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Master Thesis Strategy Economics

The chicken and the egg: Examining the connection between corporate fraud and stock prices

Elsa Sillanpää

620373

Supervisor: Sophie van der Zee

Second assessor: Jan Stoop

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Abstract

Corporate fraud is a great social concern, and the costs of it are high to the affected companies and society as a whole. The most severe fraud leads to public scandals widely covered in the media. The study examines the effect of suspicion of fraud in financial press coverage on stock prices. The aim of the study is twofold. First, we assess whether suspicions of managerial fraud impact stock prices. Second, if we find an effect, we examine which comes first: corporate fraud and the coverage of it in the media or the decrease in stock prices. Fraud has a remarkable effect on companies and societies, and due to its importance and costliness, it is important to be studied. The research question is studied by applying an event study using three models: The Market model, The Fama and French 3-factor model, and the Adjusted Mean model. The Fama and French 3-factor Model results are studied using a robust Ordinary Least Squares regression. The main findings indicate a statistically significant decrease in stock prices after the initial press coverage of the misconduct and an insignificant change before the coverage. The regression findings do not indicate significant differences between the stock price decrease and the type of misconduct or the company's participation in misconduct in the past. This means that the press coverage on suspicion of fraud comes first, followed by a decrease in stock prices.

Keywords: Event study, Corporate fraud, Financial Fraud, Stock price, Financial news, United States

Contents

1. Introduction

Corporate fraud is a matter of grave economic and social concern. It negatively affects the financial stability and health of companies, reduces the quality of public services, and decreases the disposable income of private citizens (International Public Sector Fraud Forum, 2020). Fraud is expensive, and in the most severe cases, it can even lead to bankruptcy (Giroux, 2008). Even if fraud cannot be demolished, studying it and its effects is important for the prevention of fraud (International Public Sector Fraud Forum, 2020). According to Gee and Button (2021), fraud had not been precisely measured before the late 1990s, but since the late 1990s multiple governments implemented measurements to annually study fraud. The study by Gee and Button (2021) shows that the average losses caused by fraud have increased by 88% from 1997 to 2020. In 2020, the estimated global total financial loss caused by fraud was $42 billion (PWC, 2021).

According to the Association of Certified Fraud Examiners (2021), corporate fraud most commonly includes theft, corruption, conspiracy, embezzlement, money laundering, bribery, and extortion. Corporate fraud differs in severity, and one factor affecting the scope of the crime is the position of the person or the people committing the fraud. The owners or executives of the companies commit only 20% of the internal corporate fraud cases, but those cases are the costliest to the company, and the schemes last notably longer than frauds committed by employees or lower-level managers (Association of Certified Fraud Examiners, 2021). The high costs and the long-lasting investigations can be explained by owners and executives having easier access to the companies' assets and having the opportunity to override controls (Association of Certified Fraud Examiners, 2021). Of all fraud, 37% is committed by an internal perpetrator, and the rest by an external perpetrator or by collusion between external and internal perpetrators (PWC, 2021). Zahra and colleagues (2007) define managerial fraud as "a senior company executive taking deliberate actions to deceive, con, swindle, or cheat investors or other key stakeholders."

Corporate fraud becomes a scandal when it causes public outrage. Corporate fraud has long been a severe phenomenon, but in the early 2000s, the world encountered an unforeseen wave of corporate scandals (Sullivan, 2006). The wave was caused by a lack of transparency in

financial reporting, which enabled opportunistic behavior (Camfferman & Wielhouwer, 2019). Due to the high quarterly earnings targets of the companies in the 1990s, the incentive for fraud was high, and because getting caught was more unlikely than it is today due to lack of policy - several companies committed fraud (Giroux, 2008). One of the most famous scandals of the period was the Enron scandal. The company's fraudulent activities concerning its accounting led to the fall of the company. The stock price experienced a sharp downfall from $90.75 to $0.26, and in December 2001, Enron filed for bankruptcy (Healy & Palepu, 2003). The scandals of the early 2000s led to new regulations and legislations within financial reporting, which was followed by the stabilization of the number of accounting scandals (Giroux, 2008).

Most severe corporate fraud leads to public scandals widely covered in the media and a drop in the company's stock price. Fraud becoming a public and widely discussed topic is highly due to the media coverage of it (Soltani, 2014). In nonbusiness publications, fraud is discussed in a more sensational light, while in financial publications the press coverage provides facts and more informational analysis on the subject (Miller, 2006). The stock prices of the fraudulent companies fell during the examined period, and the American stock market experienced a downturn. The index of the Nasdaq stock market fell 39.28% in the year 2000, 21.05% more in 2001, and 31.53% in 2002 (Nasdaq, 2023a). In addition to the wave of corporate fraud, the internet bubble bursting and 9/11 strongly impacted the stock market (Marinov & Marinova, 2020).

This paper aims to research how press coverage of corporate fraud affects stock prices. This research focuses on managerial fraud because of all corporate fraud it has the most notable effect on the companies' finances (Association of Certified Fraud Examiners, 2021). This research contributes to the literature by investigating the sequencing of media attention and negative shock in stock prices. The topic for the paper is chosen due to the great financial effect fraud poses to companies and economies.

This can be formulated as two research questions:

RQ1: Does the initial suspicion of fraud predict a decrease in stock prices?

RQ2: Does a decrease in stock prices precede the initial press coverage about suspicion of fraudulent action?

The research questions are investigated using an event study and an OLS regression. An event study analysis is performed to examine the impact the initial press coverage on suspicion of corporate fraud has on stock prices. The results of the event study are then analyzed with a regression. The data of the study stems from scandalous corporate frauds from 2000 to 2003. The time is chosen due to its importance in the history of fraud. The number of fraud scandals during the early 2000s was higher than today (Courtois & Gendron, 2020), but how investors react to scandals has not changed (López-Cabarcos et al., 2018). In addition, choosing a time before social media eliminates the possible bias caused by false information or rumors received from social media as the source of information.

2. Literary Review

Fraud was first described in literature in 1939 by Edwin X. Sutherland, and ever since that, the number of fraud cases and the level of financial losses caused by fraud has continuously increased (Krokhicheva, Mezentseva, & Yu, 2021). The Enron scandal in 2001 started a new wave of corporate fraud. During the first four years of the millennium, multiple major companies, most located in the United States, were investigated for fraudulent accounting practices (Camfferman & Wielhouwer, 2019). According to Sullivan (2006), many of the fraudulent companies participated in so-called "creative accounting,", which means that the companies used unethical ways to miswrite their numbers to hide overstated revenues or assets, or understated expenses, or underreported liabilities. Multiple cases led to public scandals involving fraud accusations (Sullivan, 2006). These fraud cases were widely discussed in the media, and the companies suffered notable declines in their stock prices (Palmrose, 2004).

For example, Enron, WorldCom, and Lehman Brothers were companies accused of misconduct, had their scandals widely discussed in the media, and suffered notable losses (Sullivan, 2006). Enron used accounting techniques to falsely present its numbers in 2000, showing that the company was earning more than they were. The accounting techniques included understating debt and overstating revenue, among others. The suspicion of

fraudulent actions led to a globally reported scandal, and eventually in 2001 Enron filed for bankruptcy (Healy & Palepu, 2003). WorldCom was another company accused and later charged with accounting fraud. They overstated their earnings in 2001 and 2002 and when the crime became public knowledge, the company's stock price dropped, and WorldCom filed for bankruptcy (Lyke, 2002). Lehman Brothers, as well as several other financial institutions, gave their clients skewed stock advice, which the Securities and Exchange Commission later investigated (CitizenWorks, 2003). The scandal led to a considerable decrease in stock price, and in 2008 after another scandal, Lehman Brothers filed for bankruptcy (Fitzpatrick & Thomson, 2016).

