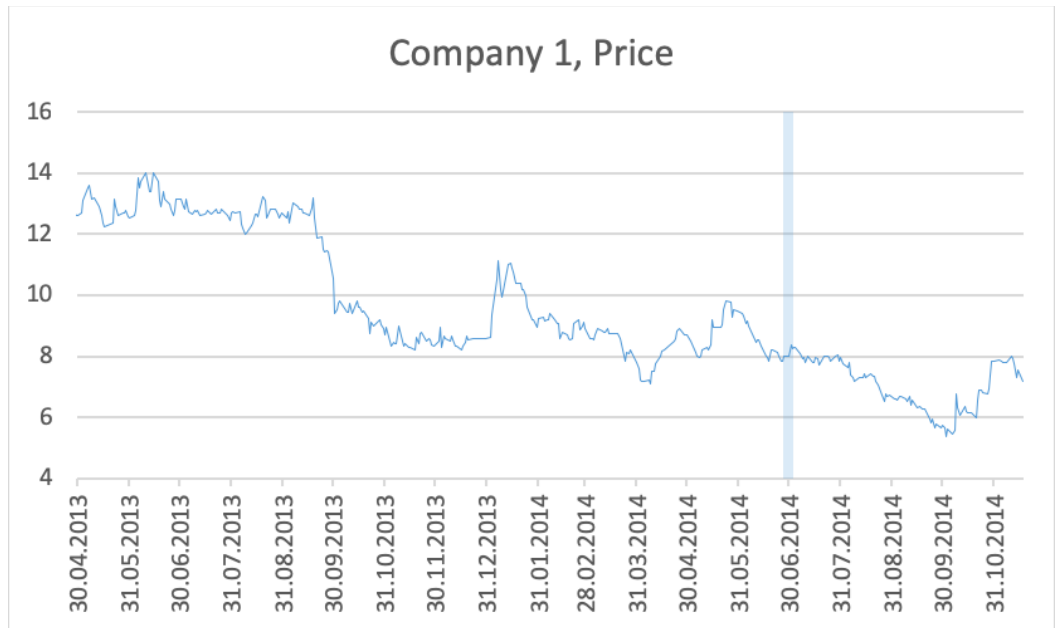
Days surrounding the announcement date	Average Abnormal Return	Test
-2	-0,0001	-0,03
-1	0,0165	2,39
0	-0,0092	-0,96
1	0,0053	0,49
2	-0,0063	-1,05

