



Does Corporate Governance Failure Facilitate Crime?

*An empirical study of companies domiciled in the US using textual data
analysis*

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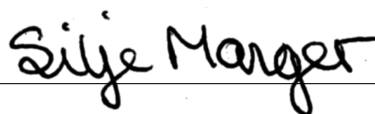
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Abstract

This thesis aims to investigate whether corporate governance failures facilitate crime. There is an arising awareness of corporate crime and the huge consequences of corporate governance failures. Therefore, we explore if certain corporate governance features are used differently by companies that have been convicted of corporate crime, compared to companies that have not. Previous literature gives indications of how some corporate governance features can be misused to facilitate crime and we want to elaborate on this literature by investigating the changes in corporate governance features around the time of crimes. We explore the changes in audit firm, the changes of board members, the changes in the share of female directors and the share of tax haven subsidiaries and secrecy jurisdiction subsidiaries.

We investigate these relationships by using a difference-in-difference design, which allows us to discover differences in the companies' behavior relating to these corporate governance features. In addition, we conduct an event study that unveils trends around the period of the crime and the conviction date.

The results of our analysis show indications that companies who commit crime behave differently than companies who have not with regards to the changes in the share of female directors around the time of the crime. They also behave differently with regards to changes in auditor firms, board members and tax haven subsidiaries around the time of the conviction. On the contrary, no evidence is found with regards to a relationship between the share of secrecy jurisdiction subsidiaries and crime. As companies that commit crime use several corporate governance features in a different way than similar companies that have not committed crime, our results suggest that some corporate governance features are used to facilitate crime.

Keywords – Textual Data Analysis, Corporate Governance, Corporate Crime, Business Analytics, Web Scraper

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1 Introduction

1.1 Background

Effective corporate governance is a key element in the prevention of corporate crime. The collapse of Enron and the Worldcom accounting scandal are examples of corporate governance failures and their potentially huge consequences. In addition, as the opportunities for fraudsters never have been greater due to increasing globalization, an increased number of cross-border transactions, and emerging technologies (Banerjee, 2015), this is a highly relevant issue. However, despite the Securities and Exchange Commission and other federal agencies getting new tools to discover and pursue crimes, there is a trend of increasing corporate crime (Duke Law, 2017). In fact, PwC's global economic crime and fraud survey for 2020 notes that economic crime rates are record high and this trend is expected to continue (Said, Crowther, & Amran, 2014). This is where our research enters as a contribution to clarify the relationship between corporate governance failures and corporate crime, and hence shed light on what features could help indicate when crime is committed.

Corporate Governance can be defined in several ways, for example as being about “how public companies are structured and directed” (Monks & Minow, 2011, p. xviii) or “the process and structure that is used to direct and manage the business and affairs of the company towards enhancing business prosperity and corporate accountability” (Said, Crowther, & Amran, 2014, p. 3). Regardless, it concerns managing and structuring the company to steer it in a certain direction. For corporate governance to be effective it must prevent the occurrence of fraud and financial reporting violations (Vadasi, Bekiaris, & Andrikopoulos, 2020). In addition, effective corporate governance is something that could essentially be used for fraud-preventing, depending on the context (Wang, 2010). Therefore, we argue that if a feature of corporate governance is used to either enable or conceal crime it is considered a corporate governance failure. Furthermore, companies that want to commit crime might want to have a quite different corporate governance than companies that want to prevent crime.

Previous literature focuses on the consequences of different structuring of corporate governance, but there is little research into a causal relationship between corporate crime and corporate governance. By using the indications from previous literature regarding the consequences of misuse of different corporate governance features we will further explore this relationship. Hence, we want to elaborate on previous literature by looking at the relationship between crime and a selection of corporate governance features, and investigate whether they contribute to enable corporate crime. Previous literature gives indications about corporate governance features like auditor quality, board members and complex structuring of the firm using tax havens and secrecy jurisdictions. In this thesis, we argue that ineffective corporate governance can lead to the misuse of the previously mentioned features which again leads to the enabling and concealing of crimes.

The research on this topic is highly relevant in the US especially as low detection rates and the variability in prosecution rates of corporate crime necessitate awareness surrounding this topic. One of the most important elements of committing crime is the opportunity to do so (Albrecht, Albrecht, Albrecht, & Zimbelman, 2019). If companies were to commit crime, they would consider the chances of getting caught, and in the US these chances vary with the political rule. This is evident as the prosecution rates change considerably between presidencies. For example, the average number of white-collar defendants decreased by 26% and the percentage of fines on corporations fell 76% from Barack Obamas years in office to Trump's ruling (Hurtado, Dolmetsch, Roth, & Voreacos, 2020). In addition, as the National Fraud Authority reports that the fraud reported to the authorities is only a fraction of the fraud that remains undetected (Banerjee, 2015), there is an apparent need for more knowledge on how corporate crime is committed. To increase prosecution rates of corporate crime in the US it is therefore important to identify what features enable companies to commit crime.

1.2 Research Question

The topic of corporate crime and the associated consequences are highly relevant today, especially with increasing globalization and technology that enables fraudsters to commit crime in consistently new ways (Banerjee, 2015). As previous literature points out, corporate crime is facilitated through corporate governance weaknesses. To investigate whether corporate governance failures facilitate crime, we want to investigate if different corporate governance features are used differently by companies that commit crime. Our research question is therefore:

Do Corporate Governance Features Relate to Crime?

To answer this question, we will consider five features of corporate governance: the external audit firm, female directors, board members, tax haven and secrecy jurisdiction subsidiaries. Furthermore, we will investigate how these five features are related to crime initiation and crime conviction by comparing companies that have committed crime to a set of control companies. Previous literature considers for the most part the consequences of corporate governance and there is little research regarding a causal relationship with crime. By exploring the relationship between corporate governance and crime in the US, we will shed light on more aspects of what enables companies to commit crime and what could serve as indicators for governments who want to work on preventing corporate crime.

By using textual data analysis, we gather information about these five corporate governance features from 10-K filings filed to the Securities and Exchange Commission (SEC). We do this for companies that have been convicted of crime and a selection of control companies in the same industry. These variables are related to corporate governance as they are critical for determining the direction and performance of a company. Without effective corporate governance, and effective use of these features, their weaknesses can be exploited to enable or conceal crime. For example, a complex structure using tax havens and secrecy jurisdictions can decrease the companies' transparency and amplify the opportunities for hiding both transactions and activities.

The focus of this thesis is on American companies because they are one of few countries that have corporate governance information publicly available. American companies that are publicly listed are required by the SEC to report certain features in their annual reports, which is referred to as the form 10-K. We investigate companies that have been convicted of crime between 2010 and 2020 and use company data from 2002 to 2020.

Our study contributes to the growing literature on how corporate governance can fail. Firstly, our results allow for more assured claims about the corporate governance changes following a corporate governance failure. Secondly, in contrast to previous literature, our thesis addresses the issue of how companies who commit crime structure some of their corporate governance features. We especially expand on the literature about changes in audit firms and tax haven and secrecy jurisdictions subsidiaries. Finally, our results contribute to characterizing what corporate governance features usually fail when crime is committed.

The results of our analysis show that only changes in the share of female directors and in the share of tax haven subsidiaries relate to crime initiation. The evidence we find shows that companies who commit crime have a higher increase in the share of female directors and a smaller share of tax haven subsidiaries during the crime. On the other hand, changes in audit firm, changes in board members and the share of tax haven subsidiaries relate to crime conviction. Our analyses indicate that companies who commit crime change audit firms less frequently and have higher board turnover following the conviction of a crime. Furthermore, we find evidence that companies who commit crime have a higher share of tax haven subsidiaries following the conviction of a crime. On the contrary, we do not find any evidence of a relationship between crime and the share of secrecy jurisdiction subsidiaries.

As companies do not always behave as expected, our thesis gives indications of alternative explanations and relationships that could further characterize companies who commit crime and be of interest for future research. From the analysis on the relationship between audit firm and corporate crime it can be deduced that a relationship between lead auditor and crime could yield more interesting results. This is because it might be the relationship with the lead auditor that leads to the misuse of this corporate governance feature. In

addition, both our results and previous literature indicate that the relationship between auditors and crime could either result in abnormal long or short audit tenures and further research on this topic could give more interesting results. For the board member analysis our results, considering previous literature, indicate that there could be different relationships between board members and corporate governance failures depending on the type of crime. For the change in female directors, we investigate a sample with a share of female directors smaller than the average in the US and an investigation of a sample with a more representable share of female directors could yield better results. Lastly, the analyses on the relationship between tax haven and secrecy jurisdiction subsidiaries and crime also give indications of relationships that could depend on the type of crime studied and could be interesting for future research.

1.3 Outline

The thesis will be structured with main and sub-headlines. In sections 2 and 3 we first discuss relevant theory and review previous research on the topic. In section 4, we will explain how we gathered the data before we in section 5 elaborate on our methodology. In section 6, we will explain and present our analysis. Section 7 contains a discussion and evaluation of the results, before we conclude the thesis in section 8.

2 Relevant Theory

In this section, we will introduce the different concepts that underpin this thesis, such as corporate crime, tax havens, and secrecy jurisdictions. To understand the relationship between corporate governance and crime, it is important to understand the different corporate governance features that are investigated and how they could be related to crime. We will discuss the relevance of these concepts considering corporate governance and elaborate on the consequences of misusing them.

2.1 Corporate Governance and Crime

Corporate crimes are acts in defiance of the law, committed by corporations or individuals within organizational entities who act on behalf of a business entity (Said et al., 2014). The distinction between corporate crime, done on behalf of the firm, and occupational crime, which is done for the individuals' benefit, is important in our context (Young, 1981). In this thesis, we are considering criminal cases where a crime is done to benefit the business entity. As corporate governance lays the fundament for the companies' processes and how they are structured, it can be designed purposefully to be exploited for crime that benefits the company. As we are investigating criminal cases where the companies are accountable, the use of corporate governance features is important to consider.

The reason for committing corporate crime and fraud can be many, but the literature suggests that all crime is done through a combination of motivation and opportunity (Wells, 2001). The fraud triangle presents three key elements that are common to different fraud cases and essential for fraud to take place (Albrecht et al., 2019). These elements are pressure, opportunity, and rationalization. If these elements are present, managers and executives can be motivated to commit corporate fraud. This is supported by Hopwood et al. (2008) who suggests multiple specific reasons for the occurrence of corporate fraud. For example, performance pressures by the firm, economic pressure because of poor employee compensation or opportunities because of negative examples in the top management and hostile work environments.

Even though corporate governance is supposed to prevent the occurrence of fraudulent behavior, Said et al. (2014) note that some of the most important scandals from the twenty-first century have happened because of breakdowns in the structure of corporate governance. One way in which companies can prevent corporate crime is to make sure that the reasons why people want to commit crime do not arise. To do this, the firm can either create a culture of honesty, openness, and assistance or eliminate the fraud opportunities (Albrecht et al., 2019). This is where effective corporate governance comes in and is supposed to ensure that everything within the firm is structured so that crime and fraud will not occur. Therefore, ineffective corporate governance might lead to corporate crime and highlights the necessity of effective corporate governance.

All the elements of corporate governance that we are investigating can be exploited for the purpose of having better opportunities for committing crime. In the next subsections, we will describe how these features can be exploited in more detail.

2.2 Auditors and Crime

The choice of external auditor is crucial for how the company is represented to outsiders and how companies enhance corporate responsibility. Subsequently, this is a corporate governance feature, as it is a part of determining the direction of the company. This feature could be exploited to give false or faulty representations of the companies' performance to the outsiders. Through auditor tenure or conspiracies with the auditing firm, companies can structure this feature in a way that gives them the best abilities for committing or concealing crimes.

Companies should always represent their performance and activities correctly to the outsiders of the company. Based on this information investors and others can make educated decisions of whether they want to either invest in the company, give loans or be in business with them. For the outsiders of the company to make the right decisions the companies' representation must be correct, and this is where the external auditor is key. The goal of an external audit is to prevent fraud, in addition to certify the credibility of management's annual reports and accounts. It is usually performed by independent

experts for the benefit of parties external to the audited entity (Said et al., 2014).

To ensure reliable financial statements, auditors must follow many standards to uphold independence from the companies they audit (PCAOB, n.d.). To ensure auditor independence there are both auditing standards and codes of conduct that the auditors must follow. However, throughout the years, the auditing firms have grown bigger and the competition between them has been at the expense of quality. For example, the prices were pushed down which resulted in lower salary and hiring staff with no auditing experience, as well as the time spent on each audit was trimmed down, which all over resulted in audits of lower quality (Imhoff, 2003). In the later years, the system of financial reporting has been improved drastically and incentives to correctly report has been provided (Imhoff, 2003). Hence, the accounting standards today include more requirements, for example more frequent reporting. However, there are few restrictions on tenure for auditing firms. They must rotate the lead auditor every five years, but they are not required to rotate audit firms because of the high costs to the audit firm and their clients.

Despite accounting standards and codes of conduct, there are still instances where auditing has failed and contributed to corporate crime. These are usually cases where accountants failed to provide clear, accurate pictures of the companies' financial performance and failed to serve the public interest (Stuart, Stuart, & Pedersen, 2014). There are numerous examples of auditing failures, but to mention some: Ernst & Young was charged by the SEC for ethics code violations and engaging in business deals with an audit client, which is against the American Institute of Certified Public Accountants (AICPA). In addition, in 2009, two partners from PwC were charged with criminal conspiracy in connection with a fraud investigation at Satyam Computer Services (Stuart et al., 2014). The most mentionable case may be when Arthur Andersen, one of the five largest audit partnerships at the time, lost its Certified Public Accountant license in 2002 after obstructing an investigation into Enron Corp (Browning & Sparks, 2016). These types of charges show how auditors can intentionally disregard both the auditing standards and codes of conduct and how the external auditor function can be exploited to commit crime.

The numerous cases that show how auditors purposefully neglect both the auditing standards and codes of conduct indicate that the auditor feature can be exploited. Furthermore, as there are no restrictions on audit firm rotation or tenure, the change of audit firms is something that could be purposely used in a certain way. For example, if there is a conspiracy with the auditing firm, companies could change audit firms less frequently as this would give the company the best potential for committing and concealing crimes. Accordingly, changes in audit firms and their connection to corporate crime are interesting to investigate.

2.3 Board Members and Crime

The purpose of a board is to attend to the interests of a company's shareholders and stakeholders (Browning & Sparks, 2016). As shareholders' and stakeholders' interests are very important in deciding the direction of a company, the board of directors is certainly a part of corporate governance. In fact, among some, the board of directors is considered one of the most important actors to uphold corporate governance (Hillman & Dalziel, 2003) and the most important barrier for effective corporate governance (Leblanc, 2016). With their position in the firm, the board members are in a position of opportunity to commit crimes because of the connections they have, their authoritative position, and their ability to influence others. In addition, they may be the most motivated, because of compensations in the form of bonuses if the firm performs well. Accordingly, the function of board members can certainly be exploited to commit crime.

Throughout the years there have been changes to the requirements and guidelines of the board of directors to ensure that the board acts in a manner that avoids corporate wrongdoing and financial crises. Events like the 2008 financial crisis and the corporate misconduct in 2001 by corporations such as Enron and WorldCom have had their share of impacts on the expectations of boards today (Browning & Sparks, 2016). These events led to the implementation of the Sarbanes-Oxley Act and the Corporate and Auditing Accountability and Responsibility Act. However, one of the biggest changes to board behavior came with the Listed Company Manual which was approved in 2002 and included guidelines for corporate boards (Browning & Sparks, 2016). In addition, the Dodd-Frank legislation was signed during the Obama administration to give shareholders a "say on

pay” for executive compensation.

Despite the changes made to ensure proper board member behavior, things could still go wrong. Even though organizational strategies provide employees with incentives to perform, these incentives can turn into motivations for fraud. For example, if firms prioritize short-term profit over long-term profit and hence impose unrealistic growth targets on personnel (Erp, 2018). Managers can then feel the pressure to realize the goals of the firms and see illegal means as the only option to do this (Erp, 2018). Levi et al. (2006) note that managers have considerable opportunities to initiate and facilitate complicity in economic crime. There are numerous cases where board members have exploited their position in the company to commit crimes. For example, the CEO of WorldCom, Bernard Ebbers, was charged with fraud and conspiracy for campaigning to prop up stock prices by creating false accounting entries, and the CEO of Hollinger International, Conrad Black, was in 2007 charged with fraud for payments made to him and other directors for over 200 million dollars (Investopedia, 2013).

As board members are countless times caught doing inappropriate actions, we see that board members can certainly commit corporate crime. Keeping in mind that board members also often are found in a position of opportunity and motivation to commit crime, the development in board members is interesting to investigate. If companies were to increase the change of board members in the times surrounding a crime, this could for example indicate that a company is hiring directors with more education or experience to improve the performance of the board. If companies were to decrease the change of a board surrounding the time of a crime, this could perhaps indicate that they want to keep a consistent board to conceal the crime. Consequently, the feature of board members can be exploited to commit crime and is interesting to investigate to see whether the board is strategically used for crime.

2.4 Tax Havens and Secrecy Jurisdictions

The purpose of taxes is to provide the community with funds to be able to run public goods and services. Tax abuse and tax evasion are contrary to this purpose and are why there are severe social consequences of companies using tax havens and secrecy jurisdictions. In the US, multinational firms are taxed on their worldwide income. However, an exception is income from subsidiaries, which is taxed only when it is repatriated to the parent company (Gravelle, 2015). Through subsidiaries, the company can structure its firm in a way that is pivotal in how the company deals with corporate responsibility and how the company is managed. Subsequently, this is a part of a company's corporate governance. By structuring the company in a complex way with subsidiaries in either tax havens or secrecy jurisdictions the company could avoid taxes, neglect its corporate responsibility, and create a less transparent environment. By achieving these objectives, companies could get better opportunities for both enabling and concealing crimes.

Tax havens offer a way to minimize taxes and at the same time obtain financial confidentiality. There is no official definition of a tax haven, but the OECD defined in 1998 a list of identifying key factors. This list includes no or only nominal taxes, lack of effective exchange of information, lack of transparency, and no substantial activities. In general, a tax haven is defined as a country or jurisdiction that allows multinational companies and individuals to escape the tax law in their home country. The goal of the companies is to pay less tax than they would without the use of tax havens (Tax Justice Network, n.d.-c). Furthermore, the term secrecy jurisdiction is often used interchangeably with the term tax haven (Tax Justice Network, n.d.-c). However, the Tax Justice Network (n.d.-b) states that a secrecy jurisdiction provides facilities that enable people or entities to escape or undermine the laws, rules, and regulations of jurisdictions elsewhere, using secrecy as a prime tool.

Despite the abundance of negative consequences on society by using tax havens and secrecy jurisdictions, companies still use them for achieving less transparency. The world is losing over \$427 billion (USD) a year due to international tax abuse (Tax Justice Network, 2020b). In addition, the use of secrecy jurisdictions contributes to steepening social inequality and rampant financial crime (Tax Justice Network, n.d.-a). This is a

consequence of how secrecy jurisdictions hinder effective regulation, shift investments and financial flows away from where they are most productive, and towards where the owners of capital can extract the greatest gains from secrecy (Tax Justice Network, n.d.-a). Nevertheless, they are still widely used. For example, Enron used offshore subsidiaries to move debt off their balance sheet and thereby hiding their losses. WorldCom also devised a scheme where they made transactions across subsidiaries that saved them taxes but had no effect on their global profits (Hodge, 2009).