Fraud can be committed by an external or an internal perpetrator. Internally performed fraud can be divided into categories based on the position of the person committing the crime. A low-level employee performs most internal fraud; only 20% of internal fraud can be considered managerial fraud (Association of Certified Fraud Examiners, 2021). However, of all the internal fraud, managerial fraud costs companies the most (Parks, 2019). According to Kaplan (2010), the motives for corporate fraud include the following "the desire to meet expectations about company's earnings; concealing the company's weakened financial condition; bolstering the company's performance for pending equity or debt financing; or increasing the management's compensation".

2.1. Stock prices

Stock prices are the market value of a company's publicly traded shares of stock at any given time. Stock prices are traded on the stock market, and their value represents the company's value as they are bought and sold based on investors' demand (Fama, 1995). Stock prices are influenced by different factors, such as the company's financial performance, industry trends, economic conditions, and geopolitical events (Inci & Merkan, 2016).

Change in expectations causes the stock market to fluctuate (Barsky & De Long, 1993). The expectations can be divided into two factors: the expected payoffs and trust in the system (Guiso et al., 2005). The decision to invest in stocks is partly an assessment of risk–return trade-off based on existing data and partly on a leap of faith (Guiso et al., 2005). Trusting the system can be defined as the subjective probability individuals attribute to the possibility of

not being cheated (Georgarakos & Pasini, 2011). When the system seems untrustworthy, fewer people are willing to take the leap of faith and invest.

2.2. The effect of fraud on stock prices

According to Guiso and colleagues (2005), a decrease in trust can be caused by monetary causes, such as a crash of an economic bubble, or by non-monetary causes, such as war or a pandemic. Corporate fraud can also cause a decrease in trust. When the investors' and the households' expected return on investment lowers, the stock price drops (Surti, 2021).

Corporate fraud scandals significantly affect the stock prices and the debt ratings of the companies in question (Palmrose et al., 2004). The early 2000s wave of corporate fraud caused a notable negative effect on the global stock markets. In 2000, the Nasdaq index fell 39.28%, 21.05% in 2001, and in 2002, 31.53% (Nasdaq, 2023a).

2.3. Press coverage and fraud

According to Soltani (2014), press publications about fraudulent firms and their executives have often been a substantially important part of fraud scandals, especially in the United States. Compared to Europe, in the United States, publications about corporate fraud lead to more and larger public discussion (Soltani, 2014).

Prior literature has two conflicting views on the press representing crime, as Cohen and colleagues (2010) described. One theory postulates that the press does not provide in-depth analysis but only sensationalizes issues to sell (Jensen, 1979; Core et al., 2005; DeAngelo et al., 1996). Press coverage based on sensationalism with the goal of selling as many copies as possible may affect the popularity of the company and the public's trust in the company (Cohen et al., 2010). As a result, investments may decrease, and stock prices may lower. The second theory states that free media is a tool for economic growth because it provides information to the public (Djankov et al., 2002; Dyck & Zingales, 2002; Dyck et al., 2005). Cohen and colleagues (2010) suggest that press coverage about corporate fraud that functions as an information source for the public educates households and investors, and that the provided information may decrease the investors' expected returns and lower stock prices. However, the press coverage focused on providing the public with facts instead of sensational

stories provides a more realistic picture and leads to a more truthful adjustment of the stock market (Cohen et al., 2010). Research on press coverage of corporate fraud shows that the press focuses more on the adjudication of crime than the breaking of scandal (Benediktsson, 2010). That means that the press coverage of corporate fraud is focused on providing the public with information and will therefore shape public knowledge and opinion in a realistic manner.

2.4. The effect of press coverage on stock prices

The impact of press coverage on stock prices has been highlighted in several studies, such as Cutler et al. (1988), Hiroyuki (2013), and Scheufele et al. (2011). The media has the ability to influence public opinion by shaping the way fraudulent companies are portrayed in the news, as argued by Carroll and McCombs (2003). However, it is important to note that stock price fluctuations are a result of a combination of factors such as supply, demand, company performance, economic reports, and investor sentiment. Negative news is one aspect that can influence investor sentiment (Narayan, 2019). Negative news can be described as factual information that portrays a negative image of the subject. Facts are inputs to news reporting, and confirmed information is qualitatively different than rumors (Bai & Chen, 2010). Therefore, focusing on news published in reliable journals should be more important for investors than rumors. The rising importance of social media might change this but is out of scope of this study.

Behavioral finance theory suggests that the investment decision is to a great extent affected by the investor sentiment (López-Cabarcos et al., 2018). Lucey and Dowling (2005) further elaborate that investors often rely on psychological reasoning and their optimism or pessimism towards the future stock market activity to make investment decisions. Given that many investors depend on the financial media as a primary source of information, as suggested by Wu et al. (2022), it is plausible that press coverage of a scandal can significantly impact how investors perceive and value a company in the present moment.

Countering the assumptions of the previous paragraph, it has been found that many financial publications report the stock price crash already in their initial articles discussing a scandal. Financial information is initially posted in the company statements before being published in

the financial media (Miller, 2006). The information is available to the public before the initial press coverage; however, the ease and accessibility of the information in financial publications lead most investors to rely on financial newspapers for information (Golman et al., 2022). According to Baker (2021), news articles most often discuss stock jumps in their articles the following day, which may be caused by the most established investors searching for the information before the initial press coverage.

This research contributes to the literature by filling a knowledge gap on whether the press coverage on fraudulent companies affects stock prices.

3. Hypothesis Development

Previous research has found a link between fraudulent financial reporting and decreasing stock prices (Cox & Weirich, 2002). According to Fama (1970), prices respond to available information in the efficient market, and a news article about suspicion of managerial wrongdoing or a news article stating such wrongdoing can be considered as new information provided to the market. Such information may decrease trust and expected returns on investment, subsequently leading to the stock price decreasing (Botazzi et al., 2016). This leads to the following hypothesis:

Hypothesis 1: In companies where executives were suspected, investigated for, or convicted of financial fraud, and the fraud scandal was covered in the media, the stock prices decreased after the initial press coverage.

Stock prices fluctuate according to how the company is valued at the current moment. Before any press coverage about possible fraud, the public will likely value the company as trustworthy (Georgarakos & Pasini, 2011). If there have not been rumors and suspicion of wrongdoing, the company might even be viewed in a better light than usual, if the criminal activities deceive the investors to believe that the company is doing very well. That is because if the company's numbers are overstated, the investors have a false, overly positive picture of the company's health (Giroux, 2008). Company health is one factor affecting the investment decision, and an incorrect view of it might lead investors to value the company highly (International Public Sector Fraud Forum, 2020). According to this, it can be assumed

that media coverage precedes the decrease in stock prices. To test the logic from both directions, a second hypothesis is formed:

Hypothesis 2: In companies where executives were suspected, investigated for, or convicted of financial fraud, and the fraud scandal was covered in the media, there was no decrease in stock prices prior to the initial media coverage.

The effect of the public learning about the suspicion of fraudulent activities within the company is affected by how the media presents the information. Carberry et al. (2018) suggest that the public reacts more negatively towards companies about which the media has provided clear information on the company being solely responsible for the misconduct and when it results from deeper organizational problems.

Based on this, we can formulate the following hypothesis:

Hypothesis 3: The type of misconduct affects the media coverage's effect on the stock prices.

Lastly, we investigate the effect that previous misconduct within the company has on the decrease in the stock price. The efficient market hypothesis assumes that prices are a reflection of all available information (Malkiel, 2003), which means that the company's history should not affect investors' opinions. However, Lange and Washburn (2012) find that the social irresponsibility of a company negatively affects the observer, for example, an investor. That means that the investors with previous negative beliefs about the company will react more drastically to the news about the suspicion of fraud. This leads to the following hypothesis:

Hypothesis 4: Companies that have been previously investigated or convicted of corporate crime will be more affected by press coverage on suspicion of fraud than those that do not have such history.