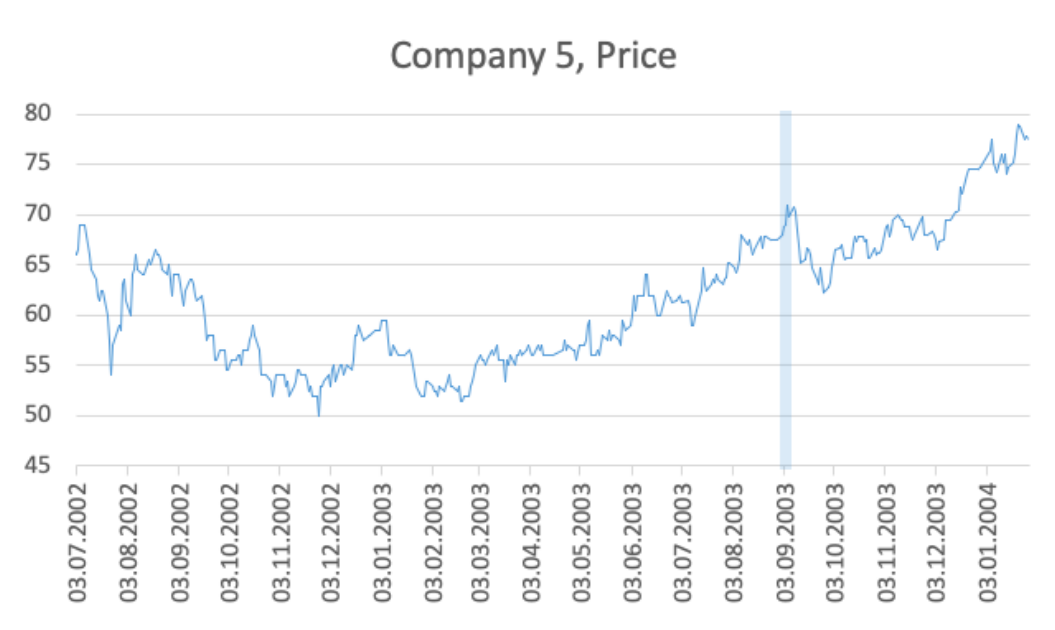
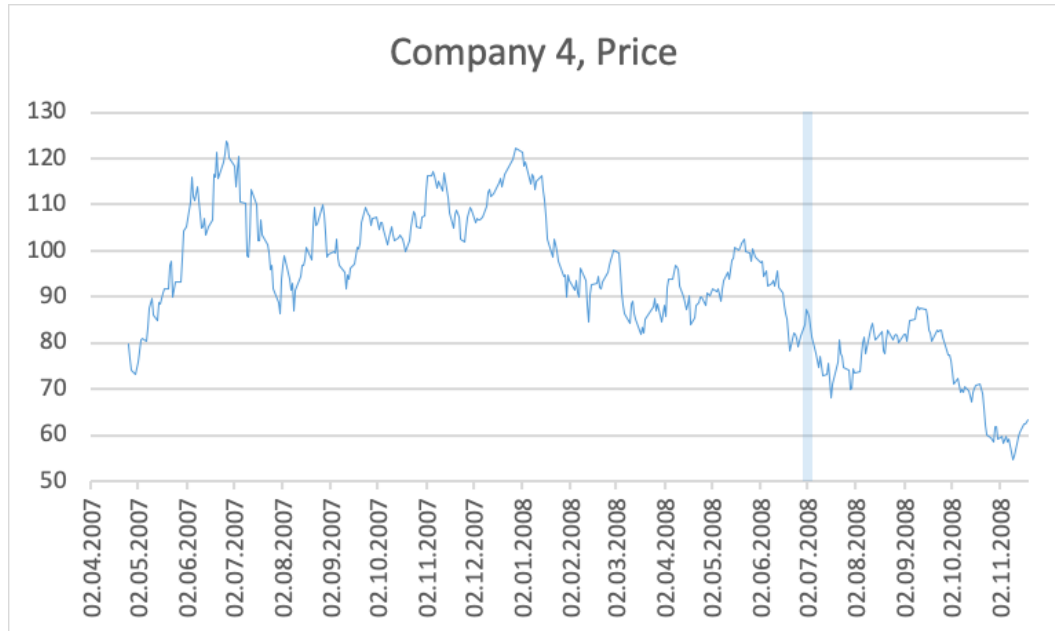
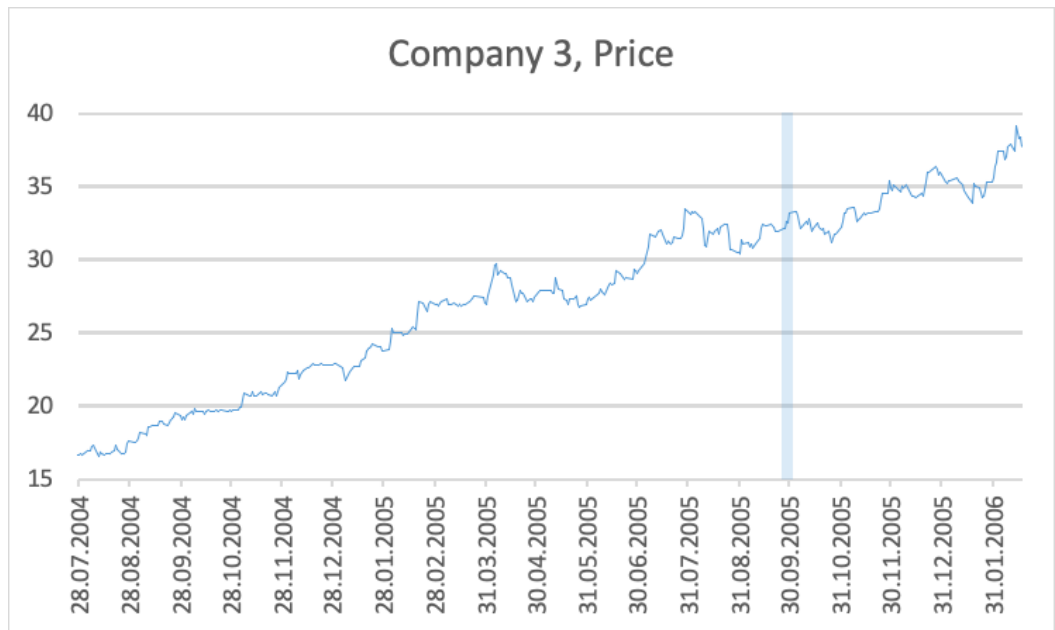