The use of tax havens and secrecy jurisdictions promote less transparency and less corporate responsibility, and could therefore counteract effective corporate governance, which goal is to prevent fraudulent behavior. Therefore, we look at the companies' structure around the crime years to determine whether companies purposefully use this strategy to enable crime.

3 Literature Review

Crime and corporate governance are wide topics and diverse research has been conducted on different aspects of these topics. However, as mentioned, a considerable amount of the previous research on this topic discusses governance features and the consequences of different structuring of these. Consequently, there is little research into the relationship between these features and crime and how or if companies that commit crime structure these features differently than other companies. In this section, we will therefore present and discuss the most relevant research that has been done in this area previously and see what the literature suggests about how the external auditors, female directors, board members, tax havens and secrecy jurisdictions, can be used to enable or conceal crime.

3.1 Auditors

We want to investigate how audit firm rotations are related to crime and see whether companies that commit crime change audit firms in the time around the crime. There has not been much research into the relationship between audit firm rotations and their relation to crime or auditor tenure for companies that commit crime. There is however more research on how audit firm rotation affects auditing quality. This research could give indications on how often companies that want to commit crimes should change auditors.

Audit quality can be seen as the probability that the auditor detects and reports the presence of irregularities (Corona & Randhawa, 2010). The thought behind changing auditors is that longer tenures could weaken the auditor's independence and therefore a new auditor would result in higher audit quality. On one side, a study that researches audit firm rotation in Italy finds that the audit quality improves after an audit firm rotation (Corbella, Florio, Gotti, & Mastroila, 2015). In contrast, studies on mandatory audit firm rotation in South Korea and Indonesia find that it decreases audit quality (Mali & Lim, 2018; Kalanjati, Nasution, Jonnergård, & Suttedjo, 2019). In addition, several papers find that an audit firm rotation does not affect auditor independence and gives minimal benefits on quality (Aschauer & Quick, 2018; Jackson, Moldrich, & Roebuck, 2008). Interestingly, a study in Indonesia finds no association with audit quality following a mandatory audit firm rotation, but a positive association in a period of voluntary audit

firm rotations (Widyaningsih, Harymawan, Mardjiuwono, Ayuningtyas, & Larasati, 2019).

Furthermore, a paper by Corona et al. (2010) investigates how reputation can be the motivator for auditors and illustrate how reputational concerns can induce an auditing firm to misreport. They found that the overall effect is an increase in the credibility of financial statements with tenure, despite a decrease in audit quality. This indicates that companies that commit crimes could potentially keep an audit firm longer as this gives more credibility to their financial statements.

Previous literature gives split indications of the effect of audit firm rotation on audit quality and fraud detection and seems to either be dependent on the country or sample that is being investigated. We expand on this literature by investigating the relationship between changes in audit firms and crime and see whether the changes in audit quality, when changing audit firms, can be exploited for crimes.

3.2 Board Members

Board members are at the top-level of companies and have more authority and consequently more opportunities to either commit crime or influence others to do so. It is therefore interesting to investigate the relationship between board members and crime, and this is a topic where there has been a considerable amount of previous research.

Previous research has investigated different aspects of the board of directors and their role in corporate governance (Archambeault, 2000; Vafeas, 1999; Wang, 2010). The amount of monitoring done by the board, the number of directorships held, and the size of the board are elements that have been discussed. Nonetheless, the empirical evidence supporting that a board size impacts effective corporate structure is lacking (Dechow, Sloan, & Sweeney, 1996). However, it has been shown that a staggered board, one in which only a part of the board is elected every year, has been criticized for making the corporate governance process harder (Burr, 2000).

In addition, there has been multiple studies investigating the relationship between board turnover and crime. Multiple papers find evidence of higher board turnover after a lawsuit is settled and argue that this is because firms want to signal organizational legitimacy or impose sanctions on those associated with the fraudulent activities (Baum, Bohn, & Chakraborty, 2016; Marcel & Cowen, 2014). Furthermore, Gao et al. (2016) find that female directors and directors with multiple directorships at other firms are more likely to depart the fraud firm during the fraud-committing period. In contrast to other literature, Fich and Shivdasani (2007) found that there was no abnormal board turnover following a financial fraud lawsuit in the crime committing company. However, they found that directors with multiple directorships experience a decrease in other board seats after the conviction of crime. As research has shown indications of higher changes in board members after a company is convicted of a crime, we want to expand on this literature by seeing how changes in board members change in the time around the crime itself. In addition, we will be contributing to the literature about board member changes when a company is convicted of a crime.

Furthermore, research shows that there are substantial gender differences in involvement in corporate fraud (Steffensmeier, Schwartz, & Roche, 2013). Multiple papers in both the US and Norway found that the percentage of female corporate offenders is less than 10% (Steffensmeier et al., 2013; Gottschalk, 2012). However, Gottschalk (2012) argues that the reason for this low percentage can either be because females are more risk-averse or that the detection rate of female white-collar crime is lower than for males. In addition, Kaplan et al. (2009) find that women are more likely to report fraudulent financial reporting. This is supported by Malerba (2020) who notes that females at the top-level lead to a decrease in financial risks as well as an increase in corporate social responsibility. With this in mind, it is very interesting to see if the share of female directors relates to the initiation of crime, as previous research shows that fewer women commit corporate crime and that female directors lead to increased corporate social responsibility.

3.3 Tax Havens and Secrecy Jurisdictions

The present literature gives little indication of how companies that commit crime usually structure their subsidiaries with tax havens and secrecy jurisdictions, or if the acquisition of such subsidiaries relates to crime. However, there is research on how the use of tax havens and secrecy jurisdictions are viewed by executives. This research would give indications of how companies would want to structure their subsidiaries and the consequences of using tax havens and secrecy jurisdictions.

Sharman (2010) found that the barriers to the cross-border exchange of financial information have been linked to a variety of financial crimes. In addition, a study by Graham et al. (2013) finds evidence that 69 percent of surveyed executives do not engage in tax planning due to reputational concerns. They find that 58% of firms think of the risk of harmful media attention as important. Such evidence on reputational concerns is supported by Akamah et al. (2018) who hypothesize that reputational concerns can cause managers to hide their haven affiliates in the guise of the more general geographic area (i.e., a subsidiary in Luxembourg would be reported as being in Europe). Akamah et al. (2018) find that there is indeed a reporting avoidance behavior when tax havens and secrecy jurisdictions are implicated. Therefore, executives, seem hesitant to the idea of using tax havens and secrecy jurisdictions because of reputational concerns.

Considering the high reputational concerns regarding the use of tax havens and secrecy jurisdictions, we wonder why companies still seem to have subsidiaries in such havens. One possible reason is that companies achieve more secrecy, which makes it easier to commit and conceal crimes, and because of this companies are willing to sacrifice their reputation. We therefore want to investigate whether the reputational concerns found in previous research are grounded and if the use of tax havens and secrecy jurisdictions relate to crime.

3.4 Hypotheses

Previous literature gives differing indications of how companies that want to commit crime would change audit firms, board members, and their corporate structure to better enable and conceal crime. However, there are clear indications that changing these corporate governance features could lead to weaknesses that could be exploited for crime. We therefore want to investigate the associations between crime and these corporate governance features. To specify our research, we are testing five different hypotheses:

Hypothesis 1: *There is a Relationship Between the Change of Audit Firm and Crime.*

Hypothesis 2: *Increased Board Turnover Increases the Possibility of Crime.*

Hypothesis 3: *Increased Share of Female Directors Decreases the Possibility of Crime.*

Hypothesis 4: *Higher Share of Tax Haven Subsidiaries Increases the Possibility of Crime.*

Hypothesis 5: *Higher Share of Secrecy Jurisdiction Subsidiaries Increases the Possibility of Crime.*

By answering these hypotheses, we expand on the growing literature on corporate governance failures. Our main contribution is investigating if there are any significant relationships between these corporate governance features and crime, in addition to evaluating the differences between companies that commit crime and companies that do not, with respect to corporate governance. Lastly, we contribute to previous literature by exploring how the use of textual data can be used to research corporate governance, as well as other information found in textual format.

4 Data Retrieval

In this section, we will explain how we gathered the different data needed for our analysis. To answer the question of how corporate governance features relate to crime, we first needed data on companies that have been convicted of crime in the US, hereafter referred to as crime companies. For these companies, we extracted different types of information such as audit firms, board members, and subsidiaries. In addition, we needed data on tax havens and secrecy jurisdictions to be able to identify whether companies' subsidiaries are located in such places.

4.1 Corporate Prosecution Registry

To identify companies that have committed corporate crime we used data from The Corporate Prosecution Registry. The Corporate Prosecution Registry is a joint project of the University of Virginia School of Law and Duke University School of Law (Garrett & Ashley, n.d.). The registry contains information about federal organizational prosecutions and includes, among other variables, the name of the companies, the date of judgment, fines, and type of crime.

The Corporate Prosecution Registry consisted of 4 338 observed crimes at the time we extracted the data. This dataset includes observations of every federal organizational prosecution since 2001, as well as deferred and non-prosecution agreements with organizations since 1990 (Garrett & Ashley, n.d.). However, this dataset includes both listed and unlisted companies, as well as multiple observations of the same companies if they have been convicted of more than one crime. We only keep publicly listed companies, as we rely on the companies' ticker for further data retrieval. For companies that have been convicted of crime several times, we focus on the latest. In addition, we remove observations of crimes that are categorized as Dismissal or Declination, as in these cases the companies were not judged for the crime. Furthermore, we focus on companies that have been convicted of a crime after 2010 to obtain as much data as possible from the time before the crime. After removing observations without a ticker, with an invalid ticker, crimes that were dismissed or declined, duplicated companies, and cases where the crime was committed earlier than 2010 we are left with 48 unique crime convicted companies. A

complete list of these companies can be found in Appendix A2.

The final dataset contains different types of corporate crime. The types of crime range from accounting fraud to controlled substance violations. Displayed below is a graph of the different types of crimes by number of occurrences, whilst a full explanation of the different types of crime is displayed in Appendix A1.

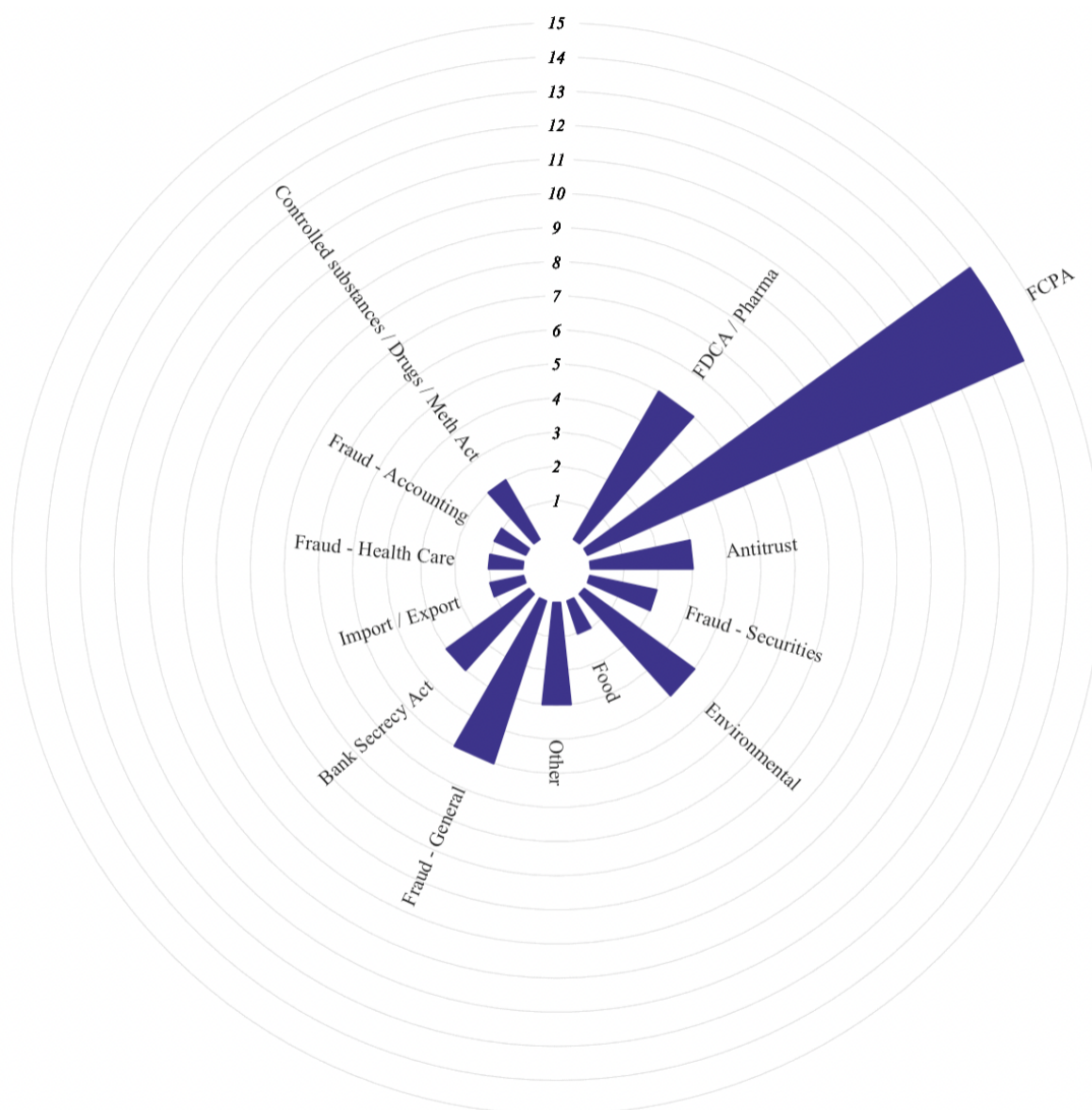


Figure 4.1: Visualization of the number of different crime types.

In addition, we used the Corporate Prosecution Registry to retrieve the dates when the crimes were committed. The Corporate Prosecution Registry has different documents available for each of the companies that elaborate on the details of the crime. For example,

press releases or agreement texts. Among other things, these documents contain the time and duration of the crime, information about who was involved and details on how the crime was executed. However, they must be read manually as they are not standardized and often just scans of documents. We therefore read these documents manually to obtain the dates of the crime. In figure 4.2 the different crime lengths are displayed in a timeline by company ticker.

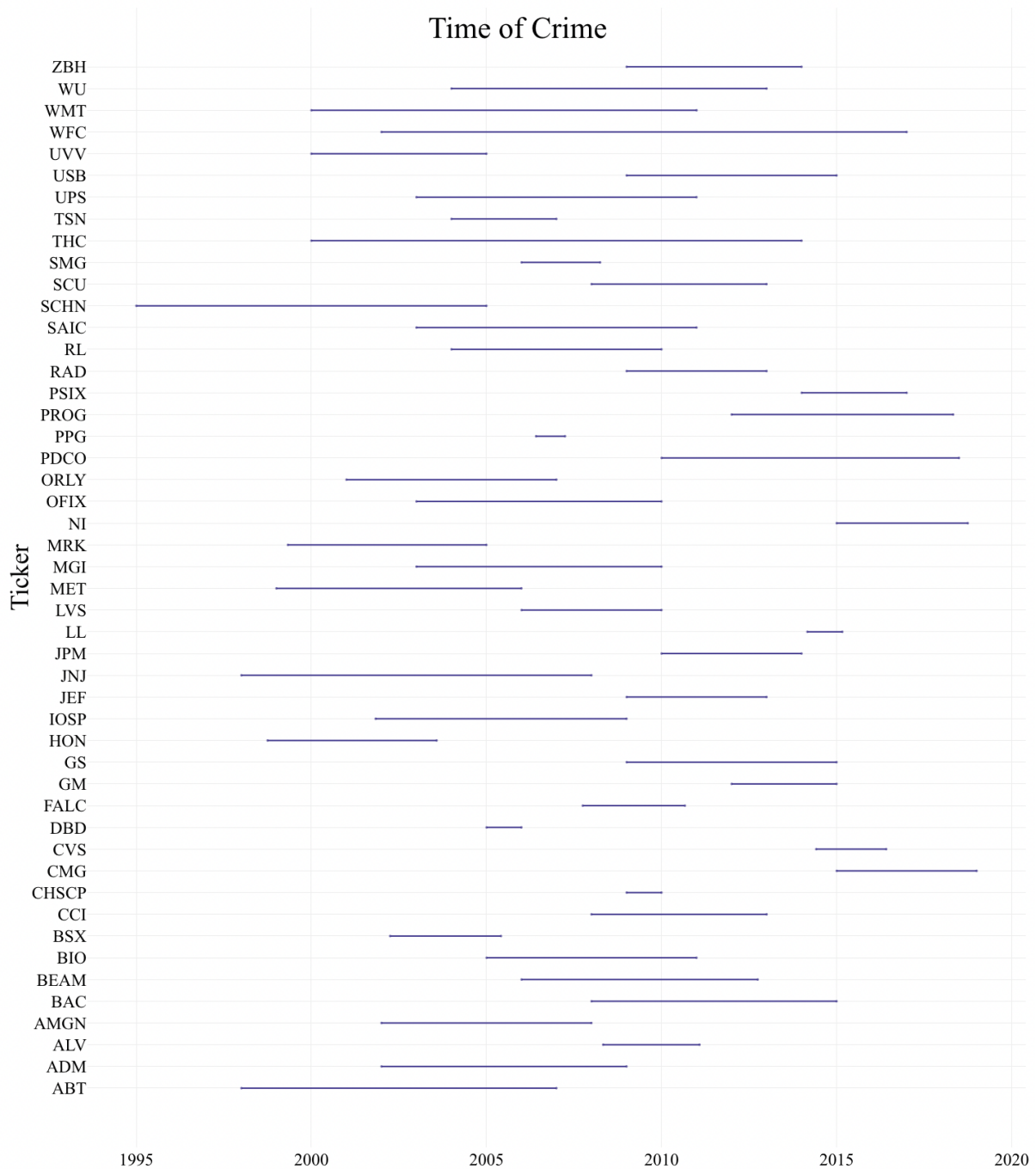


Figure 4.2: Timeline of when the crime companies committed crime.

The duration of the crimes varies from one to 15 years. In table 4.1 some descriptive statistics about the crimes are displayed. We see from these statistics that the length of the crimes varies a considerable amount. The total payment is the sum of fines, forfeitures, restitutions etc. related to the crime.

	min	max	mean	median	SD
Length of Crime	1	15	6	6	3.01
Time From Crime to Conviction	1	8	4	4	2.10
Total Payment	0	2 921 088 000	179 436 429	13 750 000	469 872 898

Table 4.1: Descriptive statistics of data.

4.2 ORBIS

ORBIS is a database that contains comprehensive information on companies worldwide, with an emphasis on private company information. We mainly used ORBIS to extract information about publicly listed companies in the US. We extracted a dataset of all US-based companies, with both company names and tickers, that were active and publicly listed. This gave us a dataset that consists of 16 960 companies.