4. Methodology

4.1. Data

The dataset used for this research consists of observations of the largest American companies between 2000 and 2003 that had an organizational scandal during the same period. First, a selection of the largest American companies was made based on the Fortune's Top 500 list in the years 2001-2003. Second, based on the Corporate Scandal Sheets by Forbes (2003) and Citizen Works (2003), we identified which Fortune 500 companies engaged in publicly known fraudulent activities. Given that scandals may lead companies to drop from the Fortune 500 list, the companies must reach the list at least once during the 2001–2003 time window to be included in the study.

To study the immediate effect of the news on stock prices after and right before the news breaks, we research the dates when the suspicion of fraudulent action is mentioned in the media. Initial suspicion is chosen over the official investigation to capture the effect with minimal bias. The dates when the media first mentions a suspicion or states that a company executive or a group of executives has participated in fraud are collected from the news archives of Fortune, Wall Street Journal, Bloomberg Businessweek, Financial Times, the Economist, New York Times, and Washington Post. The selection of the magazines is based on them covering business news, being mentioned in the Corporate Scandal Sheet (Citizen Works, 2003; Forbes, 2003), and having a large circulation (Schumaker & Maida, 2018).

The two scandal sheets together comprise 61 companies, of which 43 are also on the Fortune 500 list. Of the 43, 31 were publicly listed companies or had stock price data available. One company has been excluded from the sample due to its scandal starting in 1999, and two more are excluded because their scandal was caused by another scandal on the Corporate Scandal Sheet. This leads to a total of 28 eligible fraudulent companies. According to Bartholdy et al. (2007), an event study must contain a minimum of 25 events to result in statistically significant, plausible values. The study is combined of an event study and an OLS regression. In the event study, the initial media coverage dates are considered the studied events. With a sample comprising 28 companies, statistically reliable results can be

achieved. An overview of included companies and dates when fraud suspicion about each included company was initially mentioned in the media is presented in Table 1.

The Corporate Scandal Sheets include years, company names, and information about the scandals. Both lists have been used in previous academic literature on corporate fraud (Hirtle, 2006; Cohen et al., 2010; Aven, 2012). The lists were cross-referenced with the Global 500 lists of 2001 to 2003 (Fortune).

Table 1
The Date of Initial Suspicion published in the financial press

Fraudulent Companies	Date
AES	May 22nd, 2001
Bearn Stearns	December 13th, 2000
Bristol Myers Squibb	March 5th, 2002
Citigroup	September 18th, 2000
CMS Energy	May 9th, 2002
ConAgra	March 28th, 2003
Duke Energy	February 9th, 2001
Dynegy	February 9th, 2001
El Paso Energy	April 1st, 2000
Enron	March 5th, 2001
General Electric	September 17th, 2002
Goldman Sachs	December 1st, 2000
Halliburton	July 11th, 2002
Kmart	January 28th, 2002
Lehman Brothers	September 16th, 2002
Lucent	October 24th, 2000
Merrill Lynch & Co	December 1st, 2000
Merck & Co	June 21st, 2002
Morgan Stanley	December 1st, 2000

PNC Financial Systems	January 30th, 2002
Qwest Communications	June 10th, 2002
Rite Aid	June 21st, 2002
Tyco International	December 9th, 2001
US Bancorp	August 2nd, 2002
Waste Management	March 27th, 2002
Williams Companies	June 2nd, 2002
WorldCom	January 22nd, 2002
Xerox	April 3rd, 2001

Note: The date of initial press coverage is retrieved from the publication date of the scandal in question in the chosen financial publications

4.1.1. Research Design

An empirical analysis based on existing stock and news data was conducted to examine whether the initial suspicion of fraud can predict a decrease in stock prices and whether a decrease in stock prices precedes the initial press coverage about suspicion of fraudulent action. The sample used for the analysis consists of the Fortune 500 companies in the United States in the early 2000s that participated in fraudulent activities. We analyzed fluctuations in stock prices before and after media coverage of corporate fraud. The data is analyzed using event study methodology and OLS regression. Several control variables were used in order to highlight the effects found in the data.

4.1.1.1. Stock price

The data used for measuring the stock prices are collected from the Eikon and Kenneth. R. French databases (Eikon, 2023; French, 2023). The stock price is measured on four different occasions: 6 days before the first mention in the media, one day before the first mention, when the scandal is first mentioned in the media, and five days after the initial mention. 6-day event windows have been widely used in event studies to research the effect of a spontaneous external event on the stock price (Kammoun et al., 2019). We choose [-6, 0] as our pre-event window to capture the effect that the news has or does not have on the stock price before the

initial suspicion of fraud. The post-event window [-1, 5] is chosen to capture the news's impact on the stock price. The first day of the post-event window is prior to the initial press coverage so that the stock price has not yet been affected by the news. The 120 days long estimation window [-130, -11] is chosen by the suggestions of Peterson (1989), Campbell & Lo (1997), and Pynnönen (2005).

Based on the stock price data, the normal rate of return is calculated based on the market return rate and the daily return rate of the stock of company *i.* The normal rate is predicted from the market index, considering a risk factor, which is calculated differently based on the event study model used (Basdas & Oran, 2014). From that, abnormal returns are calculated by subtracting the expected return from the actual return (Fama et al., 1969). The S&P 500 index is used to calculate the expected return due to all the companies studied in this paper operating in the United States.

4.1.1.2. Fraudulent activities

The lists of Corporate Scandal Sheets (Citizen Works, 2003; Forbes, 2003) were used to determine whether a company participated in corporate fraud during the examination period. The sheets include a full overview of companies with scandalous media coverage concerning corporate fraud between 2001 and 2003. The Corporate Scandal Sheets include a variety of white-collar crimes that can be divided into five categories:

1. Accounting fraud
2. Conspiracy
3. Improper use of company funds by an owner or an executive
4. Insider trading
5. Skewed stock advice

All crimes in the Corporate Scandal Sheet were performed by an owner or an executive, making it corporate fraud. *Accounting fraud* can be defined as the deliberate manipulation of financial statements to falsely appearear in better corporate financial health (Auditing Standards Board, 2020). The term *financial conspiracy* groups together crimes where a group of people or companies agree to an act of deceit or falsification to obtain something of value (Dressler, 2010). Stealing or misusing company funds, such as excessive retirement

packages, falls under the third category of *Improper user of company funds*. According to Roddenberry and Bacon (2011), i*nsider trading* refers to the illegal act of trading on the stock market with the advance of having access to confidential nonpublic information on the company which is being bought or sold. According to Mokoaleli-Mokoteli and colleagues (2009) stock analysts make biased decisions when giving advice and recommendations. Companies investigated for *skewed stock advice* have given their clients advice on stocks that, instead of benefiting the client, has benefited either the company as a whole or its employees or partners. They note that such biases or favoritism can be influenced by a variety of factors, such as the analyst's personal beliefs, the pressure to maintain good relationships with investment banking clients, or the desire to generate publicity for the analyst or their firm (Mokoteli, 2006). As the difference in the type of misconduct affects the investor's opinions (Carberry et al., 2018), the type of misconduct is used as an independent variable.

Table 2
Frequency of different types of corporate fraud

Type of misconduct	Frequency	Percent	Cumulative Frequency
Accounting	12	42.86	42.86
Conspiracy	7	25.00	67.86
Improper use of company funds	2	7.14	75.00
Insider trading	1	3.57	78.57
Skewed stock advice	6	21.43	100.00
Total	28	100.00	

Note: The researched companies may have committed crimes in multiple categories. However, companies in the study are assigned only one category based on the initial and most notable type of fraud.

4.1.1.3. Control variables

Along with the test variables, we include variables to control for company characteristics that might affect the effect of media coverage about corporate fraud on stock prices, such as binary variables for the company sector and continuous variables for revenue. According to Palmrose (2004), small firms experience a stronger impact on the stock price after a spontaneous event than large firms.

The control variable for revenue is collected from the company's revenue posted in the Fortune 500 list and presented as million U.S. Dollars. As our research period covers four editions of the Fortune 500 list, the revenue used for the variable is the revenue of the company during the year prior to the scandal. Table 3 shows the revenues of the studies companies summarized into categories.