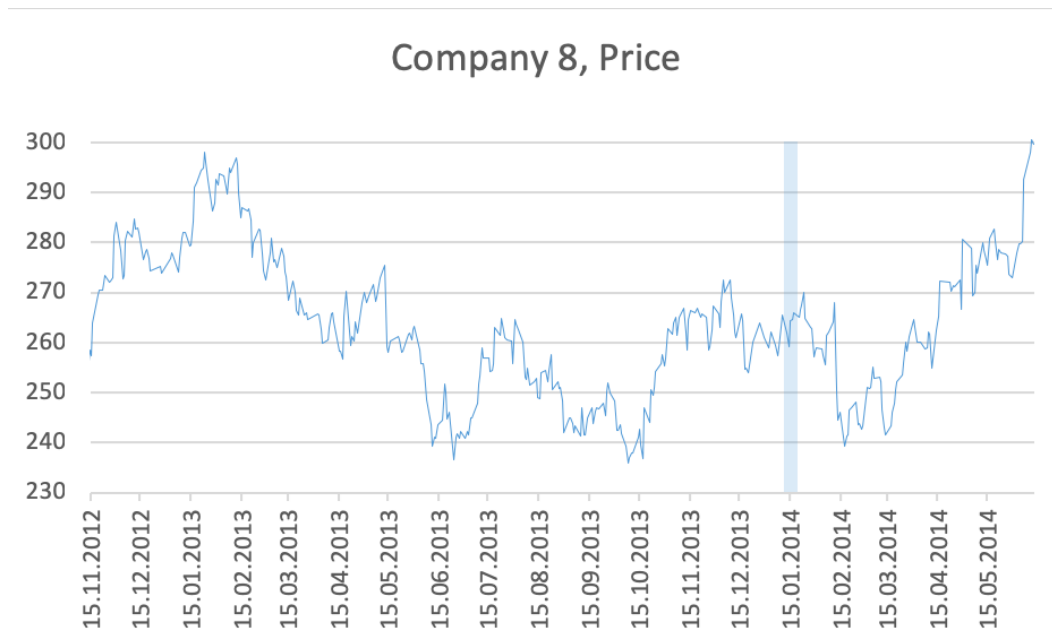
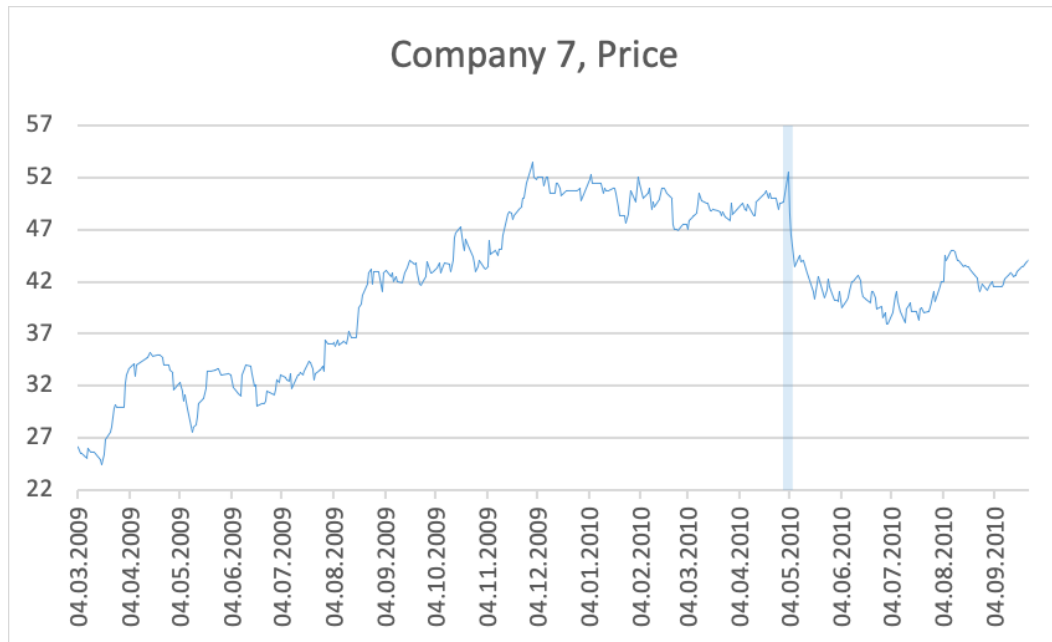
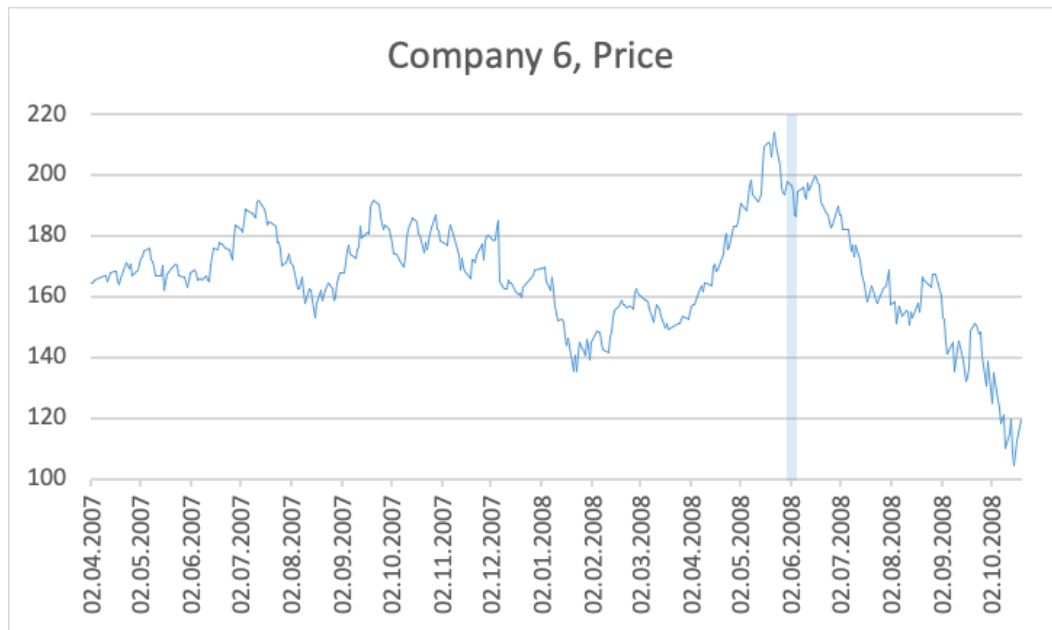
Days surrounding the conviction date	Average Abnormal Return	Test
-2	0,0143	1,87
-1	-0,0047	-0,78
0	-0,0177	-1,72
1	0,0009	0,11
2	0,0033	0,73