For further data extraction from the SEC, all companies had to be publicly listed in the US. By downloading the dataset from the Corporate Prosecution Registry, and a list of US publicly traded companies from the ORBIS database, we matched the observations from both datasets. Hence, we could be certain that our dataset only consisted of companies that were listed in the US.

4.3 Control Groups

To determine whether companies convicted of crimes behave unusual with regards to the change of auditor, board members, and subsidiaries, they are compared to a control group. The control groups consist of companies that are not registered in the Corporate Prosecution Registry but operate in the same industry and are approximately of the same size, with respect to revenue, as the crime convicted companies. To extract representative control groups, we used the Standard Industrial Classification (SIC) and the revenue of the different companies in the crime dataset as requirements. We then used ORBIS to

find similar companies. A limit for the number of control companies in each industry was set to 10. However, for some industries, the number of companies in the industry was limited to less than 10. In those instances, all companies in the industry are included. The 48 unique companies that committed crime conduct business in 38 different industries. The final dataset for control companies consists of 245 companies that have tickers and SICs to identify which companies they should be compared to. A complete list of these companies can be found in Appendix A3.

4.4 SEC and EDGAR

Publicly traded companies in the US are required by law to file several different forms with the SEC. The purpose of this requirement is to have information available for investors and corporations. Until the Electronic Data Gathering, Analysis and Retrieval (EDGAR) was developed in the early 1990s, filings were filed with SEC by paper. Today, all public US companies are required to file through EDGAR (Garcia & Norli, 2012), where the information is publicly available. In this analysis we are interested in the information available in the companies' 10-K filings. We used the full-text search that allowed us to search for different filings based on type, date, and company ticker (SEC, 2008). From this search we could gather filings from 2001. Therefore, we only used company data from 2001 and to this day.

4.4.1 10-K

The 10-K form is the company's annual report and provides a comprehensive overview of the companies' business and financial condition (SEC, n.d.). The purpose of the 10-Ks is to keep investors aware of a company's financial situation and allow them to make decisions based on a correct and fair base (Kenton & Scott, 2020). From these reports, we extracted information about the companies' audit firm, board members, and subsidiaries. Furthermore, the format of a 10-K form is supposedly standardized. However, after investigating them, we find that companies structure these documents in a variety of ways. In addition, the 10-Ks are only available after the companies became publicly listed in the US. For our analysis, this implies that we might not have data from before or during the crime, depending on when the companies were publicly listed.

4.4.2 Textual Data Analysis

There is a huge amount of data available that is not used due to its natural format and the time-consuming process of converting it to a form that is suited for analysis. In the later years, the amount of textual data has increased rapidly, however, it is not easily accessed without further processing. Textual data analysis is a method that allows us to convert unstructured textual data into a structured form (Kinra, Beheshti-Kashi, Buch, Nielsen, & Pereira, 2020). For this thesis we use R, which is a helpful software when exploring these opportunities. For our analysis we explore the opportunities of extracting non-financial information from 10-Ks by using textual data analysis. We hope to elucidate how information in textual format can be used for data analysis purposes.

The process of converting the textual data to a structured form consists of three steps: harvesting, cleaning and pre-processing, and lastly, analyzing the text. Textual data can be collected from websites, databases, or newspapers. The most common formats of data are txt, xml, and pdf. Text is mostly displayed in ways that help human understanding. Therefore, measures must be made in transforming the text into a format the computer can understand. Some pre-processing steps such as removing tags and putting plain text into a word vector must be done before the text can be analyzed. Furthermore, the cleaning steps are important with regards to how easily the data is interpreted.

4.4.3 Web Scraper

The 10-K forms can be found in EDGAR which is structured in a way that makes it possible to web scrape for information. Web scraping is the action of extracting data from a website. It is a specific approach, and the goal is to mine information from a website and transform it into a format that can more easily be analyzed (Saurkar, Pathare, & Gode, 2018). In the EDGAR database, the URLs for the different forms are constructed in a standardized format, which makes it possible to web scrape for information. A web scraper does the same procedure as humans would do manually to retrieve the information, but much more efficiently.

By using the `EdgarWebR` package in R, the web scraper we have developed allows us to

extract information from the companies' 10-Ks and exhibit 21s by only inputting a ticker and date. When defining the date, we set a "before date", which means that the web scraper finds the latest 10-K filing filed before the given date. The web scraper extracts information from all URLs for all the given company's 10-K filing for every given year. When the relevant filing is found, the web scraper searches for a given string. This string is defined based on what type of information we want to extract. When the given string is found, the web scraper is coded to find the index of where the string is located and outputs the text after this index for a given length of indexes.

As mentioned, the 10-K filings and exhibit 21's are not necessarily completely standardized. Therefore, the web scraper implements different methods for reading the data, based on conditions such as if the document is a .txt file or a .htm file, or if it has a certain set of rows. Because the documents are not fully standardized the web scraper will output some "noise" where the text is not of value to us. However, due to the nature of textual analysis, the chances of losing data are high. Therefore, we accept more noise to be sure to keep as much relevant data as possible. The noise is later handled in a data cleaning step.

Further, certain web scraping steps are specific to the different types of information we extracted. We will now consider in more detail how we extracted information on audit firm, board members and subsidiaries. We gathered the information in a way so that in the final dataset, used for the analysis, the change of audit firm variable is a dummy variable that is equal to 1 if there is a change in audit firm from the year before and 0 otherwise. The variables for the change in board members and the share of female directors are percentage changes from the previous year. These changes includes both entries and exits of the board. Lastly, the tax haven and secrecy jurisdiction variables are the total share of tax havens and secrecy jurisdictions subsidiaries every year.

Auditors

The 10-Ks include a section of financial statement and supplementary data. In this section, we find the audited financial statement together with a certifying letter from the companies' independent auditor. The auditors usually sign with the audit firm's name. We extract the name of the independent auditor for all the companies in our dataset for all years possible between 2001-2020.

What is interesting with relation to who audits the company, is to see whether the company switches auditor often or keeps the same auditor over a longer period. After cleaning the output from the web scraper, we were able to display when the companies changed audit firm, based on a textual comparison from the previous year. Displayed below is a visualization of which years the companies who have committed crime change auditors and which auditors are used.

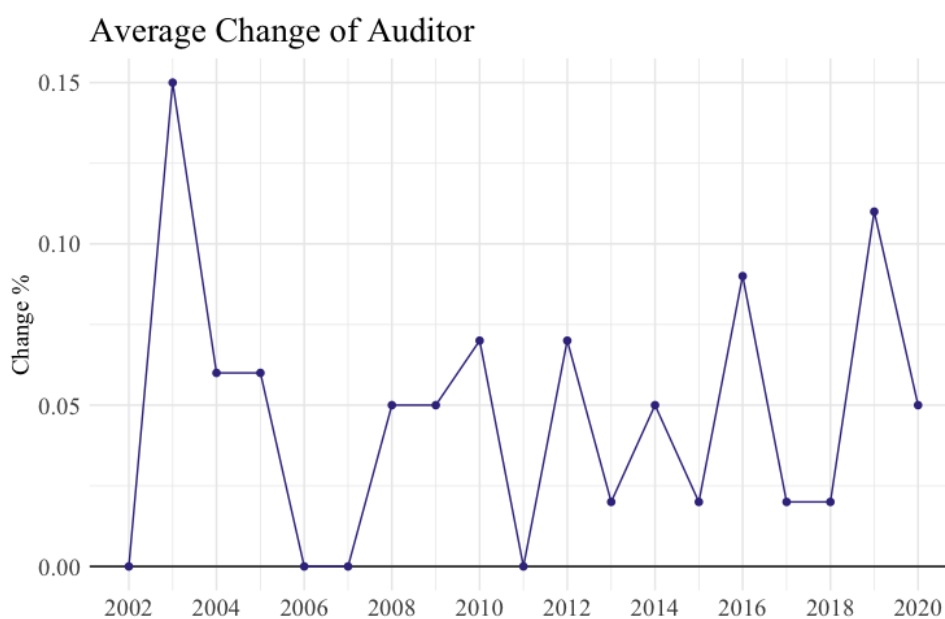


Figure 4.3: Plot of how often the crime convicted companies change audit firm in average in percent per year.

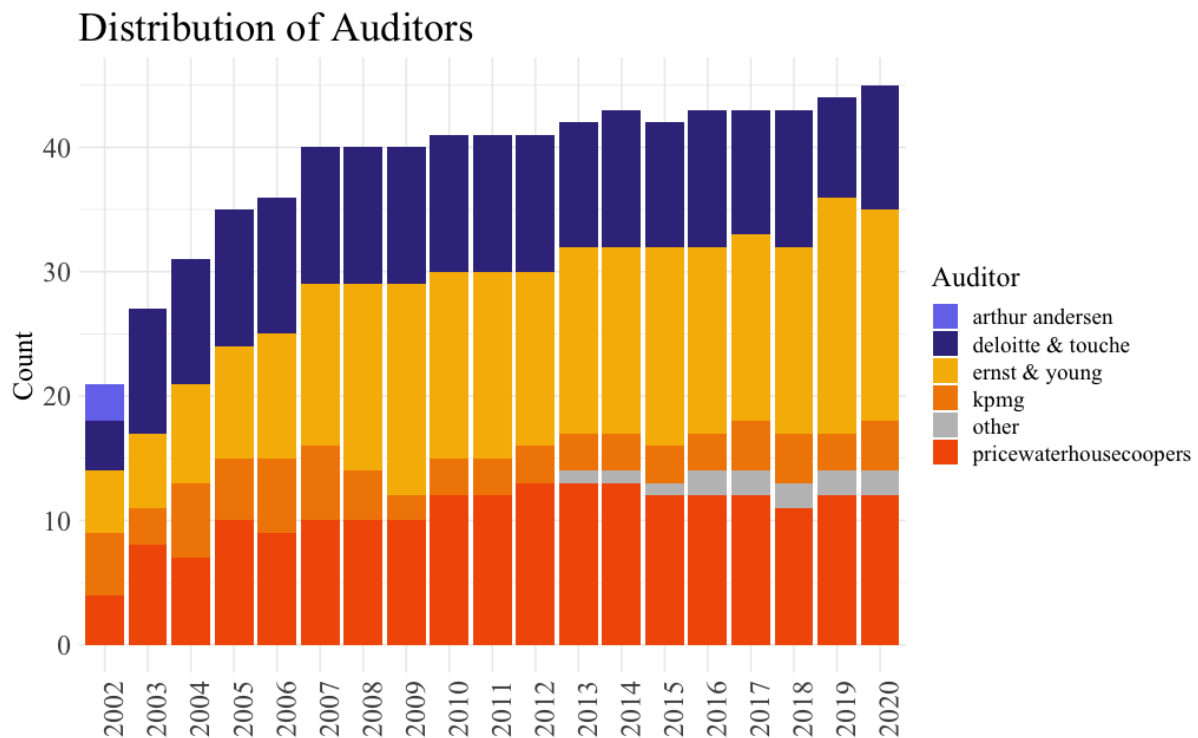


Figure 4.4: Distribution of audit firms. “Other” are audit firms used by only one company.

In addition, we display a comparison in the change of audit firms between the crime companies and control groups. The plot shows the average in each of the companies, presented by their ticker. We can see from the graph below that the crime companies seem to be changing auditors somewhat more often than other companies in the same industry and of the same size. However, a paired t-test shows that the mean of the groups is not significantly different. As we see that there could be a trend, the reason for a insignificant t-test could be due to the small number of observations. The results for this, and all the following t-tests, are displayed in Appendix A6.

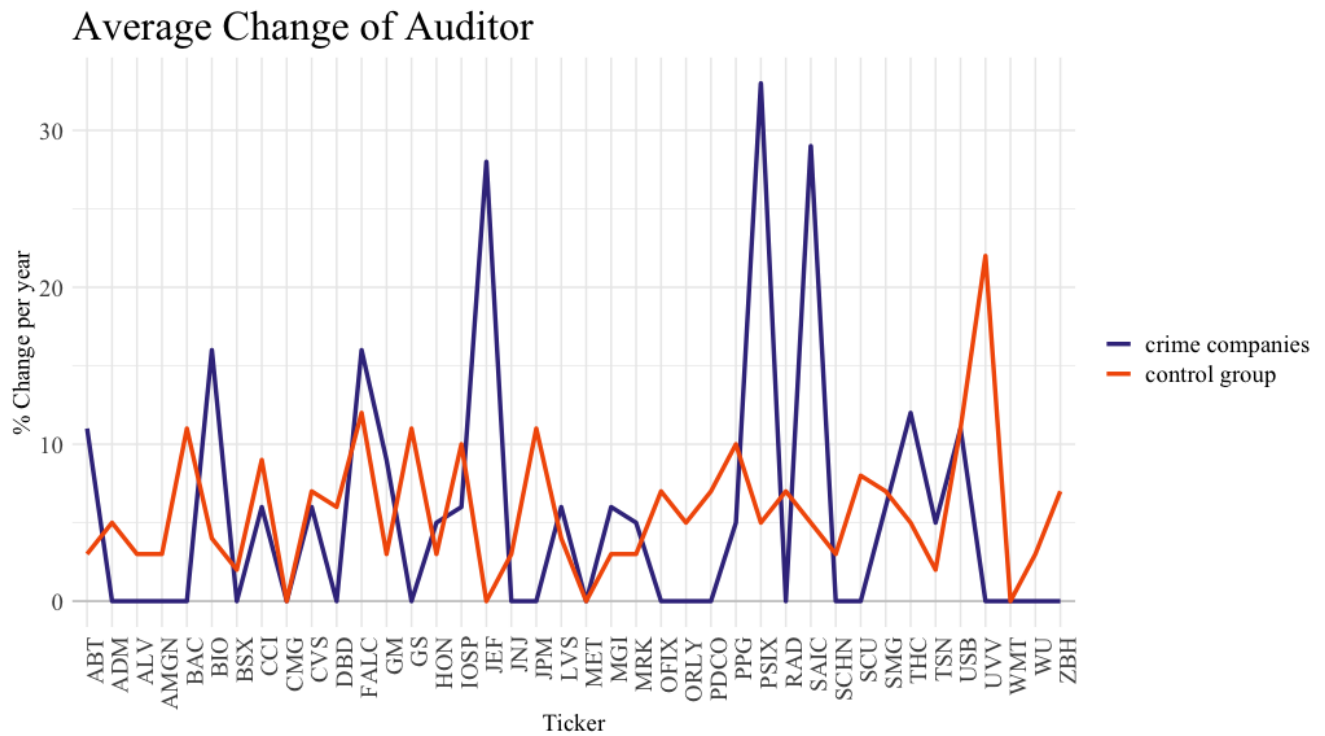


Figure 4.5: Plot of average change of audit firm.

Board Members

Another requirement in the 10-K form is that it must be signed by the registrant. This means that it should be signed by the principal executive officer, or officers, its principal financial officer, and by at least most of the board of directors or persons performing similar functions (SEC, n.d.). We used this part of the 10-K form to extract the names of the directors of the companies for all years possible between 2001-2020. Because of the lack of filings or issues with data extraction there are little or no observations of board members for 2002 and 2020. By web scraping the 10-K we were able to extract the board members' names. Using this data, we computed the change in board members of each company from year to year. Displayed below is a comparison in change of board members between the crime companies and the control groups, presented by a difference for each company. We can see from the graph that the crime companies seem to be changing board members in a somewhat consistent pattern as the control groups. A paired t-test shows that the mean of the groups is not significantly different from each other.

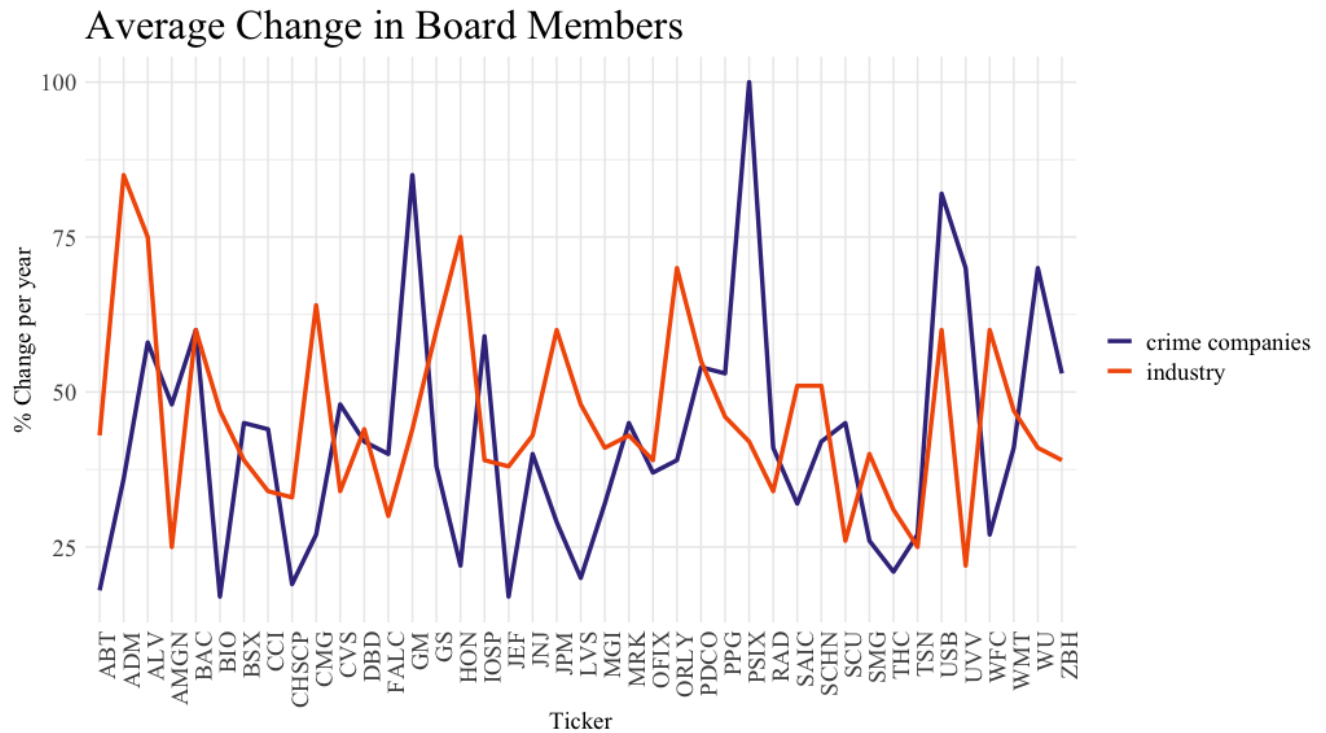


Figure 4.6: Plot of average change in board members.

In addition, we were interested in looking into female directors. We downloaded a dataset from data.world containing around 95 000 names and their associated gender (Howard, 2016). Data.world is a free and open collaborative data community. By matching these two datasets we got the gender of all the board members and could compute a share of female directors in each company for each year. Below we display an overview of the average board size per year, grouped by gender, and a comparison between average share of female directors in the treatment and control group. We see that there is a majority of male board members all years, but indications of an increasing share of female board members in the latest years.