Table 3
The Revenue of the Fraudulent Companies

Revenue (million $)	Frequency	Percent	Cumulative Frequency
> 50 000	2	7.14	7.14
50 000 > 20 000	12	42.86	50
20 000 > 10 000	6	21.43	71.43
< 10 000	8	28.57	100.00
Total	28	100.00	

Control variables for sectors are two binary variables that measure whether the company operates in banking or not and whether they operate in the field of technology or not. Technology, energy, and banking sectors are chosen as control variables because they cover most studied companies. An overview of companies divided by sector is provided in Table 4.

Table 4
The Sector of the Fraudulent Companies

Sector	Frequency	Percent	Cumulative Frequency
Banking	8	28.57	28.57
Technology	4	14.29	42.86
Energy	6	21.43	64.29
Other	10	35.71	100.00
Total	28	100.00	

Note: The sector Other includes companies from the following industries: pharmaceuticals, consumer goods, communications, and security services.

Previous misconduct is measured as a binary variable, where the variable gets the value one if the company has participated in a notable scandal in the previous 20 years. We measure the history of misconduct in the past 20 years because, on average, a first-time investor is 30 years old (Royal, 2023) with a years-long memory span. The control variable is summarized in Table 5.

Table 5
Frequency of the Fraudulent Companies Having a History of Misconduct

Previous misconduct	Frequency	Percent	Cumulative Frequency
Yes	18	64.29	64.29
No	10	35.71	100.00
Total	28	100.00	

Note: The variable of previous misconduct = 1 if the number of company's misconduct in the past 20 years $\geq$ 1, else = 0.

An overview of dependent and independent variables used in the current research is presented in Table 6.

Table 6
Independent and dependent variables used for the study

	VARIABLE	UNIT	RESEARCH METHOD
DEPENDENT VARIABLE	*Cumulative Abnormal Return*	%	$\sum_{t_1}^{t_2} AR_{it}$
INDEPENDENT VARIABLES	*Type of misconduct*	Categorical variable, categories 1-5	
	Revenue	Million U.S. dollars	P_{-1}
	Technology Industry	Binary variable	
	Energy Industry	Binary variable	
	Banking Industry	Binary variable	
	Previous misconduct	Binary variable	= 1 if number of company violations ≥ 1, else = 0

Note: The research method provides the formula or method used to define the value of the variable.

4.2. Data analysis procedure

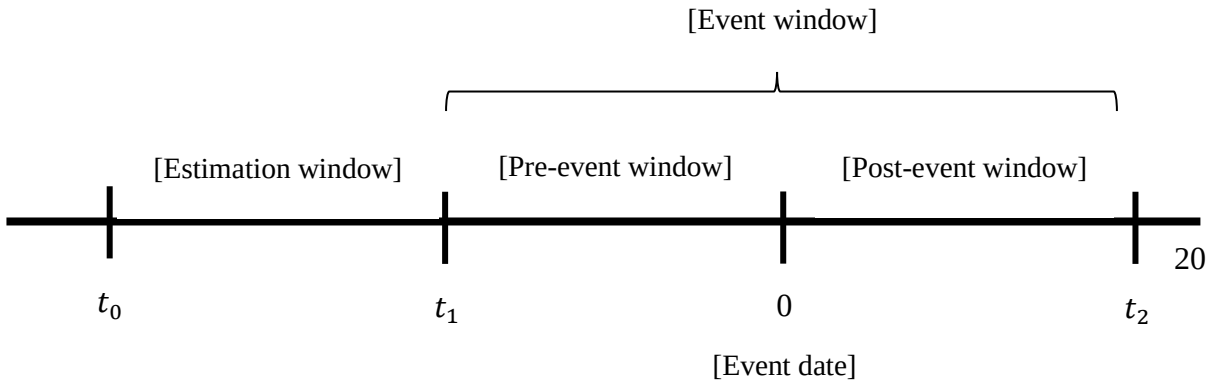
We use event study methodology to test the effect of press coverage of suspected fraud on the stock price of the fraudulent company. To allow testing the effects of different variables together in a multivariate framework, we complete the research with an OLS regression using

the cumulative abnormal returns as the dependent variable, as suggested by Wu and colleagues (2022).

An event study is a statistical technique used to research the impact of a specific event on stocks (Renner, 2011). As explained by MacKinlay (1997), event study is useful when measuring an economic event's effect on the firm value, since it uses time as the explanatory variable. The event study methodology is a widely used research technique in finance (MacKinlay, 1997; Binder, 1998). In general, event studies can be measured with different models, including a *Mean Model*, the *Market Model*, the *CAPM*, the *Fama and French Three Factors Model* (1993), and the *Carhart Four Factors Model* (1997). Conducting an event study begins with defining the event and estimation windows, the time frame of interest (Pynnönen, 2005). The event window is the period during which we compare the stock returns of selected firms, while the estimation window is the prior period used to calculate the expected returns for the researched company during the event window (Pynnönen, 2005).

For this research, we study events that occurred between January 2000 and December 2003, with an estimation window of [-130, -11]. According to Peterson (1989), a common estimation window in an event study varies between 100 and 300 days. We conduct our research with a four-month long estimation period (120 days) (Cambell & Lo, 1997). We choose six days as the lengths of both our event windows. Due to the spontaneity of the stock market, a short-term event window is preferred over a long-term event window, and a 6-day event window specifically is chosen because the stock prices begin to react within 2 to 3 days from the event and start to recover after 3 to 4 days (Wu et al., 2022). The cumulative abnormal returns are calculated for two event windows: [-1, 5] to test for the effect of the news pre-event and [-6, 0] to test for the effect post-event.

Figure 1
Estimation and event windows



Note: The value for cumulative abnormal return is calculated by finding the abnormal return in the event window by predicting it using the values of stock returns in the estimation window.

4.2.1. Normal Returns Model

In the event study, the impact of press coverage on stock prices is calculated by defining the cumulative abnormal return. The cumulative abnormal return is the sum of all abnormal returns (Nasdaq, 2023b). As explained by Jacobsen (1988), abnormal return refers to the unpredicted profits or losses of a stock, and it can be calculated as the difference between the real stock return and the expected or normal return.

Wu and colleagues (2022) define the normal rate of return as the expected rate of return in the future event window, assuming no impact of the event. To estimate the impact of press coverage of fraudulent activities on stock price, first, the normal return is calculated. A few different models and their formulas are presented.

The *Market Adjustment model* assumes that the return of all stocks in the sample are identical to the corresponding market index (Klein & Rosenfeld, 1987). In that case, the expected return can be formatted as follows:

$$ER_{it} = R_{mt},$$

where ER_{it} is the expected return of stock *i* at time *t*, and R_{mt} is the actual return of the market index at time *t*.

In the *Mean Adjusted model*, explained by Wu and colleagues (2022), the expected return is a constant, and the value of which can be found as the average of all normal returns in the estimation window.

Wu and colleagues (2022) argue that the *Market Model* combines both previously mentioned models, and the expected returns can be expressed as follows:

$$ER_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it},$$

where the dependent variable ER_{it} is the expected return of the stock *i* at time *t*, the independent variable R_{mt} is the market index, α_i is the intercept, β_i is the regression coefficient, and ε_{it} is the residual term of the regression model, which is assumed to be a normal distribution.

There are multiple formulas and models to calculate the normal return of a stock, and the best-fit model should be chosen to fit the sample of the study (Martinez-Blasco et al., 2023).

4.2.2. Abnormal Returns model

An abnormal return (*AR*) measures performance in the stock market on a risk-adjusted basis, and represents the daily unanticipated profits or losses generated by the stock (Basdas & Oran, 2014). Abnormal return is calculated as the difference between the expected return and the actual return (MacKinlay, 1997), and formulated as follows:

$$AR_{it} = R_{it} - R_{mt}$$

where, R_{it} is the actual return of the *i*th stock in the time *t*, R_{it} is the actual price and R_{mt} is the market index at time *t*.