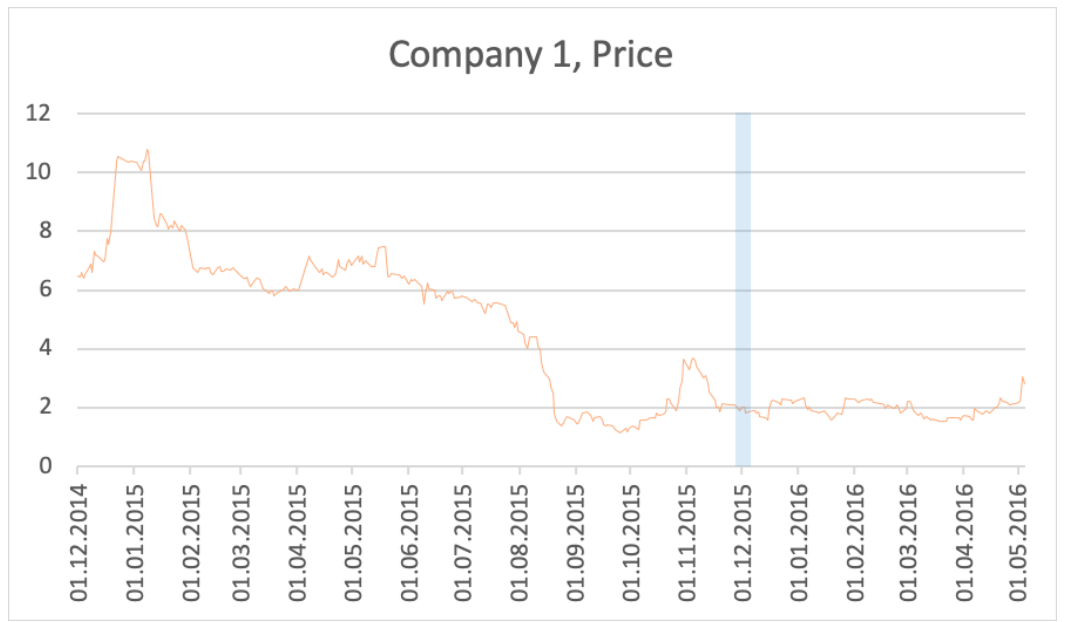
Appendix 5. Graphed stock prices, announcement of corrupt activity.