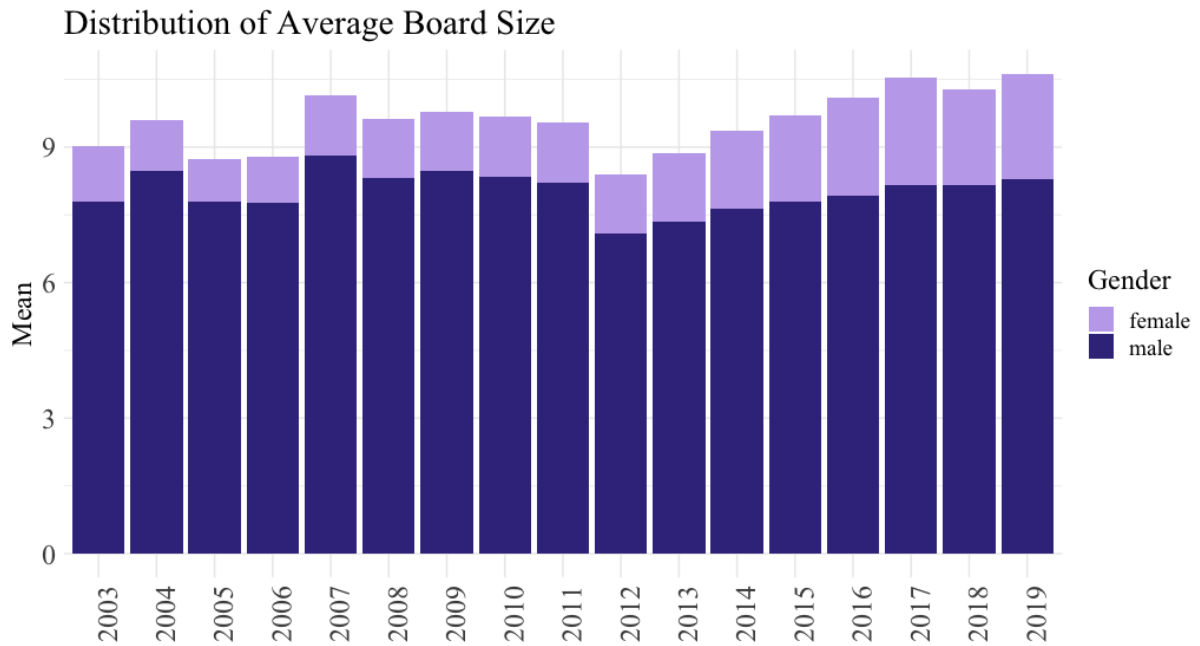


Figure 4.7: Bar plot of average board size and gender distribution.

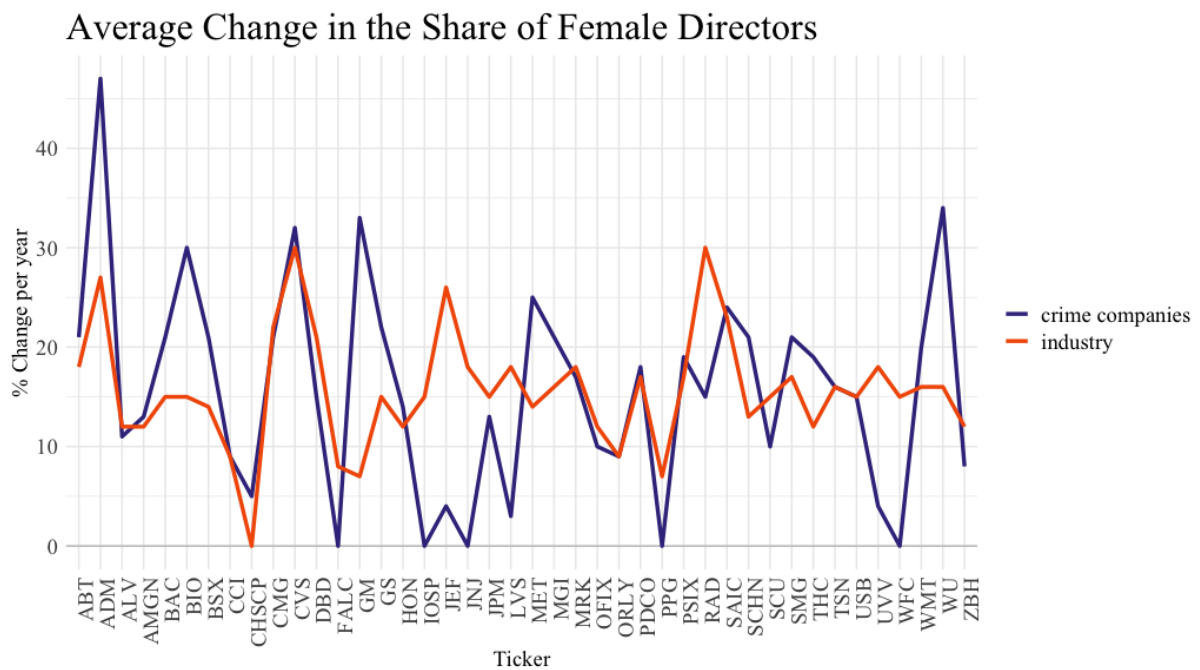


Figure 4.8: Plot of average change in share of female directors.

We see from figure 4.8 that some of the companies in the crime group have either a lot more or a lot fewer females on their boards than the average in the control groups.

However, a paired t-test shows that the mean of the groups is not significantly different from each other.

Subsidiaries

One of the requirements of the 10-K forms is an exhibit 21. Exhibit 21 is a list of the companies' subsidiaries. This list usually contains the name of the companies' subsidiaries and what jurisdiction that subsidiary is located in. We extracted this list for all the companies in our dataset for all the years possible between 2001-2020. For this part, the web scraper searched and found the exhibit 21 for all companies for all years. These exhibits are filed in several formats. Most of the exhibits are tables that are read easily, however, some are tables with many columns containing irrelevant information which needs to be cleaned. Furthermore, some of the exhibit 21's are not formatted as tables, and with the subsidiaries' location in parenthesis or after hyphens.

When the final lists of the companies' subsidiary's location are compiled, we merge them with a list of ISO codes to get the subsidiaries' country code. This list contains ISO codes for all the countries in the world. We also retrieved datasets on tax havens and secrecy jurisdictions, that also have the ISO codes of these countries. This implies that we can easily match the list of the subsidiaries with the list of tax havens and secrecy jurisdictions and count how many subsidiaries the companies have in these jurisdictions. Displayed below is a map that shows where the crime companies have subsidiaries for all the years in our dataset. Some of the jurisdictions that are considered tax havens or secrecy jurisdictions are small offshore islands and not visible on the map. An overview of how frequently the tax havens and secrecy jurisdictions are used are presented in figure 4.12 and 4.13.

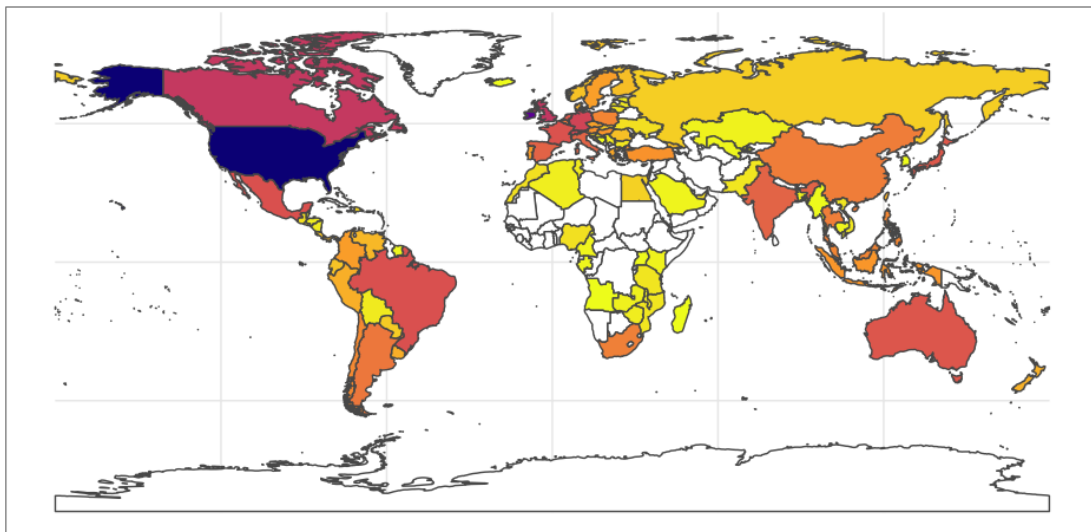


Figure 4.9: Map of subsidiaries locations.

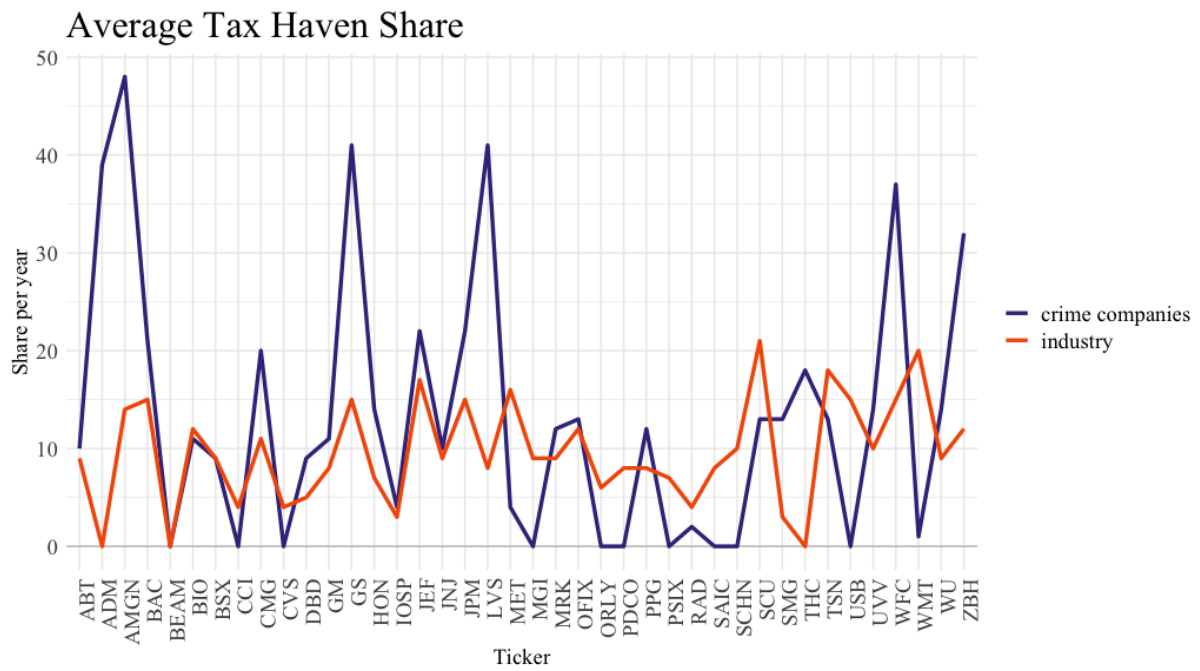


Figure 4.10: Plot of average tax haven share.

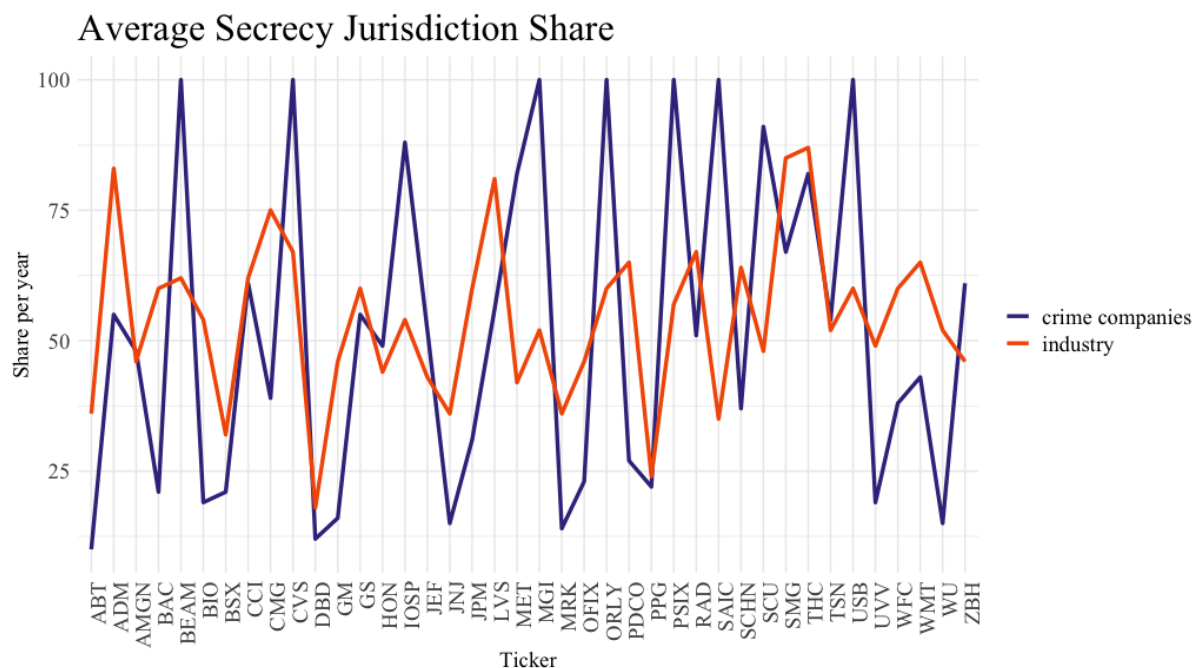


Figure 4.11: Plot of average secrecy jurisdiction share.

Above we present graphs of the average share of tax haven and secrecy jurisdiction subsidiaries for the crime companies and the control groups. In figure 4.10 we see that some of the crime companies have a higher share of subsidiaries in tax havens than the average in their industry. A paired t-test confirms this and shows that the mean of the groups is significantly different from each other at the 10% level. On the other side, whilst it can seem as though many of the crime companies have a higher share of subsidiaries in secrecy jurisdictions, a paired t-test shows that the mean of the groups is not significantly different from each other.

Control Groups

The collection of data from the control companies is done in approximately the same way as for the companies who committed crime. With just minor modifications to the web scraper, we can loop over all the 10-Ks and all exhibit 21's, from 2001 to 2020, and extract the desired information. The web scraping is time-consuming for this huge amount of data, as there are 4 655 documents to be found and read. The output is then stored in the same format as for the crime convicted companies.

4.4.4 Data Cleaning

As the output from the web scraper contains noise, some cleaning steps are necessary to get the data in a format that we can use for our analysis. Each of the different datasets, for the different types of data: audit firm, board members, and subsidiaries are unique and must be cleaned separately. However, a common denominator for all datasets is that the extra whitespace and all special characters (except “ ‘ ”) are removed. In addition, we generated a list of finance-related words together with general stop words¹ and removed all rows containing any of these words to remove noise and unwanted rows from our dataset.

Auditors

In the auditor dataset, the noise is minimal because the audit firm is found in a clearly defined part of the 10-K. In some cases, noise is found in front of or after the audit firm's name. This is typically found where the audit firm's name is retrieved from inside a paragraph, and is removed. The indicator of a signature, /s/, is also removed from the beginning of the strings. Nevertheless, some random noise still appears after these cleaning steps. Therefore, we create a list of words related to business and business titles that are removed from the data.

Board Members

To ensure that all the board members are extracted from the 10-K, the acceptance of noise is high. The data is outputted in a data frame with each string in a new row. In the cleaning step, we want to remove all the rows that do not contain the names of board members. Therefore, we create a list of around 5 000 finance-related words and expressions, together with general stop words. We then remove all the rows in the dataset that contains at least one of these words. We find that there is a pattern where some names are in the same string as their titles, such as "CEO" or "director", but separated by several spaces. To be sure to not remove these lines, we first split the strings by multiple spaces. In this way, the name of the board member remains, while the title is removed.

In addition, extra whitespace and rows with only one word are removed. As rows that

¹Stop words are words which do not add much meaning to a sentence. They are common words such as “and”, “the” and “is” and can be removed without distorting the context.

contain digits, less than three characters or more than 30 characters are most likely noise, these are removed as well. Further, as some board members are captured more than once we remove duplicates of names within the same company the same year. Some names are also printed twice in the same string. To resolve this issue, we check if the first half of the string is equal to the second half of the string. If it is – we only keep the first half.

Lastly, some companies state their board members with the first name shortened to one character but use their full middle name. Therefore, as a character will not be assigned a gender, we remove any character at the beginning of the string followed by a space. Therefore, in some cases we might match some of the last names to the wrong gender. However, this method allows us to keep the observations with a middle name. In the final dataset, the first name is put in a separate column to make it easier to assign a gender based on the gender dataset.

Subsidiaries

The dataset of subsidiaries does not require any extra cleaning after the web scraper has obtained the data.

4.5 Tax Justice Network

4.5.1 The Corporate Tax Haven Index

The Corporate Tax Haven Index is retrieved from the Tax Justice Network and ranks the world's most important tax havens for multinational corporations. The havens are ranked according to how aggressively and how extensively they contribute to helping the world's multinational enterprises escape paying taxes and erode the tax revenues of other countries (Tax Justice Network, 2021). We chose to use the top 10 tax havens in our analysis, as the list consists of 70 countries. We think that using the complete list would give misleading results as it consists of almost 40% of all countries.

Rank	Tax Haven
1	British Virgin Islands
2	Bermuda
3	Cayman Islands
4	Netherlands
5	Switzerland
6	Luxembourg
7	Jersey
8	Singapore
9	Bahamas
10	Hong Kong

Table 4.2: List of top 10 tax havens.

The tax havens are ranked by a combined score, consisting of a haven score and global scale weight, that indicates how much of the world's financial activity is abused by that jurisdiction (Tax Justice Network, 2021). In Figure 4.12 we present a summary of the development in the use of the different tax havens per year. We see that the use of these tax havens has been increasing annually. Most of this increase seems to be in tax havens such as the Netherlands and Luxembourg.