From finding the abnormal return, we can calculate the average abnormal return (*AAR*), which can be used to investigate the abnormal return of the whole sample:

$$AAR_t = \frac{1}{n}\sum_{i=1}^{n} AR_{it}.$$

The average abnormal return refers to the weighted average of the abnormal return of all stocks in the studied sample (Wu et al., 2021). In the formula, *n* is the number of stocks in the sample, and AR_{it} is the average abnormal return of the stock *i* at time *t*.

4.2.3. Cumulative Abnormal Returns Model

From the average abnormal return, we can calculate the cumulative abnormal return (*CAR*), which is the value used for the event study analysis. The cumulative abnormal return measures the cumulative effect of abnormal returns over the time of the chosen event window (Nasdaq, 2023b). It is calculated as follows:

$$CAR_{(t_1, t_2)} = \sum_{t_1}^{t_2} AR_{it},$$

where AR_{it} represents the abnormal return of stock *i* at time *t*, and t_1 and t_2 represent the bounds of the event window in the study. Abarbanell and Bushee (1998) explain the cumulative abnormal return as the differences between a stocks' total expected and actual returns.

4.2.4. Model Selection

Event study can be conducted with multiple different models. In this study, the abnormal return and the cumulative abnormal return based on it are calculated using three different models: the *Market Model*, the *Market Adjusted Model*, and the *Fama and French 3-factor model*. Due to the *Fama and Frech Model's* capabilities to calculate returns with risk factors included (Fama & French, 1993), we use it to estimate the cumulative abnormal returns for the companies examined in this study. The *Market Model* and *Market Adjusted Model* are used to test the robustness of the results.

In the *Market Model*, we assume that the normal return follows a single-factor market model. The firm's individual CAPM risk is calculated by multiplying the market return with the firm's individual β factor (Klein & Rosenfeld, 1987). It is widely accepted as the standard model for event studies (Armitage, 1995; Coutts et al., 1994); however, according to Coutts and colleagues (1994), the model conflicts with the presumption that market returns vary over time, as it assumes that the risk as a constant. The abnormal return in the *Market Model* is calculated as follows:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i \times R_{mt}),$$

where R_{it} is the return of the stock *i* at time *t*, β_i is a measure of the sensitivity of R_{it}, and R_{mt} is the market return. The model assumes that the error term is uncorrelated to the market return and that the firm return is not autocorrelated and homoscedastic (Klein & Rosenfeld, 1987).

The *Market Adjusted Model* uses the actual market return to control for the potential effects of the event on the market (Klein & Rosenfeld, 1987). Wu and colleagues (2022) emphasize

the model's inability to count for the distinct systematic risk profile. The abnormal return in the *Market Model* is calculated as follows:

$$AR_{it} = R_{it} - R_{mt}.$$

The *Fama and French 3-factor model* is a multivariate model that counts for three stock-market risk factors; an overall market factor and factors related to firm revenue and book-to-market value (Fama & French, 1993). The expected return is calculated as follows:

$$E(R_i) = R_f + \beta_{m,i}\big(R_m - R_f\big) + \beta_{s,i}(R_s - R_l) + \beta_{v,i}\big(R_v - R_g\big),$$

where $E(R_i)$ is the expected return of stock i, R_f is the risk-free rate, $\beta_{m,i}$ is the sensitivity of stock i to the market factor, R_m is the market return, R_s is the small firm return, R_l is the large firm return, $\beta_{s,i}$ is the sensitivity of stock *i* to the size factor, R_v is the value stock return, R_g is the growth stock return, and $\beta_{v,i}$ is the sensitivity of stock *i* to the value factor. The abnormal return is calculated as the difference between the real return of the stock *i* and the expected return, with factoring in a three-factor risk component (Fama & French, 1993).

4.2.5. Regression Analysis

As the results obtained by the event study method only show whether the press coverage affects the stock price, we must run a regression analysis to determine how the different control variables affect the stock price.

The following model is established:

$$CAR_i = \alpha_0 + \beta_1 \cdot type\ of\ misconduct + \beta_2 \cdot revenue + \beta_3 \cdot previous\ misconduct + \varepsilon_i,$$

where α_0 is the intercept, ε_i is expressed as a random disturbance term, and i is the number of researched companies.

The regression between the cumulative abnormal return and the control variables is researched using models with only one independent variable, as well as a model with all of the variables.

Berry (1993) lists the underlying assumptions of the Ordinary Least Squares regression as follows:

1. Linearity
2. No endogeneity
3. Normality and heteroscedasticity
4. No autocorrelation
5. No multicollinearity

Multiple tests are performed to check for normality of residuals, heteroscedasticity, and multicollinearity in the sample. The assumptions of an OLS regression are tested. Appendix 1 shows the results of the Shapiro-Wilk test that tests for the normality assumption; Appendix 2 provides the results of a heterogeneity test; Appendix 3 shows the correlation between variables; and Appendix 4 presents results for an endogeneity test. As can be seen from the results of all the previously mentioned tests, all the assumptions of OLS are satisfied.

4.2.6. Robustness testing

To test for robustness and significance, multiple different tests are used. Robustness is tested to provide evidence of structural validity (Lu & White, 2014), and significance tests are used to test the probability of the result happening only by chance.

To test for significance in our event study, we calculate the cumulative abnormal returns using multiple models and different event windows. In addition, we perform the event studies for both event windows with a parametric and a nonparametric test. We use an ADJ-BMP test for parametric testing, which considers cross-correlation (Kolari & Pynnönen, 2010). A nonparametric test is needed for an event study because stock prices do not follow the normal distribution. To allow a multiple-day analysis, the GRANK test is used (Kolari & Pynnönen, 2011).

Significance tests for the *Fama and French Model* are presented in Appendix 5. The average cumulative abnormal return remains the same when performing the parametric test, ADJ-BMP, and the nonparametric test GRANK. Appendix 6 provides the average cumulative abnormal return of the *Fama and French Model* with different event windows. Due to the statistical significance and the magnitude remaining the same in all significance tests for

post-event window cumulative abnormal return, the results of the event study can be considered valid and robust.

In the regression models, we run robust regressions for both event windows.

5. Results

In this chapter, the results of the research are discussed on how they performed against the hypotheses.

5.1. Event Study

The cumulative abnormal returns have been calculated with the Fama and French 3-factor model (Table 7). To test for robustness, the cumulative abnormal return has also been calculated with Market Model (Appendix 6) and Market Adjusted Model (Appendix 7).

To examine whether the stock prices were negatively affected by the initial press coverage (Hypothesis 1), the cumulative abnormal return for the post-event window [-1, 5] is studied. Results show (See Table 6, column 4) that the average effect of the news on stock price is negative 3.32% five days after the initial press coverage. The effect is statistically significant at the 10% level. The intensity of the effect, however, differs remarkably between firms. For example, Enron, Lucent Technologies, and Xerox experienced a larger drop in stock returns. In contrast, companies such as Lehman Brother's and PNC's stock decreased minimally. For some stocks, such as Duke Energy, and Dynegy's, the cumulative abnormal return increased after the scandal was first communicated in the media. This means that *Hypothesis 1* can be accepted as there is a significant decrease in the stock prices after the initial press coverage on suspicion of fraudulent action.

Next, it is investigated whether the initial press coverage negatively affected the stock prices (Hypothesis 2). The cumulative abnormal return for the pre-event window [-6, 0] is studied. Results show (See Table 6, column 3) that the variability among the abnormal returns between companies is diverse. Some companies, such as Lucent, General Energy, and Halliburton, show large increases in market value. In contrast, we see the opposite for other companies, such as Bearn Stearns, Kmart, Morgan Stanley, and Qwest Communications. Their cumulative stock returns during the pre-event period are negative. As a result, we can

see that the average cumulative abnormal return for pre-event is slightly negative but not statistically significant. This means that *Hypothesis 2* can be accepted as prior to the initial press coverage there is no significant effect on the stock prices.