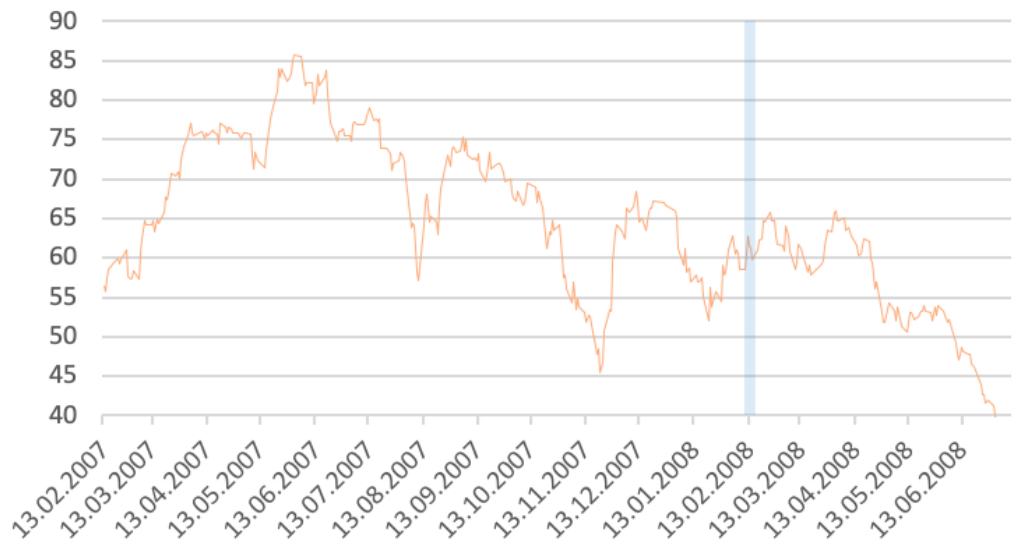




Appendix 6. Graphed stock prices, conviction of corruption.



Company 3, Price



Company 4, Price



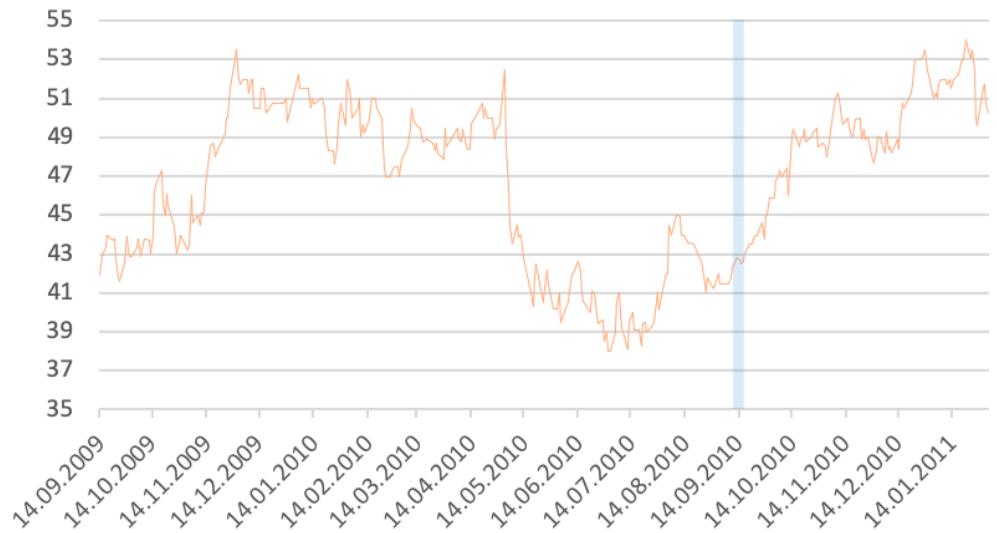
Company 5, Price



Company 6, Price



Company 7, Price



Company 8, Price