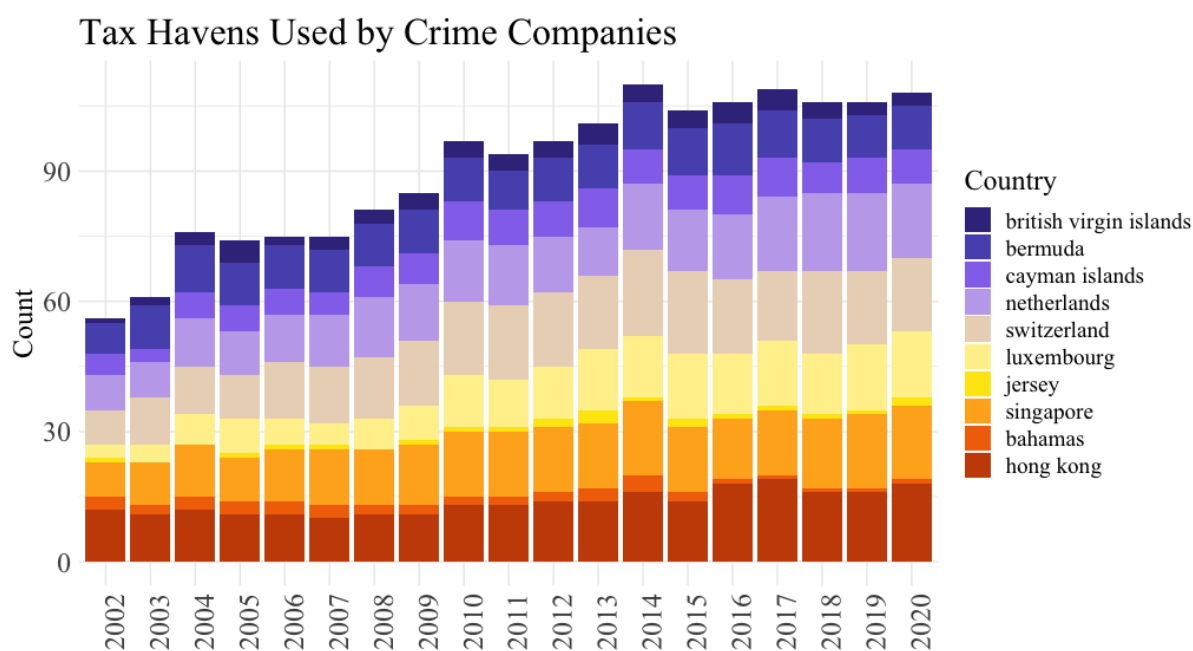


Figure 4.12: Distribution of tax havens used by crime companies.

A summary of how many of the companies in our sample of crime companies that have used any of these tax havens during the years from 2002-2020 is found in Appendix A4.

4.5.2 The Financial Secrecy Index

The Financial Secrecy Index ranks each country based on how intensely the country’s legal and financial system allows wealthy individuals and criminals to hide and launder money extracted from around the world (Tax Justice Network, 2020a). The country’s secrecy score is then combined with the volume of financial activity conducted in the country by non-residents to calculate how much financial secrecy is supplied to the world by the country (Tax Justice Network, 2020a). We chose to use the top 10 secrecy jurisdictions in our analysis, as the list consists of 133 jurisdictions. We think that using the complete list would give misleading results as it includes around half of the jurisdictions in the world.

Rank	Jurisdiction	FSI	Secrecy Score
1	Cayman Islands	1,575.19	76
2	United States	1,486.96	63
3	Switzerland	1,402.10	74
4	Hong Kong	1,035.29	66
5	Singapore	1,022.12	65
6	Luxembourg	849.36	55
7	Japan	695.59	63
8	Netherlands	682.20	67
9	British Virgin Islands	619.14	71
10	United Arab Emirates	605.20	78

Table 4.3: List of top 10 secrecy jurisdictions.

The jurisdictions are ranked by their FSI value which ranks jurisdiction by who contributes the most to the global financial secrecy. The secrecy score on the other hand is a measurement of financial secrecy in each jurisdiction. We see that both the indexes for tax havens and secrecy jurisdictions consist of many of the same countries. The United States, Japan, and The United Arab Emirates are the only countries that are considered a secrecy jurisdiction, but not a tax haven. This is interesting as small island offshore centers are usually what is considered as tax havens and secrecy jurisdictions, but in the

later years, it has been revealed that some islands have higher standards of corporate transparency and disclosure than the US (Sharman, 2010).

In Figure 4.13 we present a summary of the development in the use of the different secrecy jurisdictions per year. We see that the increase in the use of secrecy jurisdictions is greatest in the first few years. It appears that the use of the United Arab Emirates has begun in the latest years. Furthermore, the increase seems to be because of a general increase in the use of all these jurisdictions.

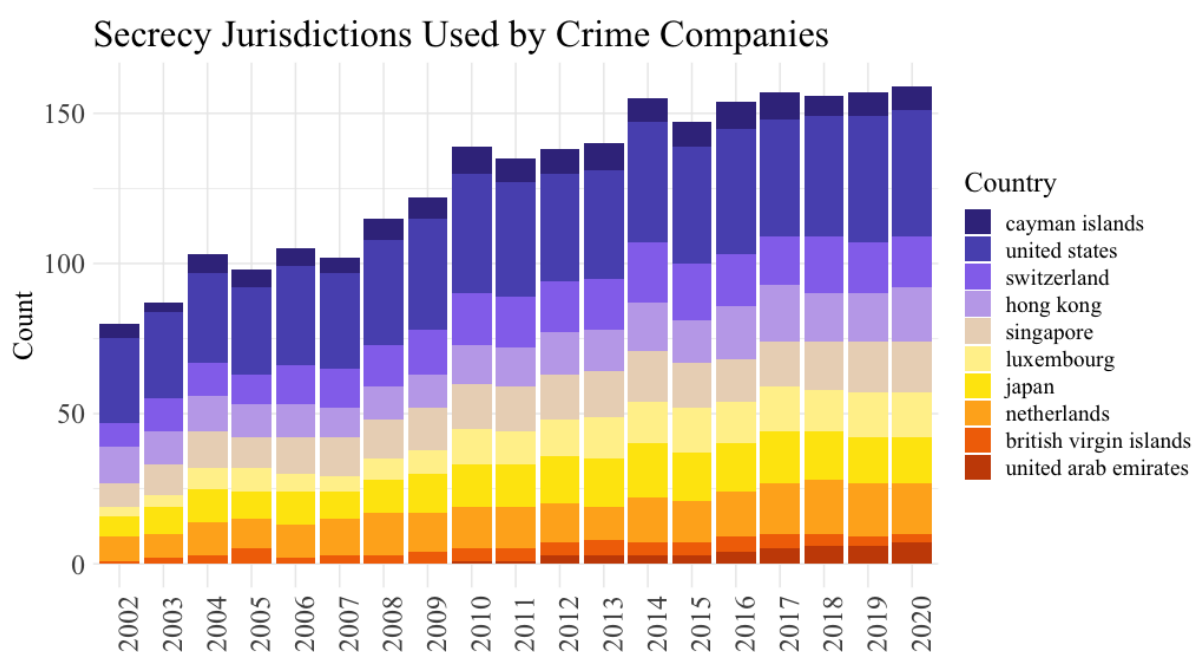


Figure 4.13: Distribution of secrecy jurisdictions used by crime companies.

A summary of how many of the companies in our sample of crime companies that have used any of these secrecy jurisdictions during the years from 2002-2020 is found in Appendix A5.

4.6 Country ISO Codes

To match the countries from the companies' subsidiaries dataset with the countries in the tax haven and secrecy jurisdiction dataset we use country ISO codes. These codes are based on the countries that the International Organization for Standardization (ISO) uses and is downloaded from datahub. DataHub began as a project by Datopian and Open Knowledge International and has been creating tools and applications for data for over a decade (Kariv & Pollock, n.d.). The dataset from datahub lists the country names (official short names in English) in alphabetical order as given in ISO 3166-1 and the corresponding ISO 3166-1-alpha-2 code elements (Kariv & Pollock, n.d.). It lists 250 official short names and code elements as of Dec 2012.

5 Methodology

In this section, we will elaborate on the method we used for our analysis. We have investigated different corporate governance features of companies and if they relate to crime. To investigate this, we have performed an event study and compared the crime convicted companies to selected control groups. Further, we will first define what an event study is, then go through the parameters of our study. Secondly, we will discuss the validity and reliability of this type of study. Lastly, we will discuss the caveats of using this methodology and how we have tried to overcome these limitations.

5.1 Event Study

The event study design is an extension of the difference in difference family (Schmidheiny & Siegloch, 2020). This is because its empirical estimates can be plotted, graphs are intuitive and the underlying econometrics straightforward. Recent developments in quasi-experimental methods have given rise to panel event studies (Clarke & Schythe, 2020). This methodology allows for dynamic effects of the time periods before and after an event, in addition to controlling for fixed factors by area and time (Clarke & Schythe, 2020). The event study method allows for a visual representation of the causal effect of the event because it considers the variation in outcomes at the different time periods compared to a reference period (Clarke & Schythe, 2020). The coefficient for the reference period is normalized to zero and is usually the period prior to the event (Schmidheiny & Siegloch, 2020).

There are several concepts of an event study that needs to be defined. The first is an *event window*, which is the time when the dynamic effects of a treatment are studied. For an event window, the researcher needs to define a limiting number of leads and lags, which entails that the researcher makes assumptions about what happens beyond the endpoints of the event window. The lags and leads are variables that indicate how many periods away from the event a specific time period is. (Clarke & Schythe, 2020). The *observation window* for the dependent variable is the different time periods in which we observe our

dependent variables in a balanced panel.

The treatment of the endpoints of the event window is important as they directly affect the treatment estimates. The last lag is often defined as an open interval capturing all known events that have happened in the past, while the last lead is defined as the open interval capturing all known events that will happen in the future (Schmidheiny & Sieglöcher, 2020).

5.2 Parameters in our Event Study

In this study, we are considering a sample of 48 treated companies with an observation window from 2002-2020. They are compared to a sample of 245 control companies. For the event study, we are considering two different events that occurred at different times between the years 2010-2020 for the different companies. The first event is the years when the crime was committed and the second is when the company is convicted of the crime. The companies are usually convicted of the crime many years after the end of the crime, and it is therefore interesting to investigate if the relationship between corporate governance features is related to either of these events. In the case of the crime being the event, the duration of the event is different for all the companies and ranges from one to 15 years. In the event study the event indicator is a dummy equal to 1 for the years of the event and 0 otherwise.

The other parameters in the event studies are the same regardless of what the event variable is. For both event studies we have considered the five different y variables: change of audit firms, change in board members, change in the share of female directors, the share of tax haven subsidiaries, and the share of secrecy jurisdiction subsidiaries. For the event window, we have chosen to use both lag and lead of three years. We have used year -1 as the reference period, as previously stated this is a common practice.

We estimate equations of the following type:

$$Y_{it} = \alpha + \sum_{j=-3, j \neq -1}^{+3} \beta_j I(t = j)_j + \epsilon_{it}$$

$I()$ stands for indicator equal to 1 when the condition in the brackets is met. The parameter β_j is the dynamic treatment effect j time periods after ($j \geq 0$) or before ($j < 0$) the event. With these regressions, we want to see the evolution of the Y variable with respect to the different events. The regression outputs one coefficient for each time period, so we are able to see the effect of each of them. For example, if the coefficient for a given time period, β , which is the time of the crime, is positive and significant it means that in this time period the y variable increases in relation to the reference period. β_{-3} and β_3 measure the average effect for all years before and after the event window.

By doing this we will see if the events have any effect on our respective y variables and hence be able to see if the companies change any of these corporate governance features when they commit crime or are convicted of crime. Our theory is that the control groups do not commit crime and should therefore not change their behavior in the time surrounding the crime initiation or conviction. Significant results for the event study would indicate that the treatment group behaves differently than the control group.

5.3 Reliability and Validity

We want to investigate how crime initiation and conviction impacts different corporate governance measures. To ensure that our analysis is both reliable and valid, there are certain assumptions that need to be considered.

Methods like matching, as done in difference in difference, come with an explicit statement of the conditional independence assumption which justifies a causal interpretation of the matching estimators (Angrist & Pischke, 2009). The treatment effects in matching are constructed by matching individuals with the same characteristics (MIT Economics, n.d.) and are based on a weighted average of comparison (Angrist & Pischke, 2009). The conditional independence assumption states that the treatment assignment is independent

of potential outcomes after conditioning on observed characteristics of participants (Masten & Poirier, 2018). Hence, the matching estimates have a causal interpretation assuming that conditional on the firms' characteristics such as revenue and industry, corporate governance features are independent of potential crime committing.

However, claiming causality is something one should be cautious about as some assumptions cannot be measured with certainty. To claim causality three criteria must be fulfilled: First, there must be an empirical association between the independent and dependent variable, second, the variation in the independent variable must precede the variation in the dependent variable and third, the relationship must be nonspurious (Chambliss & Schutt, 2018).

One of the most important assumptions for the difference in difference design is the parallel trend assumption and the confirmation of this assumption ensures that the variation in the independent variable precedes the variation in the dependent variable. The parallel trend assumption states that the difference between the treatment and control group are constant over time without the treatment (Ryan, Kontopantelis, Linden, & Burgess Jr, 2018). This means that the companies in the treatment and control group differ from each other, but if the treatment does not have an effect, this difference should stay constant. Thus, a change in the slope for the treatment group is the treatment effect. This assumption can be verified by checking the event study plots in the analysis and looking at the pre-trends. By checking the plots and estimates the causal requirement of an association between the independent and dependent variable can also be confirmed.

To ensure a nonspurious relationship it is important to include all possible variables that affect the dependent variables. In matching strategies, the only source of omitted variable and selection bias is the set of observed characteristics (MIT Economics, n.d.). In our case the source of omitted variable bias might be unobserved variables within the companies or yearly effects that are the reasons behind the corporate governance changes. In the difference in difference analysis, we control for entity and time specific fixed effects. The entity effects control for omitted variables that are common within the company and the yearly coefficients consider all the across-year variation and control for omitted variables that are common for all the companies but vary over time (Haan, n.d.). Furthermore,

selection bias arises when the treatment group differs from the control group in ways other than the treatment. In our study, the control group companies have been selected based on the revenue, country, and industry of the crime convicted companies. They are therefore of the same size and operating in the same industry as the crime committing companies and the assumption is therefore that the control group companies have the same possibilities as the treatment companies. This ensures the internal validity of our research.

The companies in our sample operate in 38 different industries. Because of this the effects that are captured in our analysis can be generalized to a variety of industries. However, the crime companies have been chosen with respect to their size, where we have chosen the largest companies, and one should therefore be careful in applying the results of our study to smaller companies that do not have the same opportunities.

Reliability is established through the transparency of the data and that one elucidates the research process (Ringdal, 2018). Through elaborating on how we have retrieved the data, the weaknesses of textual data analysis, and how the analysis has been performed using this data, we ensure the reliability of this study.

5.4 Limitations

It is important in empirical research to get accurate statistical inference and two of the challenges to this is the possibility of errors being correlated within cluster (Cameron, Gelback, & Miller, 2011) and the concern of high correlation in the x variable of interest and little change in the y variable (Clarke & Schythe, 2020). This is an important issue as failure to control for clustering leads to under-estimated standard errors and therefore over-rejection using hypothesis tests (Cameron et al., 2011). This is because the smallest changes in standard errors can have large effects on statistical inference. It is therefore important that we account for the within-cluster correlation when conducting inference. This is usually done by allowing for within-cluster autocorrelation by using cluster-robust variance-covariance estimator to estimate standard errors and confidence intervals (Clarke

& Schythe, 2020). We account for this by using the *coefstest* function in R.

The main limitation of our event study is the different observation windows we have for the different companies. For some of the companies, we do not have data for three years before the crime, three years after the crime, or the observations from all the years the crime was committed. This implies that the coefficients closest to the event will be better identified than the coefficients at the ends of the event window.

6 Analysis

In this section, we will describe the empirical findings of our analyses. We will evaluate the relationship between corporate governance features and the initiation and conviction of crime, after analyzing using a difference in difference analysis and event study. The results of the event studies are given in sections 6.1 and 6.2. To further validate the analyses, we will see if the pre-trend assumption is valid in all the analyses and discuss the implications of it as we present our results. In section 6.3 we present a robustness check of the analyses.

Depending on the data availability the different analyses are based on a different number of observations and companies. n indicates the number of companies and N indicates the number of observations used in the different analyses. The average time between crime and conviction is 4 years. This means that when we include 3 years prior and post event, the event studies for the crime period and the conviction date will have overlapping years. This implies that if the effect of the crime lasts longer than 3 years, this might also be measured by the conviction event study.

The estimates displayed in the plots in this section show the difference between the treatment and control group, with respect to the different corporate governance measures. We present the estimates for 3 years prior to the crime until 3 years after the crime. In addition, a 95% confidence interval is displayed.

6.1 Results When Crime is the Event

In this section, we will describe the results from the event study where the crime is the event. We will evaluate the significance and relevance of the results.

6.1.1 Change of Audit Firm

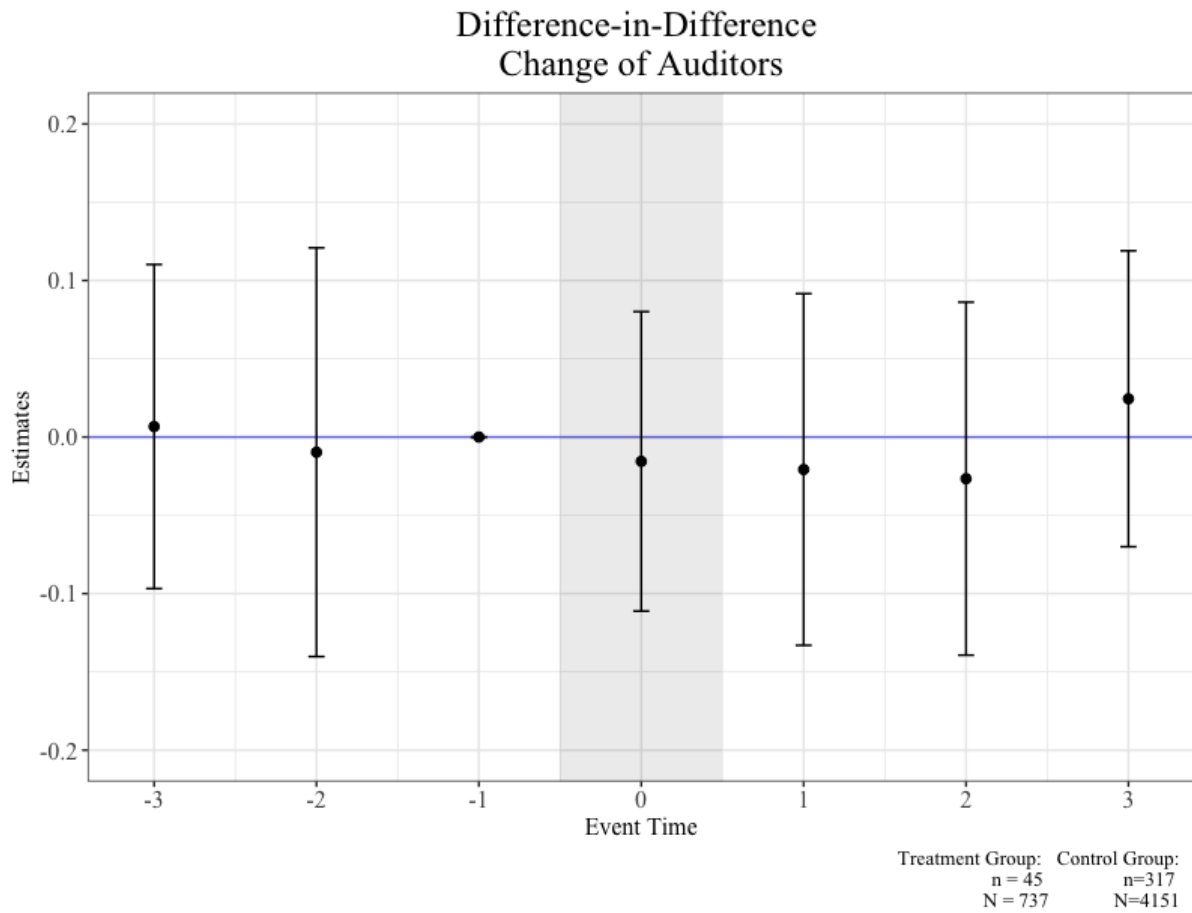


Figure 6.1: Event study for change in audit firm when the crime period is the event.