Table 6
Fama and French 3-factor Model

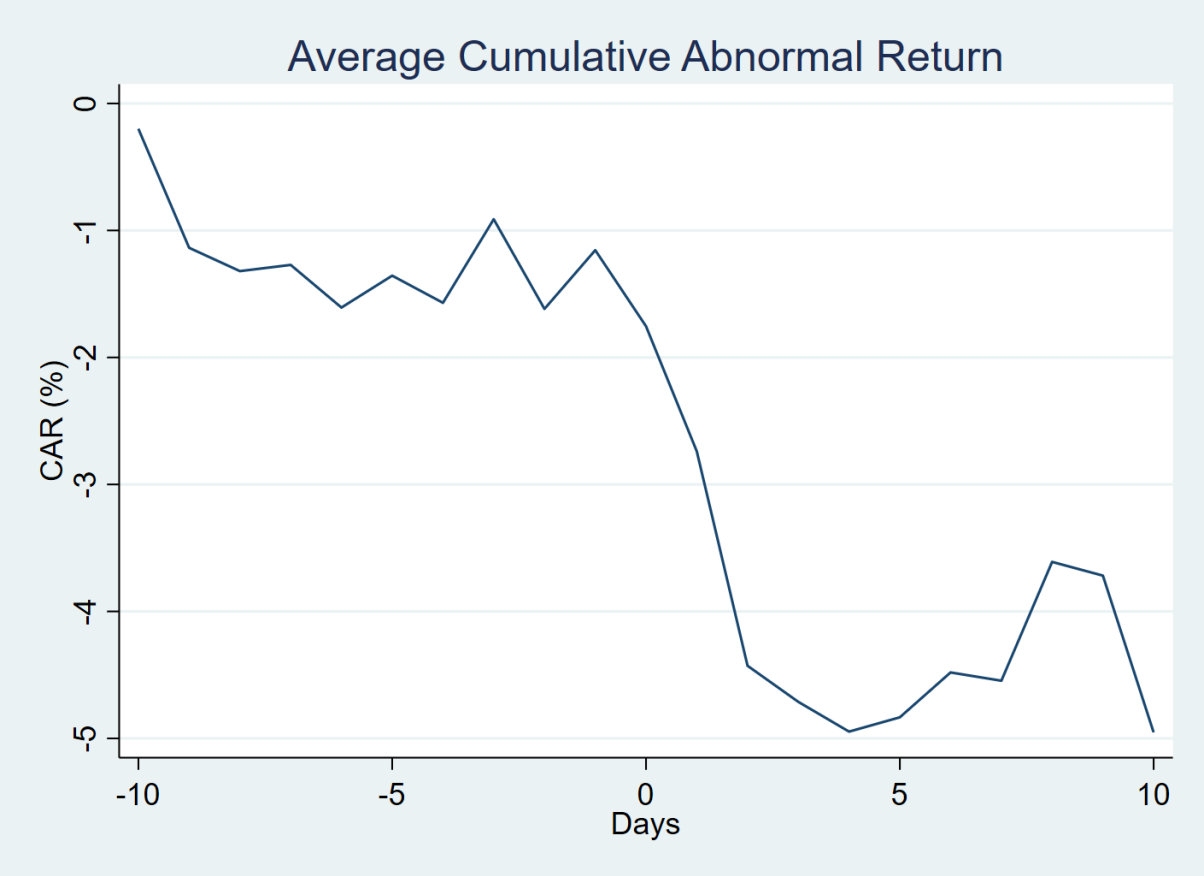
SECURITY	EVENT DATE	CAR[-6,0]	CAR[-1,5]
AES	May 22nd, 2001	-5.79%	4.40%
Bear Stearns	December 13th, 2000	-13.31%	-9.87%
Bristol Myer Squibb	March 5th, 2002	0.57%	-5.93%
Citi Group	September 18th, 2000	-2.39%	-3.72%
CMS Energy	May 9th, 2002	-2.01%	-2.42%
ConAgra	March 28th, 2003	-7.65%**	-3.50%
Duke Energy	February 9th, 2001	4.92%	7.79%
Dynegy	February 9th, 2001	9.66%	14.49%
El Paso Energy	April 1st, 2001	0.09%	4.52%
Enron	March 5th, 2001	-4.29%	-47.63%
General Electric	Septembr 17th, 2002	23.66%***	0.20%
Goldman Sachs	December 1st, 2000	-8.27%	-8.48%
Halliburton	July 11th, 2002	14.95%	-4.19%
Kmart	January 28th, 2002	-12.39%	5.47%
Lehman Brothers	September 16th, 2002	0.09%	-0.27%
Lucent Technologies	October 24th, 2000	13.08%	-34.17%***
Merrill Lynch	December 1st, 2000	-7.30%	-8.66%
Merck & Co	June 21st, 2002	5.56%	0.18%
Morgan Stanley	December 1st, 2000	-14.48%	-5.82%
PNC Financial	January 30th, 2002	-2.13%	-0.55%
Qwest	June 10th, 2002	-26.16%**	-14.07%
Rite Aid	June 21st, 2002	4.69%	0.83%
Tyco International	December 9th, 2002	0.00%	0.00%
US. Bancorp	August 2nd, 2002	0.20%	-6.51%

Waste Management	March 27th, 2002	-4.76%	4.04%
Williams Co.	June 2nd, 2002	7.66%	-6.35%
WorldCom	January 22nd, 2002	-0.80%	-4.01%
Xerox	April 3rd, 2001	11.25%	-21.51%
Total		-0.25%	-3.32%*

Note: * statistically significant at 10% level, ** statistically significant at 5% level, ** statistically significant at 1% level

These results can also be presented as a graph. Figure 1 shows how on average, the stock prices of the researched companies remained relatively stable before the press coverage on suspicion of fraud and dropped immediately after. On average, the negative effect that the news has on the stock price starts immediately after the press coverage and reaches its lowest point around the 4^{th} or 5^{th} day after. After the drop, the stock price recovers slightly and starts to decrease again around the 8^{th} day.

Figure 2
Cumulative Abnormal Return of Fraudulent Companies



Note: At day 0, the initial press coverage is published, estimation window [-130, -11] is used to calculate the cumulative abnormal return (CAR).

5.2. OLS Regression

The cumulative abnormal returns retrieved from the event study analysis are studied as an OLS regression to research how different independent variables impact press coverage's effect on stock prices. Regressions are run for pre- and post-event cumulative abnormal returns, with multiple models with different control variables.

Based on the adjusted R-squared values in the regressions of the pre-event cumulative abnormal return, Model 3 can be seen as the fittest to explain the dependent variable. In all the models in the post-event window, the regressions provide weak or non-existing causation on the cumulative abnormal return because all the Adjusted R-squared values are under 0.3.

To examine whether the impact of press coverage on stock prices is affected by the type of misconduct (*Hypothesis 3*), the cumulative abnormal return retrieved from the event study analysis is studied as an OLS regression. Results of the effect of pre-event cumulative abnormal return are presented in Table 7. In Model 1 (See Table 7, Column 2), the cumulative abnormal return is explained by only the independent variable representing the type of misconduct. All variables in Model 1 are statistically insignificant. In Model 3 (See Table 7, Column 4), the regression includes all independent and control variables: *type of misconduct, previous misconduct, revenue,* and *sector*. In the model, none of the variables representing a type of misconduct are statistically significant. Model 4 (See Table 7, Column 5) presents the robust regression of Model 3, and in the robust regression explaining the cumulative abnormal return in the pre-event window, the variable for the type of misconduct remains statistically insignificant. Results explaining the cumulative abnormal return in the post-event window are shown in Table 8. In Model 1 (See Table 8, Column 2), accounting fraud is used as a reference variable, and compared to accounting fraud, companies suspected of conspiracy have on average higher cumulative abnormal returns. The effect for the variable representing conspiracy is statistically significant at the 10% level, while the other types of misconduct are statistically insignificant. In Model 3 (See Table 8, Column 4) and with the robust regression in Model 4 (Table 8, Column 5), the variable for the type of misconduct is statistically insignificant. This means that *Hypothesis 3* should be rejected as the type of misconduct has no significant effect on how the press coverage on fraud impacts stock prices.