Since the estimates for the coefficients for the change of auditors in the years leading up to the crime are not significantly different from zero, we do not identify any pre-trends for the change of auditors. The difference-in-difference plot shows a small trend that crime convicted companies change auditor less frequently than the control companies the years after the crime. However, none of the estimates are significantly different from zero and we cannot with certainty confirm this trend.

6.1.2 Change of Board Members

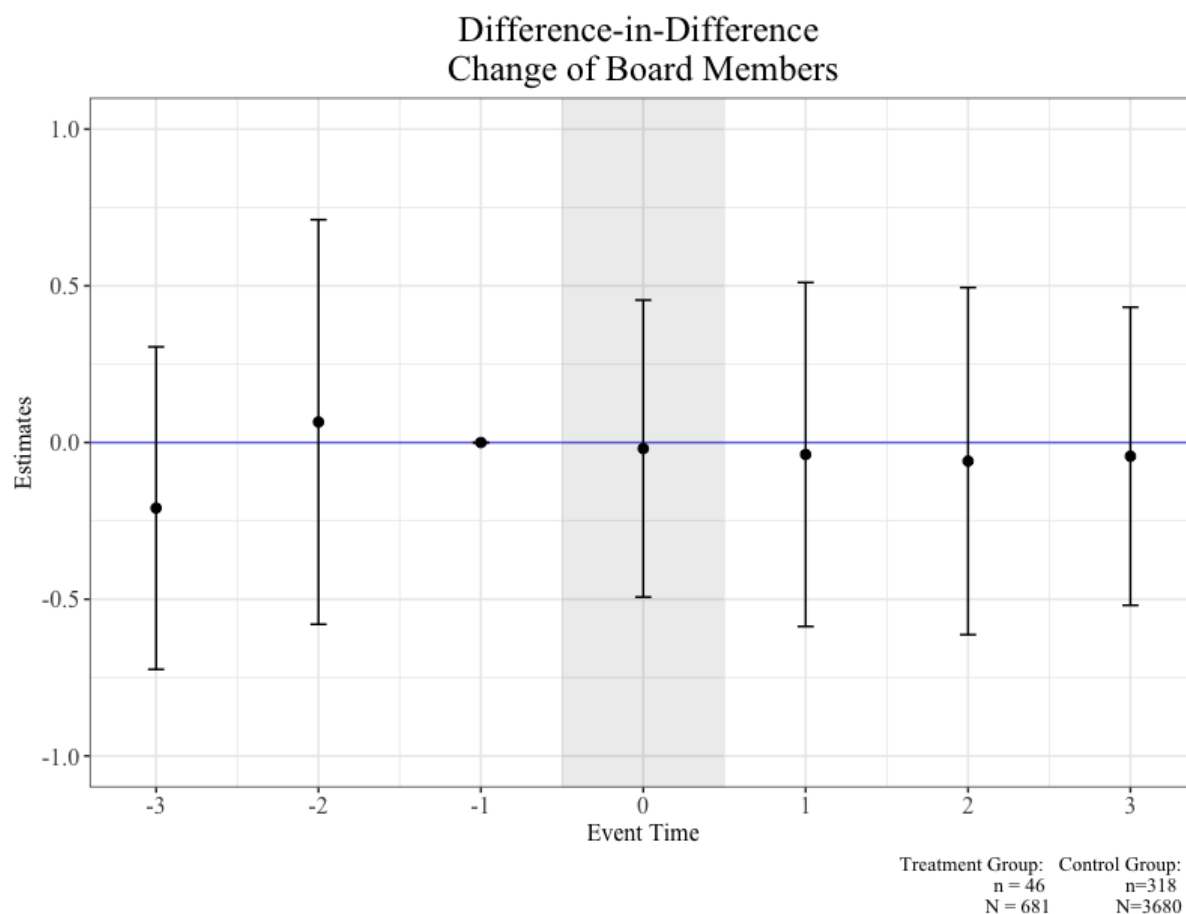


Figure 6.2: Event study for change in board members when the crime period is the event.

The pre-trend of the changes in board members indicates that there are no differences between the treatment and control companies prior to the crime initiation. The pattern in the years after the crime is seemingly alike for both the crime companies and the control companies, as the estimates are close to zero. This is confirmed as the estimates are not significantly different from zero. On the other hand, the difference in difference analysis gives indications that the crime companies had a trend of increased change of board members in the years prior to the crime compared to the control companies. However, during and after the crime they change board members at the same rate. This could indicate that leading up to the crime, the crime companies change their board members but keep a stable board after the crime to maintain a conservative leadership.

6.1.3 Change in the Share of Female Directors

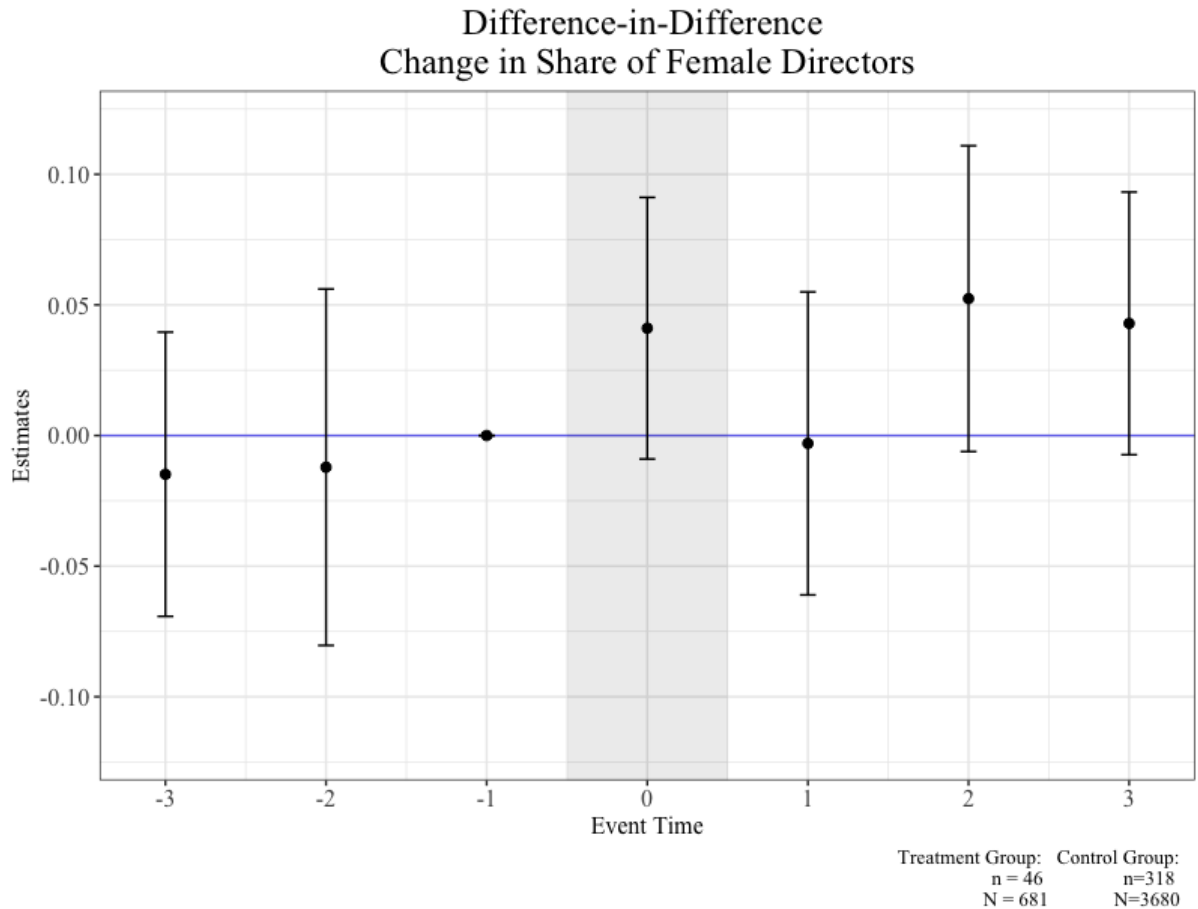


Figure 6.3: Event study for change in share of female directors when the crime period is the event.

The estimates for the coefficients for the change in the share of female directors in the years before the crime are not significantly different from zero and we do therefore not identify any pre-trends. The estimates for the coefficients for times two and three are 0.053 and 0.043 and significant at the 90% level. The increase in time two and three can be explained by the companies hiring new female directors after a crime. However, even though the estimate for time zero is not significant, we see indications that the crime companies have a higher increase in the share of female directors during the crime. The share then changes at the same rate as the control companies the first year after the crime. This indicates that female directors leave the board of companies after a crime has been committed. However, the estimates are not significantly different from zero, and we cannot with certainty state this.

6.1.4 Share of Tax Haven Subsidiaries

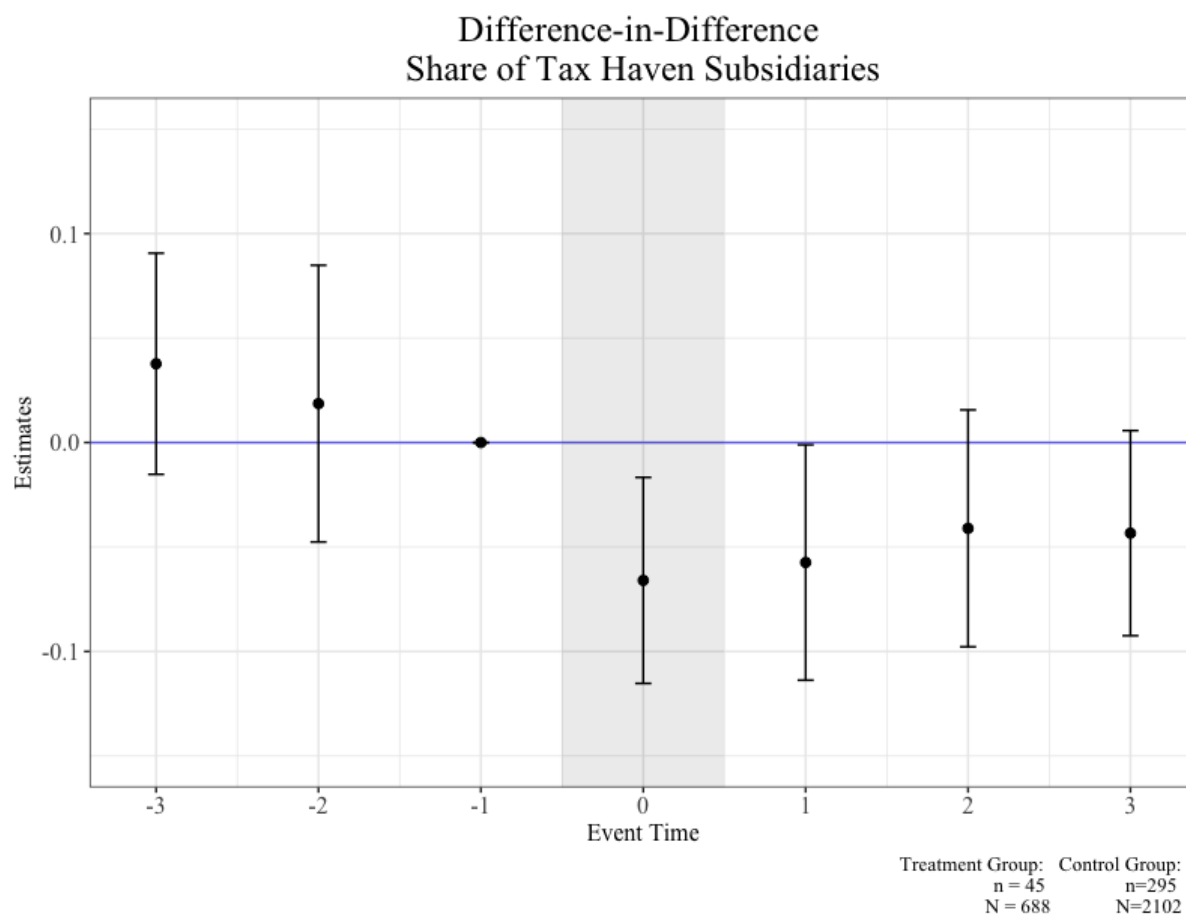


Figure 6.4: Event study for tax haven subsidiaries when the crime period is the event.

The pre-trend assumption also holds in this analysis as the estimates for the coefficients prior to the crime are not significantly different from zero. The estimates for the coefficients for time 0, the time of the crime, and the year after the crime are significant at the 99% level and 95% level with estimates of -0.066 and -0.057. The estimate for three years after the crime is significant at the 90% level with a corresponding estimate of -0.043. These results show that the crime companies have fewer tax havens than the companies in the control groups both during and the few years after the crime was committed.

6.1.5 Share of Secrecy Jurisdictions Subsidiaries

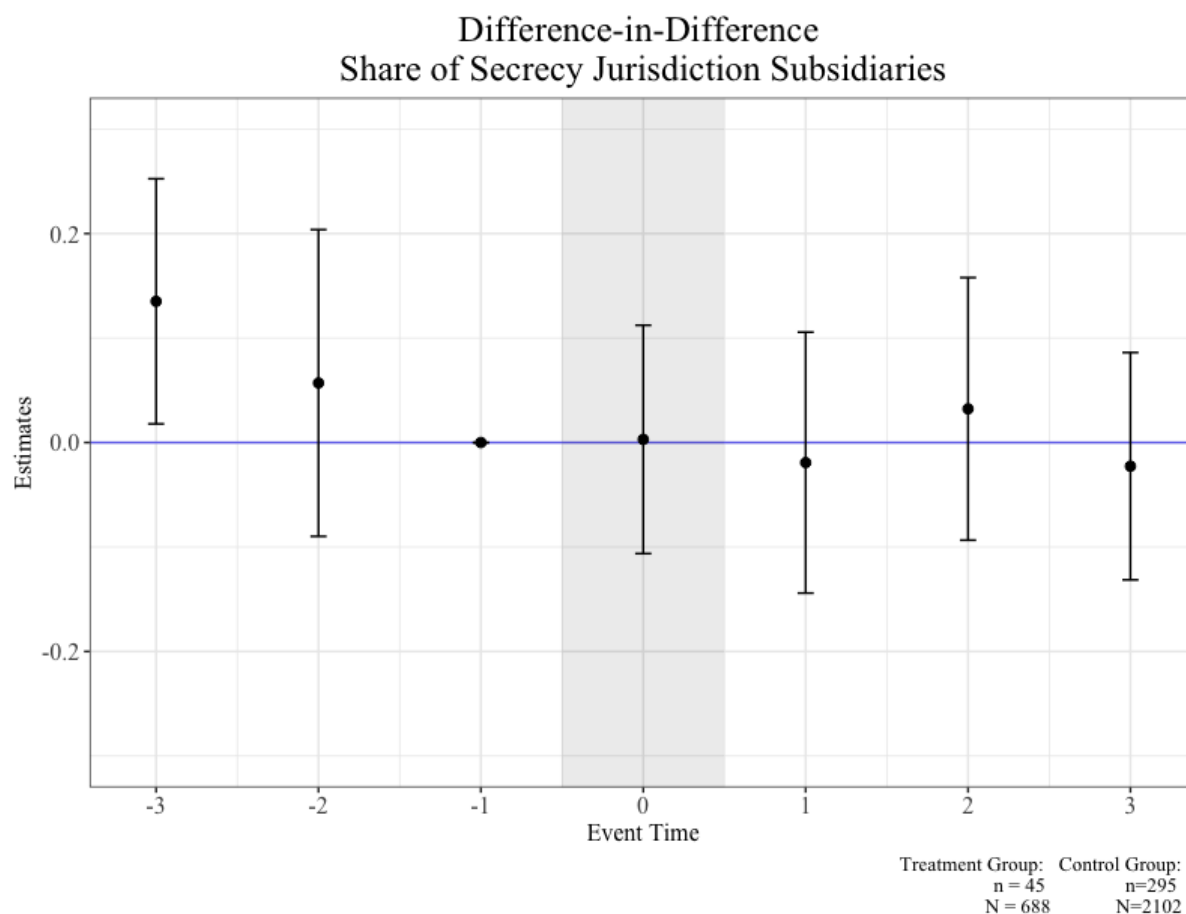


Figure 6.5: Event study for secrecy jurisdiction subsidiaries when the crime period is the event.

For the secrecy jurisdiction analysis, as the estimate for the coefficient for time three prior to the crime is significantly different from zero, the pre-trend assumption does not hold. This could indicate that there are trends in how the crime companies change their share of secrecy jurisdiction subsidiaries already before they committed the crime. However, the pre-trends are different from the trend after the crime. The pre-trend shows a pattern of decreasing share of subsidiaries in secrecy jurisdictions for the crime companies compared to the control companies prior to the crime, whilst the changes in secrecy jurisdiction subsidiaries during and after the crime do not show any significantly different patterns for the crime companies. Therefore, we do not find any evidence of a relationship between the share of secrecy jurisdiction subsidiaries and crime initiation.

6.2 Results When Conviction Date is the Event

In this section, we will describe the result when the conviction date is the event and see how a conviction affects the companies' behavior with regards to the different corporate governance features.

6.2.1 Change of Audit Firm

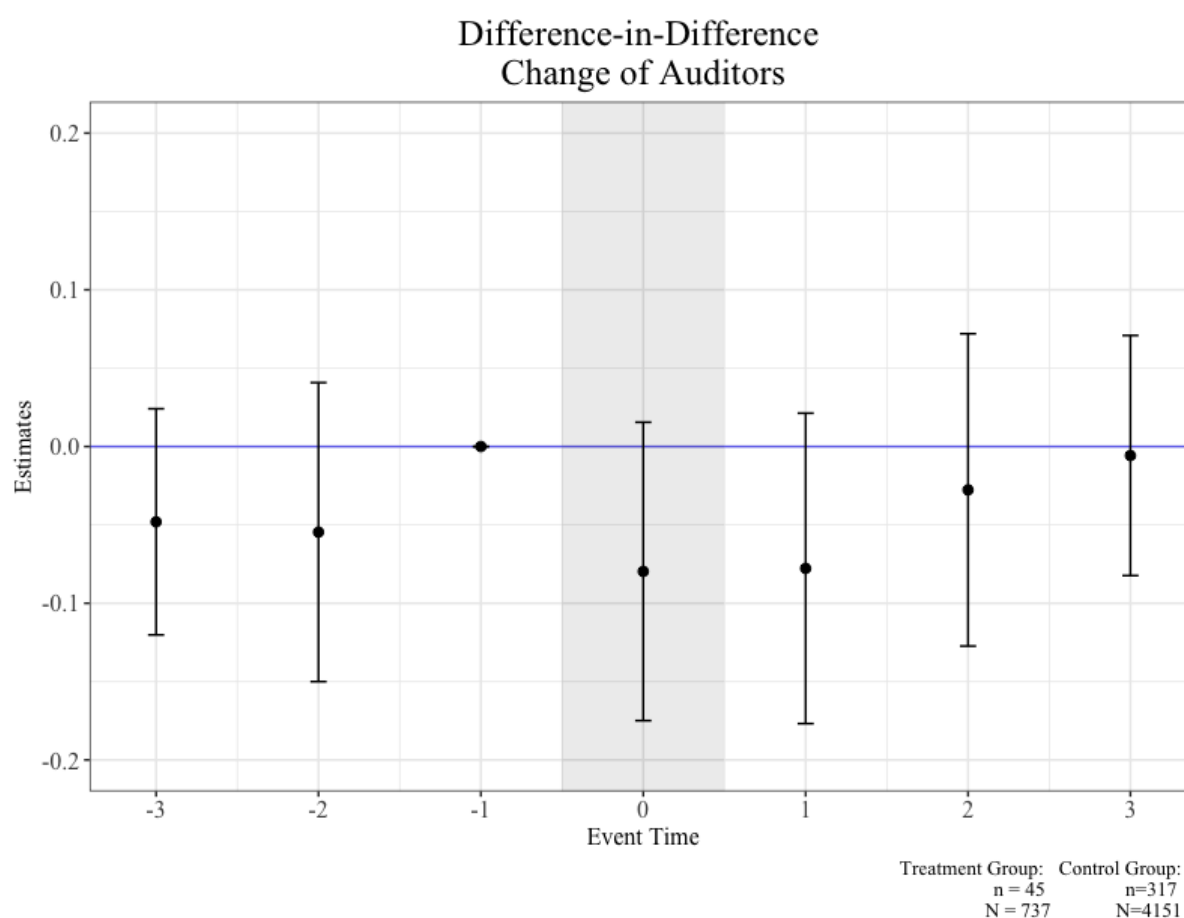


Figure 6.6: Event study results for change in audit firm when the conviction date is the event.

The pre-trend for change of auditors prior to the conviction of the companies' crime is not significantly different from zero, hence the pre-trend assumption holds. The estimates for the coefficients for time 0, the time of the crime, and the year after the crime indicate a pattern that the crime companies change auditors less frequently than other companies during the crime and the year after the crime. However, these estimates are not significant. Nevertheless, we can see a clear trend from the plot.

6.2.2 Change of Board Members

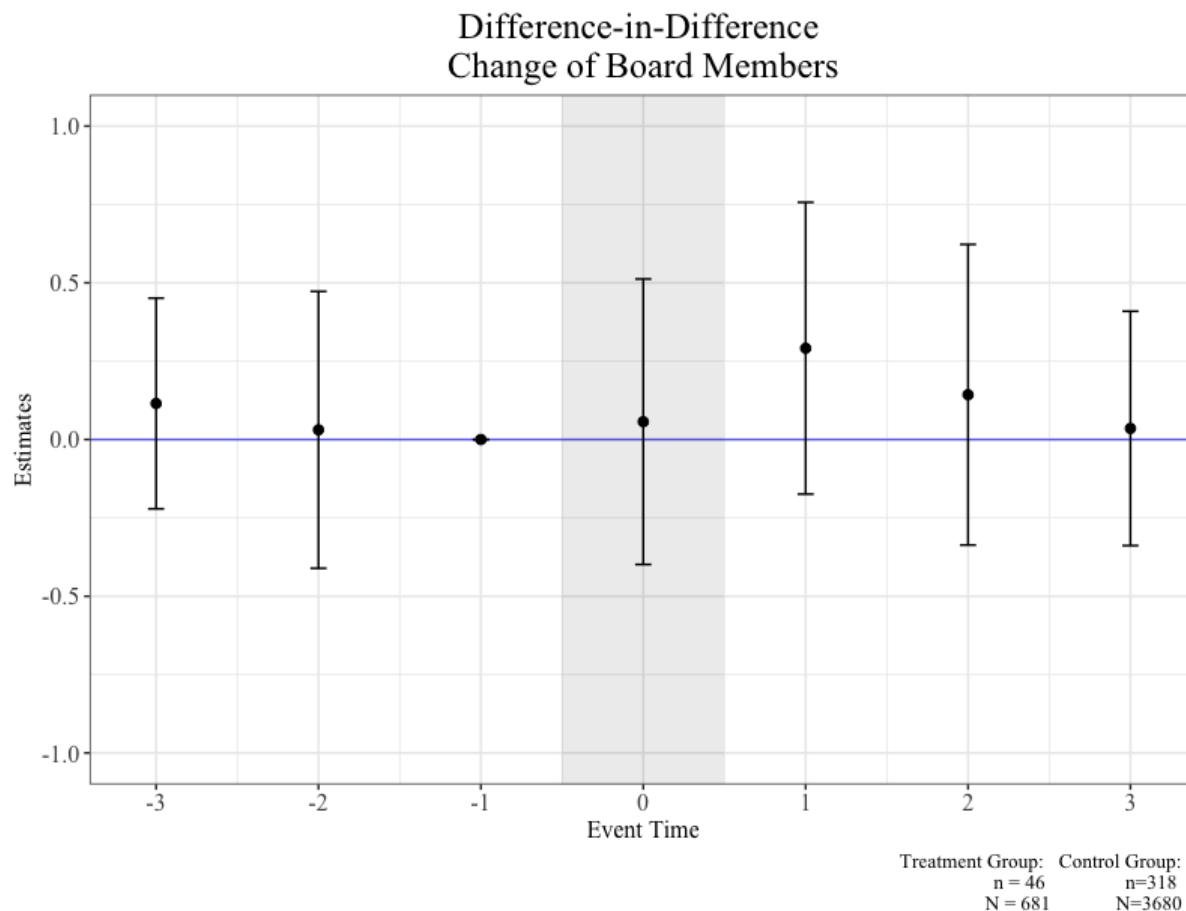


Figure 6.7: Event study result for change in board composition when the conviction date is the event.

The pre-trend for the change in board members is not significantly different from zero and does not indicate any differences in changes of board members prior to the crime conviction. The trend post-conviction gives indications that the crime convicted companies change board members more frequently one year after the conviction date, which is a reasonable consequence of the conviction. However, the results are not significantly different from zero and we cannot state confidently that this is the case.

6.2.3 Change in the Share of Female Directors

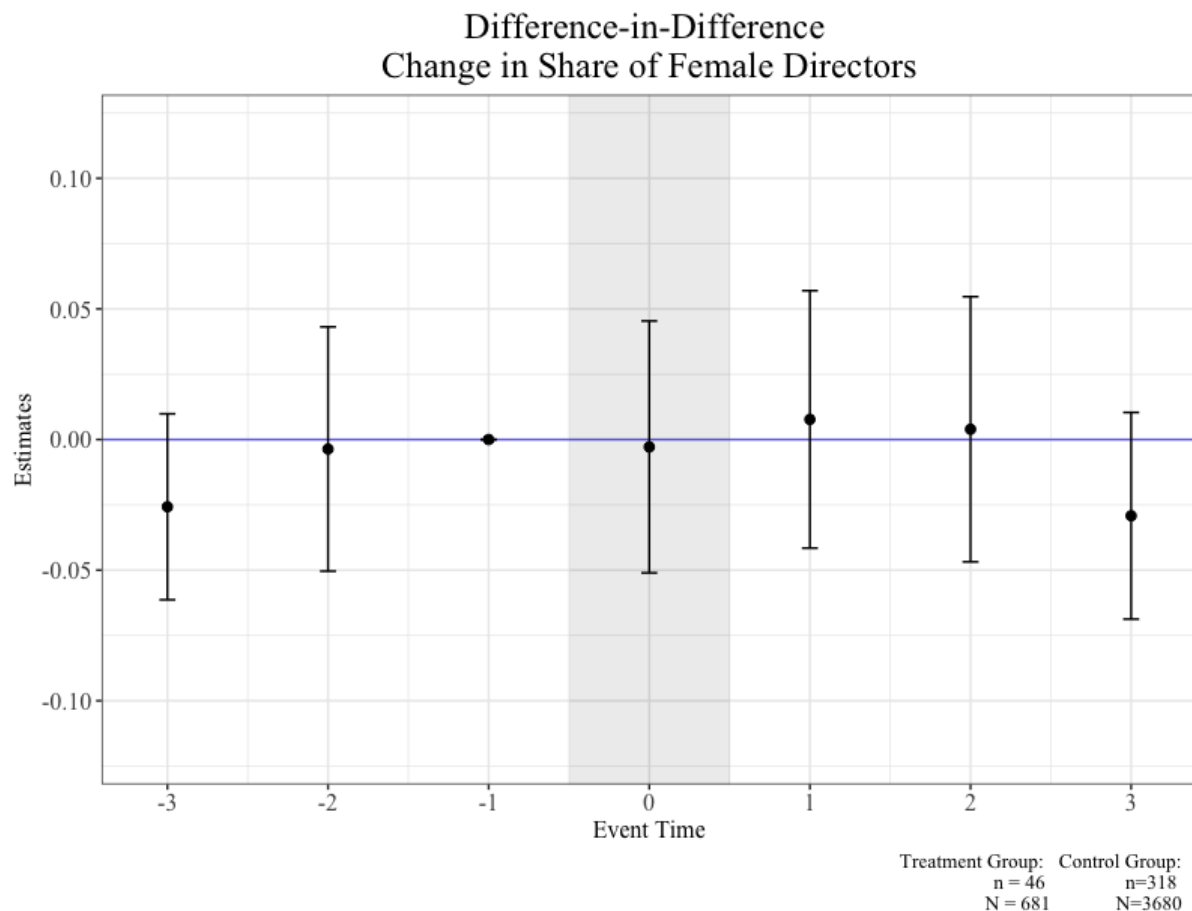


Figure 6.8: Event study result for change in share of female directors when the conviction date is the event.

The pre-trends for the change in the share of female directors are seemingly similar, and not significantly different from zero, so the pre-trend assumption holds. We see from figure 6.8 that the estimates for all time periods are close to zero, which indicates that there is a minor difference between the treatment and control group with regards to the change in the share of female directors following a crime conviction.

6.2.4 Share of Tax Haven Subsidiaries

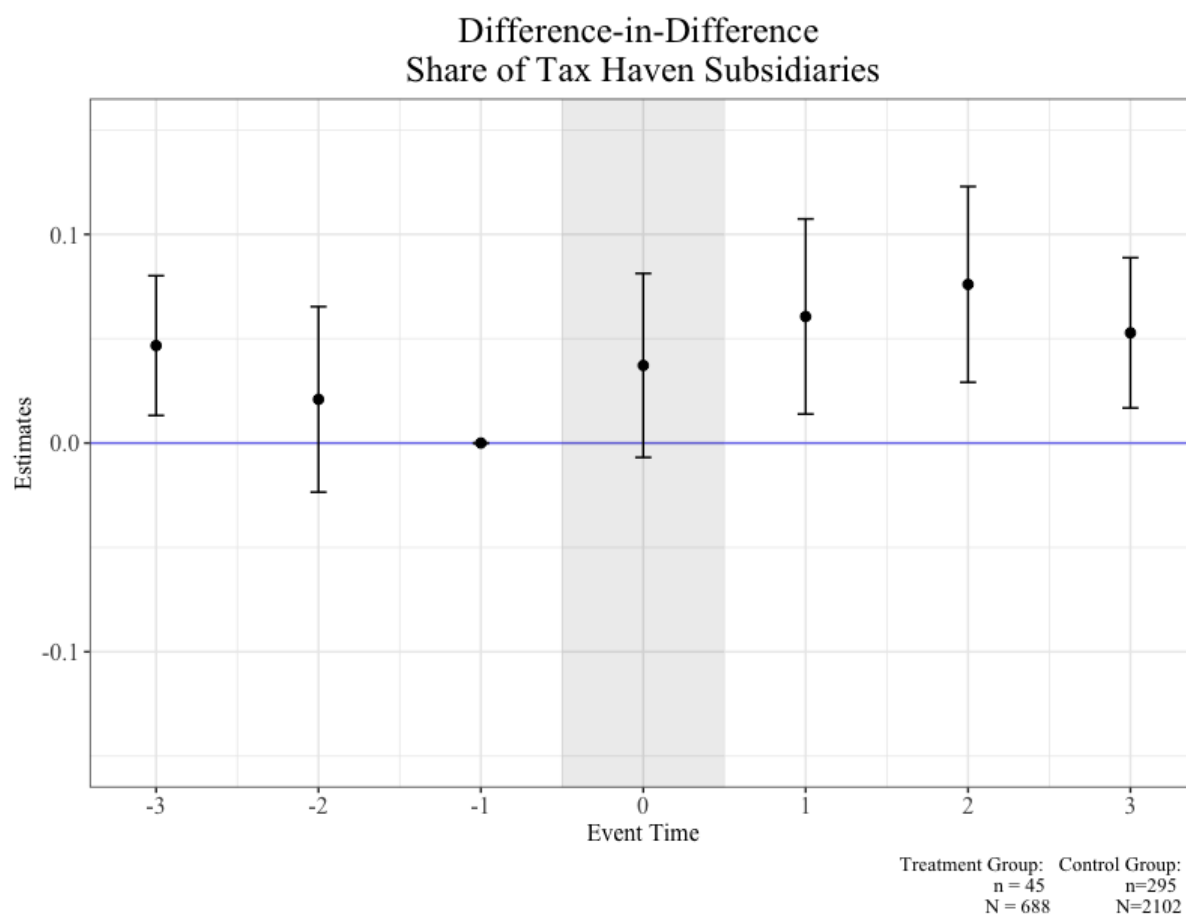


Figure 6.9: Event study for tax haven subsidiaries when the conviction date is the event.

For this analysis we see that the estimate for the coefficient for the time three years prior to the crime conviction is significantly different from zero, and hence the pre-trend assumption does not hold. This result could indicate that there are trends in how the crime companies change their share of tax haven subsidiaries already before they are convicted of the crime. However, we see from figure 6.9 that the pre trend indicates a decreasing trend in the share of tax haven subsidiaries for the crime companies relative to the control companies, whilst the trend after the crime indicates an increasing trend. The fact that the pre trend and the trend after the crime are different suggests that the trend of an increasing share of tax haven subsidiaries did not start before the crime. In addition, the estimates for the time of the conviction, and all three years after the conviction are significant. The estimate for the year of the conviction is 0.037 and significant at the 90% level. For the year after the conviction the estimate is 0.060 and significant at the 95%

level. Further, the estimates for two and three years after the conviction are respectively 0.076 and 0.053 and both significant at the 99% level. These results indicate that the companies who have been convicted of crime increase their share of tax haven subsidiaries during and after being convicted of a crime relative to companies who have not been convicted of crime.

6.2.5 Share of Secrecy Jurisdictions Subsidiaries

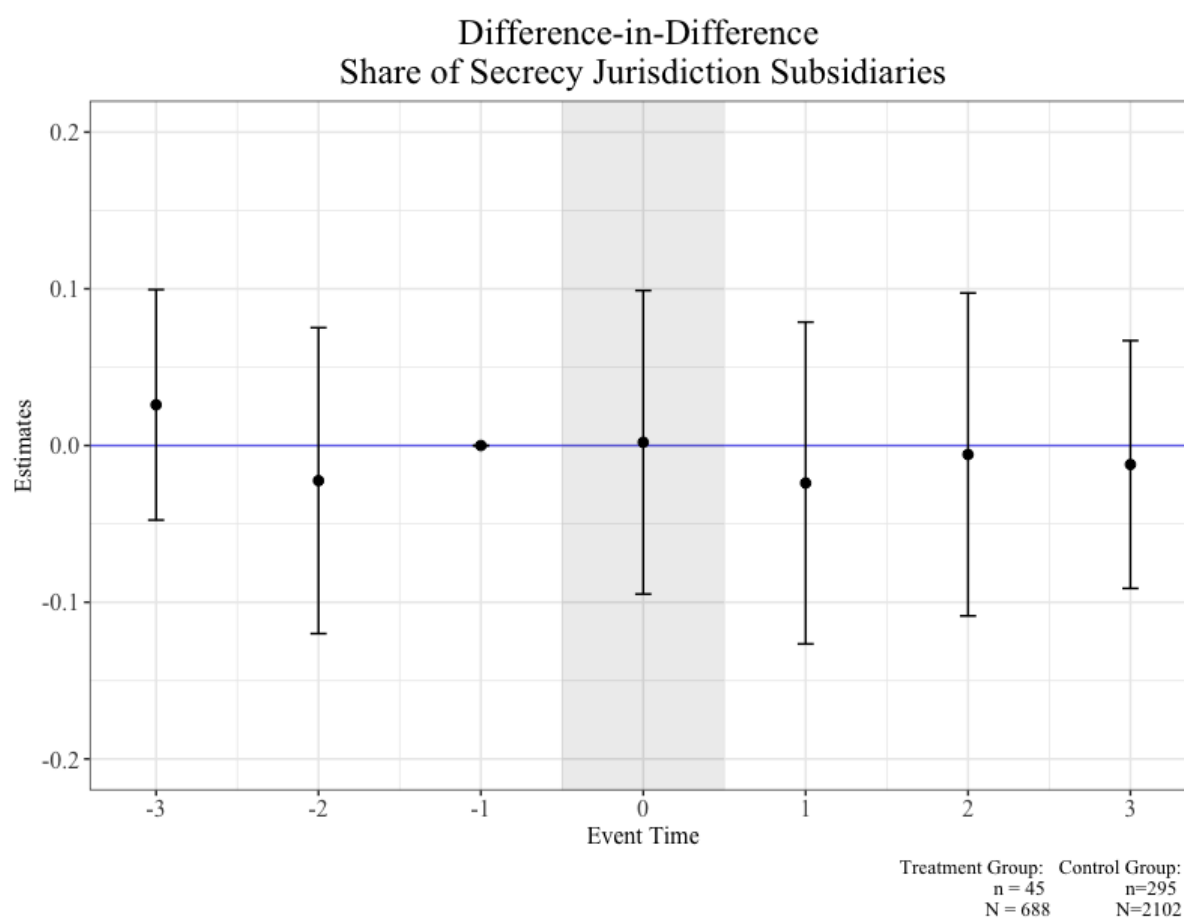


Figure 6.10: Event study for secrecy jurisdiction subsidiaries when the conviction date is the event.

The pre-trends for the share of secrecy jurisdictions prior to the companies' conviction of a crime fulfill the pre-trend assumption. The plots indicate that crime convicted companies have approximately the same share of subsidiaries in secrecy jurisdictions post crime conviction as companies who have not committed or been convicted of a crime.

6.3 Robustness Check

In this section, we will discuss the results of our robustness check that we perform to assess whether the results of our analyses are affected by changes in the sample. This is important with regards to our study having high validity. If the results from our analyses are sensitive to the sample being used, it is difficult to generalize these results beyond our study.

6.3.1 Dropping Observations Without Pre- and Post-Outcomes

The robustness check we perform is to exclude the companies where we do not observe pre and post outcomes after the events. We do this for both event studies, where the crime is the event and where the conviction is the event. With this test we can see if the unbalanced sample has any effect on the coefficients. This test will reduce the sample size as it is contingent that we have data for the complete timeline before, during and after the crime and conviction for the companies.