Second, we test whether the press coverage's impact on stock prices is affected by the company's previous misconduct (*Hypothesis 4*). That is done by examining the cumulative abnormal return retrieved from the event study analysis is studied as an OLS regression. In Model 2 (See Table 7, Column 3), the cumulative abnormal return is explained by only the independent variable representing the company's history with misconduct. The variable for previous misconduct in Model 1 is positive and statistically significant at the 10% level. In Model 3 (See Table 7, Column 4), the regression includes all independent and control variables: *type of misconduct, previous misconduct, revenue,* and *sector,* and Model 4 (See Table 7, Column 5) presents the robust regression of Model 3. In both Models 3 and 4, the variable for previous misconduct remains positive and statistically significant. Results

explaining the cumulative abnormal return in the post-event window are shown in Table 8. In Model 2 (See Table 8, Column 3), the variable for previous misconduct is negative but not statistically significant. In Models 3 (See Table 8, Column 4) and 4 (See Table 8, Column 5), where the cumulative abnormal return is explained with multiple independent and control variables, the variable for previous misconduct is positive and statistically insignificant. This means that in the pre-event window, the companies with a history of fraud had higher stock returns than the companies with no history of misconduct. In the post-event window, the effect was statistically insignificant for all models. Due to the statistical insignificance of the cumulative abnormal returns in the pre-event window in the event study analysis, we reject the results of Table 7 and focus on the results in Table 8. That said, *Hypothesis 4* is rejected as the company's history with fraud does not significantly affect how the press coverage on fraud impacts stock prices.

In addition to the hypotheses, the regression results show that the control variable for the sector, especially for the technology industry, provides statistically significant results. In the pre-event window, the cumulative abnormal return is higher if the company operates in the field of technology compared to other sectors, and in the post-event window, the cumulative abnormal return is lower for the companies operating in technology.

Table 7
OLS regression explaining the cumulative abnormal return in the pre-event window

	Model 1	**Model 2**	**Model 3**	**Model 4**
Constant	4.908 *	0.521	-0.372	-3.325
Type of misconduct				
Conspiracy	-3.980		-7.125	-6.802
Improper use of company funds	6.922		4.529	5.043
Insider trading	-9.668		-16.424	-16.177
Skewed stock advice	-4.827		-0.375	-2.327
Previous misconduct		7.020 *	12.857 **	13.091 **

Revenue			0.001	0.001
Technology industry			11.463 *	12.849 *
Banking industry			4.454	0.789
Energy Industry			-0.372	3.561
Adjusted R-squared	-0.0168	0.0906	0.1547	
Number of observations	28	28	28	28

* statistically significant at 10% level, ** statistically significant at 5% level, ** statistically significant at 1% level

Table 8
OLS regression explaining the cumulative abnormal return in the post-event window

	Model 1	**Model 2**	**Model 3**	**Model 4**
Constant	-6.635 **	-4.303 *	-4.196	-3.325
Type of misconduct				
Conspiracy	9.142 *		4.473	3.786
Improper use of company funds	6.735		8.332	5.039
Insider trading	10.675		9.839	9.776
Skewed stock advice	0.333		-1.460	-2.193
Previous misconduct		0.542	-2.637	-3.402
Revenue			0.001	0.001
Technology industry			-16.731 ***	-10.652 *
Banking industry			-2.336	-2.337
Energy Industry			3.850	3.954

Adjusted R-squared	0.0797	-0.0235	0.3139
Number of observations	28	28	28

* statistically significant at 10% level, ** statistically significant at 5% level, ** statistically significant at 1% level

6. Discussion

In this chapter, I summarize the results of the analysis. After the results, the study's main limitations are discussed, followed by the provision of suggestions for future research.

6.1. Main results

The goal of the study was to determine which comes first, the news in financial publications discussing a suspicion of financial fraud or the decrease in stock prices. This was studied by examining whether the press coverage on suspicion of corporate fraud led to a decrease in stock prices and whether a downturn in the stock prices precedes the initial press coverage. In this chapter, this is discussed by analyzing the results of the study in light of the research questions. After the main analysis, the following results are reported.

First, according to our findings, the stock price experienced a significant decrease after the initial press coverage on suspicion of fraud when comparing the stock return one day before the first article was published and five trading days after. There is notable variation between the effects on different companies. The variation can be caused by multiple factors; one factor explaining the variation is the industry the company operates in. The impact the press coverage on suspicion of fraud has on stock prices is considerably stronger for companies in the field of technology. According to Kyröläinen (2007), technology companies experience unusual volatility, especially high after a shock event.

Secondly, even though some companies experienced a decrease in the stock price before the initial press coverage, no significant change in stock prices prior to the initial press coverage on suspicion of fraud was found when comparing the day of the initial press coverage and six trading days earlier. The negative stock return that some companies experienced can be

explained by some investors receiving information about the suspicion before the article's release. That could be, for example, from statements published by the company (Dodonov, 2020) or rumors (Pound & Zeckhauser, 1990).

Third, the impact that the news has on the stock price was not found to be affected by the type of misconduct. Due to the small number of observations in some categories of the variable, not all results can be considered. However, the categories with enough observations did not provide robust results proving the difference in the effect between the different types of crime.

Fourth, the company's previous misconduct was not found to impact the effect that initial press coverage had on the stock prices. This can be explained by the efficient market hypothesis, which states that the investor decision is not affected by the previous behavior of the company (Borges, 2010).

To answer the research questions of whether the initial press coverage on suspicion of fraud leads to a decrease in stock prices and whether a decrease in stock prices antedates the initial press coverage, we can summarize that, in fact, a decrease in stock prices follows the initial article about suspicion of wrongdoing, but prior to the article there is no significant change in stock prices.

6.2. Limitations

While the current study provided several interesting insights, a few limitations may have prevented this study from reaching its full potential. Most notable is the external validity, as the study was performed with data from the United States around 20 years ago. However, the US stock market can be justified as the sample as it makes up almost 60% of the global stock market (Statista, 2023) and because the US dollar has a dominant role in international exchange (Bertaut et al., 2021). The data from 20 years ago was studied because such a wave of corporate fraud has not happened since, and the investor reaction to new information remains unchanged. Also, due to the data being from the early 2000s, the role of social media as a source of information could not bias the investor decision due to social media not existing yet. The choice for preferring traditional sources was made based on the perceived lack of reliability of social media posts, well-established research traditions, and the importance of financial publications.

Another limitation concerns the OLS regression performed in the research. As a rule of thumb (Chang et al., 2006), an OLS regression should have at least a sample size of 30 with at least ten observations per variable. Due to a small sample size when testing the causality between cumulative abnormal returns and independent variables, the small sample size might provide inaccurate results. However, Jenkins & Quintana-Ascencio (2020) have found that regressions with a sample size of at least eight can produce valid results, and with high variance samples, the minimum acceptable sample size should be 25. The sample size of 28 on the OLS regression of this study fulfills the requirement. The independent variable for the type of misconduct has very few observations per category, due to which results for some of the categories could not be interpreted as valid.

The third limitation is a possible type II error. Type II error means that one fails to reject a null hypothesis that is, in reality, false. This means that results explaining the effect of previous misconduct or type of misconduct could have been falsely considered insignificant.

6.3. Future research

The limitations of this study create new areas for future research. The study could be redone with a larger sample size to capture more accurate results. A larger sample size would provide a more valid coefficient for the regressions and minimize the possibility of Type II error.

As this study focused only on traditional media, the effect of social media rumors on stock prices could be examined in a similar setting. Regardless of the size and significance of the U.S. stock market, the study could be expanded to the European or Asian stock market to confirm the external validity of the results.

This study focuses on the short-term effect of fraudulent companies, but it would be interesting to research the long-term effect of corporate fraud on the company's value. As some of the researched companies filed for bankruptcy due to their scandals (Giroux, 2008), we can assume that there are also long-term effects.

To further the research of this paper, the way the suspicion and fraud were presented in the media could be examined, and how it affects the change in stock prices after the initial article. As per Carroll and McCombs (2003), the magnitude of the effect on stock prices could be

affected by who the press blames for the crime, an individual or the organization, and in what light they present the wrongdoing. Different variables for presenting fraud in the media could be used as independent variables in a regression to explain the cumulative abnormal return.

7. Conclusions

This paper examines whether the press coverage on suspicion of corporate fraud leads to a decrease in stock prices and whether a decrease in the stock prices precedes the initial press coverage about suspicion of wrongdoing. We find that after the initial press coverage, the stock prices decreased, and prior to the first article suspecting the company of fraudulent actions, there was no significant change in the stock prices. The variation between the strength of the effect can be explained by the difference in the industries the fraudulent companies operate in.

From the results, we can conclude that investors do react to the suspicion that is published in financial publications. The articles in the said financial publications are an important source for the investors since the stock prices do not change before the investors learn about the suspicion from the press.

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9. Appendix

Appendix 1
Shapiro-Wilk test

Variable	Observations	Probability > Chi²
Error	28	0.89933

Note: if p-value < 0.05, H1 assuming no normality can be accepted

Appendix 2
Heteroscedasticity test

Source	Chi²	Difference	p-value
Heteroskedasticity	24.82	20	0.2084
Skewness	3.52	9	0.9403
Kurtosis	0.12	1	0.7245
Total	28.46	30	0.5461

Note: if p-value < 0.01, H1 assuming homoscedasticity can be accepted

Appendix 3
Correlation between studied variables

Variable	VIF	1/VIF
Type of misconduct		
Conspiracy	1.95	0.514079
Improper use of company funds	1.43	0.697169
Insider trading	1.21	0.823550
Skewed stock advice	3.64	0.275037
Revenue	2.12	0.471162
Previous misconduct	2.05	0.488426
Banking industry	4.22	0.236787

Technology industry	1.71	0.583367
Energy industry	2.08	0.480402
Mean VIF	2.27	

Note: If VIF > 10, a variable is correlated with another variable

Appendix 4
Endogeneity test

F(1, 18) = 0.00
Prob > F = 1.0000

Note: if p-value < 0.01, H1 assuming endogeneity can be accepted

Appendix 5
Significance tests for Fama and French 3-factor event study using parametric and nonparametric tests

Significance test	Cumulative Abnormal Return[-6,0]	Cumulative Abnormal Return [-1,5]
ADJ-BMP	-0.25%	-3.32%**
GRANK	-0.25%	-3.32%**

Note: if the magnitude and sign of the cumulative abnormal return differ from the results of the original event study, the H1 of nonsignificant results can be accepted

Appendix 6
Significance tests for Fama and French 3-factor event study modifying the length of the event window

Significance test	Cumulative Abnormal Return [-5,0]	Cumulative Abnormal Return[-1,4]
5-day event window	0.05%	-3.47%**
	Cumulative Abnormal Return [-7,0]	Cumulative Abnormal Return[-1,6]
7-day event window	0.14%	-3.09%*

Note: if the magnitude and sign of the cumulative abnormal return differ from the results of the original event study, the H1 of nonsignificant results can be accepted

Appendix 7
Market Model

SECURITY	EVENT DATE	CAR[-6,0]	CAR[-1,5]

AES	May 22nd, 2001	-8.70%	1.73%
Bear Stearns	December 13th, 2000	-13.70%	-8.72%
Bristol Myer Squibb	March 5th, 2002	0.54%	-6.12%
Citi Group	September 18th, 2000	-2.48%	-3.65%
CMS Energy	May 9th, 2002	-2.41%	-2.71%
ConAgra	March 28th, 2003	-8.04%**	-3.34%
Duke Energy	February 9th, 2001	4.33%	7.72%
Dynegy	February 9th, 2001	7.73%	14.37%
El Paso Energy	April 1st, 2000	0.12%	4.51%
Enron	March 5th, 2001	0.43%	-4.95%
General Electric	September 17th, 2002	24.12%***	0.97%
Goldman Sachs	December 1st, 2000	-7.27%	-8.18%
Halliburton	July 11th, 2002	14.55%	-4.18%
Kmart	January 28th, 2002	-12.64%	4.58%
Lehman Brothers	September 16th, 2002	0.06%	-0.11%
Lucent Technologies	October 24th, 2000	12.07%	-35.54%***
Merrill Lynch	December 1st, 2000	-7.11%	-8.57%
Merck & Co	June 21st, 2002	3.00%	1.80%
Morgan Stanley	December 1st, 2000	-14.02%	-5.72%
PNC Financial	January 30th, 2002	-1.79%	-0.29%
Qwest	June 10th, 2002	-26.85%**	-15.07%
Rite Aid	June 21st, 2002	1.97%	2.69%
Tyco International	December 9th, 2001	0.00%	0.00%
US. Bancorp	August 2nd, 2002	0.10%	-6.72%
Waste Management	March 27th, 2002	-5.33%	4.71%
Williams Co.	June 2nd, 2002	6.57%	-7.39%
WorldCom	January 22nd, 2002	-1.57%	-3.99%
Xerox	April 3rd, 2001	13.96%	-20.67%
Total		-0.48%	-3.22%*

Note: * statistically significant at 10% level, ** statistically significant at 5% level, ** statistically significant at 1% level

Appendix 8
Market Adjusted Model

SECURITY	EVENT DATE	CAR[-6,0]	CAR[-1,5]
AES	May 22nd, 2001	-7.91%	1.22%
Bear Stearns	December 13th, 2000	-13.80%	-8.79%
Bristol Myer Squibb	March 5th, 2002	0.46%	-6.18%
Citi Group	September 18th, 2000	-1.71%	-4.16%
CMS Energy	May 9th, 2002	-1.89%	-2.60%
ConAgra	March 28th, 2003	-8.09%**	-3.35%
Duke Energy	February 9th, 2001	4.45%	8.51%
Dynegy	February 9th, 2001	7.65%	13.82%
El Paso Energy	April 1st, 2000	-0.15%	4.55%
Enron	March 5th, 2001	0.16%	-4.80%
General Electric	September 17th, 2002	25.15%***	2.66%
Goldman Sachs	December 1st, 2000	-7.35%	-8.65%
Halliburton	July 11th, 2002	14.04%	-5.11%
Kmart	January 28th, 2002	-13.46%	4.56%
Lehman Brothers	September 16th, 2002	0.07%	-0.09%
Lucent Technologies	October 24th, 2000	11.86%	-35.74%***
Merrill Lynch	December 1st, 2000	-7.10%	-8.50%
Merck & Co	June 21st, 2002	3.08%	2.58%
Morgan Stanley	December 1st, 2000	-14.04%	-5.86%
PNC Financial	30jan2002	-1.52%	-0.24%
Qwest	January 30th, 2002	-25.85%**	-14.11%
Rite Aid	June 21st, 2002	2.21%	5.01%
Tyco International	December 9th, 2001	0.00%	0.00%
US. Bancorp	August 2nd, 2002	0.14%	-6.61%
Waste Management	March 27th, 2002	-5.34%	4.70%
Williams Co.	June 2nd, 2002	6.49%	-7.62%

WorldCom	January 22nd, 2002	-0.86%	-3.49%
Xerox	April 3rd, 2001	12.63%	-20.79%
Total		-0.43%	-3.09%*

Note: * statistically significant at 10% level, ** statistically significant at 5% level, ** statistically significant at 1% level