We can see from table 6.1 and 6.2 that the event study when conviction is the event is based on a lot more observations than the event study when the crime is the event. This is because this test is conditional on the observations of each company having a complete timeline and whilst the crime usually lasts between one and 15 years, the conviction is just one year. Therefore, for there to be a complete timeline for the crime event study we need to observe a longer series of years than we need for a complete timeline for the conviction event study, and therefore a lot fewer companies are included in the crime event study.

Results when Crime is Event

<i>Dependent variable:</i>					
	Auditors	Females	Members	TH	SH
	(1)	(2)	(3)	(4)	(5)
-3	-0.020 (0.085)	-0.017 (0.027)	-0.781*** (0.282)	-0.024 (0.058)	0.161 (0.118)
-2	0.008 (0.105)	-0.007 (0.034)	-0.102 (0.348)	0.026 (0.071)	0.081 (0.144)
0	-0.010 (0.084)	0.028 (0.027)	-0.430 (0.274)	-0.135** (0.057)	0.001 (0.116)
1	-0.023 (0.106)	0.009 (0.034)	-0.690** (0.349)	0.006 (0.073)	-0.269* (0.149)
2	0.017 (0.106)	0.047 (0.034)	-0.348 (0.349)	0.069 (0.073)	-0.363** (0.149)
3	-0.013 (0.080)	0.022 (0.027)	-0.530* (0.276)	-0.184*** (0.059)	-0.463*** (0.119)
n	66	62	62	19	19
N	1173	992	992	312	312

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 6.1: Robustness check when pre- and post- outcomes are excluded, and crime is event.

Results when Conviction is Event

<i>Dependent variable:</i>					
	Auditors	Females	Members	TH	SH
	(1)	(2)	(3)	(4)	(5)
-3	-0.018 (0.039)	-0.002 (0.025)	0.195 (0.222)	0.027 (0.048)	0.208** (0.096)
-2	-0.021 (0.052)	0.008 (0.032)	0.081 (0.288)	0.021 (0.061)	0.042 (0.123)
0	-0.056 (0.052)	0.007 (0.032)	0.361 (0.288)	0.001 (0.061)	0.028 (0.123)
1	-0.045 (0.052)	0.030 (0.032)	0.383 (0.288)	0.028 (0.062)	0.042 (0.124)
2	0.010 (0.052)	0.036 (0.032)	0.205 (0.288)	0.052 (0.062)	0.035 (0.123)
3	0.024 (0.040)	-0.011 (0.025)	0.026 (0.225)	0.026 (0.052)	-0.139 (0.103)
n	194	138	138	34	34
N	3311	2107	2107	558	558

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 6.2: Robustness check when pre- and post- outcomes are excluded, and conviction is event.

When the crime is the event, we see that some of the time periods for the change of board members and change in secrecy jurisdiction subsidiaries become significant which contrasts with the results previously. In addition, the estimates for the change in share of female directors are no longer significant. The results for change of auditors and change in share of tax haven subsidiaries yield approximately the same results as previously.

When the conviction is the event, we see that the previously significant results for the tax haven analysis are no longer significant. The results for change of auditors, female directors, board members and share of secrecy jurisdiction subsidiaries yield approximately the same results as the main analysis.

This robustness check shows that some of the analyses are weak for changes in the sample. This is especially true for the event study where the crime is the event. However, we can see that the sample size is reduced dramatically from 340 companies to 19 in the robustness check for tax havens and secrecy jurisdiction and from 364 to 62 in the change of female directors and board members analysis. This could certainly be the reason for the robustness check resulting in less significant results. For the event study when the conviction is the event the sample size for the tax haven analysis is reduced from 340 to 34 and may be the reason for changes in the significance of the estimates. However, for the change in auditor, female directors and change in board members the sample size is not reduced as dramatically and yields the same results as previously.

7 Discussion

In this section, we discuss the results of our analysis and elaborate on how they can be interpreted. First, we discuss the results of our hypotheses and considering them in the context of previous research. Further, we propose several theories as to why we get these results. Secondly, we discuss how the results of all the hypotheses can be interpreted collectively. Thirdly, we propose a hypothesis for why there are few significant results and unexpected relationships between corporate governance features and crime. We then consider how data availability could be connected to crimes and secrecy and discuss the different implications of our thesis. Finally, we highlight some limitations of the thesis and propose ideas for future research.

To answer our research question of "*Do corporate governance features relate to crime?*" we will discuss the outcome of our five hypotheses:

Is there a relationship between the changes in audit firm, the change of board members, the change in the share of female directors, the share of tax havens and secrecy jurisdiction subsidiaries and crime?

7.1 Hypotheses

Hypothesis 1: *There is a Relationship Between the Change of Audit Firm and Crime*

For the change of auditors, previous literature gives inconclusive indications of how companies who want to commit crime might exploit changes in audit firms for their benefit. However, research on the reputational benefits of keeping an audit firm suggests that crime companies could want to have longer audit firm tenures for higher credibility of their financial statements (Corona & Randhawa, 2010). Because of the inconclusiveness regarding the consequences of auditor changes in the literature, we wanted to investigate if companies that commit crime change audit firms more or less frequently than companies that do not commit crime during crime initiation and conviction.

Our results give no indications that the change of audit firm is related to crime initiation. After and during the crimes the treatment companies seem to switch auditors at approximately the same rate as the control companies. As mentioned earlier, the goal of an audit is to both prevent fraud and certify the credibility of the annual report and accounts, and if the companies commit crime in ways that the auditors cannot discover through their regular work tasks, the relationship with the audit firm could be irrelevant for the initiation of crime. This is substantiated by the fact that the employees are the group most likely to discover fraud (Albrecht et al., 2019) and that both analysts and industry regulators discover more frauds than auditors (Dyck, Morse, & Zingales, 2010). For example, companies could hide their criminal activities from the auditors by using off-book accounts.

Another possible reason why we do not discover a relationship with crime is that there could be different relationships between auditor changes and crime for each company which makes it harder to find a trend in the data. This implies that the involvement of the auditor in the crime could affect how companies behave with regard to changes in auditors when initiating crime. Even though the literature is inconclusive in how often companies should change auditors if they want to hide crime, there are many cases where it has been revealed that auditors are involved in crimes. Our sample includes firms that are essentially audited by the Big Four accounting companies, and these are all companies that have been involved in some type of fraud (Faceless Compliance, 2020). It could therefore be that some companies change auditors often when committing crime, because of the fear of being detected, whilst some companies change rarely if the auditors are enabling or helping with the crime. Hence, if there is not just one relationship in how crime companies change their auditors this can affect our results.

On the other hand, when looking at the conviction date as the event, even though the estimates are not significant, our result indicates that there is a relationship between auditor changes and crime conviction. The crime companies change auditor somewhat less frequently than the control group at the time of conviction and the year after. They then seem to change auditors at the same rate as the control group in the later years. As presented in the literature review, Widyaningsih et al. (2019) found that voluntary audit

firm changes lead to increased audit quality. As there are no requirements on audit firm rotation in the US, a change in audit firm is voluntary. Firms who commit crime might only change audit firms when the audit firm discovers and reports their crime, and do not behave in a way that benefits the company. So, if the audit firm is not responsible for the company being convicted of the crime, the company might want to keep their auditors to ensure the same audit quality that has been. Because of this, they might change audit firms less frequently than the control group. Such an interpretation is supported by evidence from Corona et al. (2010). They found that financial statement credibility increases with audit tenure despite a decrease in quality and therefore if the audit firm is not the reason for a companies' conviction, a company wanting to conceal crime could benefit from keeping the same audit firm.

Hypothesis 2: Increased Board Turnover Increases the Possibility of Crime.

Previous literature indicates that the board of directors can be related to crimes in multiple ways but is inconclusive in exactly how. There are, however, indications that staggered boards are related to crime initiation and that high board turnover is related to crime conviction. Therefore, we wanted to research if changes in the board are related to crime initiation and crime conviction.

For the event study on the crime, even though the estimates are not significant, the results indicate that there is not a clear relationship between changes in board members and crime initiation. However, crime companies change board members at an increasing rate compared to the control group in the years prior to the crime. Furthermore, during and after the crime, both groups seem to change board members at the same rate. The change in the pattern for board change could indicate that during and after a crime, companies keep a more stable board composition to ensure that the crime stays undiscovered.

On the other hand, for the conviction event study, our results indicate that there is a relationship between changes in board members and crime conviction, despite the estimates not being significant. From the event study plot in figure 6.7 we see that the crime companies change board members more frequently than the control group the years after the conviction. This is in line with our hypothesis that increased board turnover

increases the possibility of crime, as companies who commit crime have a higher board turnover. This is also in line with Baum et al. (2016) and Marcel and Cowen (2014) who found that board turnover is higher when a lawsuit is settled than dismissed. They argue that the reason for this is that companies want to signal organizational legitimacy or that they impose sanctions on the board members that are associated with the crime. Our results substantiate this theory particularly as we only find indications of a relationship between changes in board members after the conviction of a crime and no relationship during the crime.

On the contrary, our results contrast with research done by Fich and Shivdasani (2007) who found no abnormal board turnover in the fraud firm after a financial lawsuit. The reason for the heterogeneity in the literature could be the difference in the types of crime investigated. In our study, we investigate a variety of crime types, from fraud to drug violations, whilst Baum et al. (2016) investigate securities fraud and Marcel and Cowen (2014) study fraud events. However, Fich and Shivdasani (2007) study financial misrepresentation, which is a much narrower type of crime. Therefore, the difference in conclusion between our thesis and the study by Fich and Shivdasani (2007) could imply that board turnover is different depending on the type of crime. For example, if a crime is done without the involvement of board members, the board turnover might not be affected. Crime types such as FCPA, Foreign Corrupt Practices Act, could require more authoritative people, such as board members, to be executed. On the other hand, crimes such as Food violations, would probably not require authoritative people to be accomplished. Therefore, as we analyze a broader set of crime types, we also capture the effects of other types of crime.

Furthermore, Fich and Shivdasani (2007) found that directors with multiple directorships experience a decrease in other board seats after a conviction of crime. Since we compare differences in treatment and control groups, the differences might not be captured if there are spillover effects. If there are many directors in our crime sample that have board seats in different companies in the same industry, our analysis captures this increase in changes of board members for both groups. Therefore, the actual differences between our treatment and control group might not be captured in the analysis.

Hypothesis 3: *Increased Share of Female Directors Decreases the Possibility of Crime.*

Previous research finds that just a small share of corporate offenders is female and that females both report more crime and increase corporate social responsibility (Steffensmeier et al., 2013; Gottschalk, 2012; Kaplan et al., 2009; Malerba, 2020). In addition, Gao et al. (2016) found that female directors are among those who are most likely to depart the firm after a crime, and hence we wanted to investigate how the change in the share of female directors is related to crime initiation and conviction.

With regards to the share of female directors, our results contrast our hypothesis that an increased share of female directors decreases the possibility of crime. The crime companies have a greater increase in the share of female directors during the crime than the control group. The change in the share decreases to the same level as the control groups the year after the crime period, whilst it increases in the following years. The estimates for the coefficients for time two and three after the crime, show that the increase is respectively 5% and 4% higher than for the control group. This contrasts with previous literature that indicated that more female directors would lead to higher corporate responsibility. However, our analysis shows that the companies who commit crime have a larger increase in the share of female directors during and after a crime. We do therefore not find any evidence that the female directors on the board change any part of corporate governance that is relevant for committing a crime.

However, there is a distinct decrease in the change in the share of female directors for the crime companies relative to the control companies in the year after the crime. This result could indicate that more female directors leave the board after a crime relative to the rate the crime companies usually have. This indicates that more females leave the board after a crime and supports the research of Gao et al. (2016).

On the other hand, when looking at the effect of the conviction of the crime, the trend in the change of crime companies' share of female directors is approximately the same as for the control group. This implies that we do not find any evidence that companies increase their share of female directors to increase corporate social responsibility following

the conviction of a crime.

Furthermore, one thing that can explain why we do not capture the effect as previous literature indicates is that our sample of crime committing companies generally do not have a high share of female directors. The mean share of female directors in companies in the US was 26% in 2019 (Catalyst, 2020), whilst in our sample the mean share of female directors in the board is 19% for 2019 and 15% for all years. This shows that there is in general a small share of female directors in our sample. In addition, research has found that there must be at least three women on the board of directors to change the dynamics of the board (Soledad, Vinsrygg, Summerfield, & Reingold, 2018). The mean number of female directors on the board in our treatment group is 2.34 for 2019 and 1.5 for all years. This number indicates a general increase in the number of female directors, but it is still less than what is recommended to influence board dynamics and therefore our research may not capture the same effect of female directors as previous research.

Hypothesis 4: *Higher Share of Tax Haven Subsidiaries Increases the Possibility of Crime.*

Hypothesis 5: *Higher Share of Secrecy Jurisdiction Subsidiaries Increases the Possibility of Crime.*

There has been little previous research into how changing the share of subsidiaries in tax havens and secrecy jurisdictions relates to the initiation and conviction of corporate crime. However, previous research indicates that there are high reputational concerns by using tax havens and secrecy jurisdictions (Graham et al., 2013; Akamah et al., 2018). Because of the negativity surrounding the use of subsidiaries in these jurisdictions we wanted to investigate if the timing of the acquisition of tax havens and secrecy jurisdictions subsidiaries are connected to the crime initiation or conviction.

Our results contrast our hypothesis that a higher share of tax haven subsidiaries increases the possibility of crime. The results show that crime companies have a smaller share of tax haven subsidiaries during and after the crime compared to the control group. The crime companies have on average 6.6% and 5.7% fewer tax haven subsidiaries than the control group in these periods. Therefore, our results indicate the opposite of expected

and disproves our hypothesis that a higher share of tax haven subsidiaries increases the possibility of crime. In contrast, companies who commit crime have a higher share of tax haven subsidiaries than the control group during and after the conviction. These results are more in line with our hypothesis. During the year of conviction, the crime companies have on average 3.7% more tax haven subsidiaries than the control group, whilst for the periods after the conviction this number is respectively 6%, 7.6% and 5.3%. The results for the event study on crime indicate that companies do not acquire tax haven subsidiaries to commit crime. Tax havens are therefore not necessarily essential in either enabling or concealing a crime. Furthermore, the results for the event study on conviction contrast with indications from previous literature. If there are high reputational concerns by using tax havens subsidiaries, we would think following the crime conviction, to recover the company's reputation, companies would not immediately start to increase their share of tax haven subsidiaries. However, our results indicate that companies may be indifferent about the reputational concerns of tax havens following a crime conviction.

With regards to the share of secrecy jurisdiction subsidiaries, our result shows that there is no relationship between the share of secrecy jurisdiction subsidiaries and crime and hence disproves our hypothesis. The result indicates that the crime companies have a similar share of secrecy jurisdiction subsidiaries as the control companies regarding both the crime period and the conviction. One explanation for why we do not get any significant results for the analysis on secrecy jurisdictions is that companies that commit crime have a significant number of subsidiaries in these jurisdictions all the time, and that the acquisition of such subsidiaries is not related to crime initiation or conviction. The mean share of secrecy jurisdiction subsidiaries for all companies and all years is 47% for the treatment group and as high as 54% for the control group. This shows that secrecy jurisdictions are used to a large extent and might not be exploited to enable and conceal crime.

Another explanation for these results is that companies do not take advantage of these jurisdictions or that the type of crimes in our sample do not need such structures to be committed. For example, our sample includes crimes such as FDCPA, Fair Debt Collection Practices Act, and violations and criminal violations of federal food safety laws

which are crimes where secrecy jurisdictions and tax havens would not facilitate the crime. On the other hand, our sample includes crime such as fraud where one would think tax havens and secrecy jurisdictions could facilitate the crime. As our sample includes such a variety of crimes, where the use of tax havens and secrecy jurisdictions might be different depending on the type of crime, our analysis might not capture the effects.

In addition, as mentioned previously, there is a low detection rate for corporate crime (Banerjee, 2015). It could therefore be conceivable that companies who use secrecy jurisdictions and tax havens to conceal crime are often not caught and that because of this our analysis cannot capture the actual relationship between tax havens, secrecy jurisdictions and crime.

7.2 Interpretations

To answer our research question of “*Do corporate governance features relate to crime?*”, we have now explored and discussed how five different features of corporate governance relate to crime initiation and crime conviction. We find that changes in the share of female directors and in the share of tax haven subsidiaries relate to crime initiation, whilst changes in audit firm, changes in board members and the share of tax haven subsidiaries relate to crime conviction. We do not find any evidence that the share of secrecy jurisdiction subsidiaries is related to crime in either way. Nevertheless, our results show how different corporate governance features can relate to crime.

The results of our analysis could be used to elaborate on theories suggested in previous literature. As mentioned previously, there have not been many investigations on the casual relationship between these corporate governance features and crime. However, one of the features which has been investigated to some extent is board turnover and the relationship with crime conviction. Some of the theories that have been proposed in previous literature are that high turnover following a conviction is the result of companies wanting to signal organizational legitimacy (Baum et al., 2016) or that it arises as the companies want to impose sanctions against those associated with the crime (Marcel & Cowen, 2014). As we have considered multiple corporate governance features and their changes following the

conviction of a crime, we can consider these theories further to see whether companies try to signal organizational legitimacy or impose sanctions.

As our results show that there is increased board turnover after a crime conviction, our thesis supports these theories. However, in contrast to this, our results for the share of tax haven subsidiaries indicate that companies are indifferent about the negative reputational concerns of the use of tax haven subsidiaries after a conviction, and therefore do not try to signal organizational legitimacy. In addition, we find no evidence of an increase in female directors following the conviction, which could also indicate higher corporate social responsibility (Malerba, 2020). Consequently, our results favor the theory that higher board turnover following the conviction of a crime can arise as the companies impose sanctions on those who are associated with the crime.

One of the most important interpretations of our results for the relationship between corporate governance and crime is that this relationship is highly dependent on the type of crime committed. From the discussion on the analyses for auditor change, board member changes and tax havens and secrecy jurisdiction subsidiaries this is a proposed theory. This follows from how our sample of crime convicted companies consists of a variety of different crimes and how our results contrast to previous literature and indicate from previous literature.

7.2.1 No Legislative Requirements

The different features of corporate governance that we have investigated are elements that were not restricted in any way by law at the time of the crimes. There were for example no laws that regulated how often companies had to change audit firms, how many female directors they were required to have or how often they had to make changes in the board members. In addition, the use of tax havens and secrecy jurisdictions remains legal. Hence, these features are not in themselves illegal, but they can be used to enable and conceal crimes.

Our results indicate that companies that commit crime do not change their behavior as expected after being convicted of a crime. This follows from the fact that companies change

auditors less frequently and acquire more tax haven subsidiaries after being convicted of a crime. One interpretation of this result is that as these features are not illegal, companies might not see any reason to change their behavior even though they were convicted of a crime. This can reflect the morals of a company and how their morals might not change even though they were convicted of a crime.

7.2.2 Data Availability and Secrecy

In the process of getting data through a web scraper we became aware of ample elements that made it difficult to automate the process of extracting data from 10-Ks. The 10-K requires firms to report certain information so that investors and others can be fully informed of the firms' activities. However, the way the companies report this information is not always standardized. For companies where it was difficult to extract information, it was often difficult for all years for that company. These companies structured their reports in different ways than the majority of other companies. There can be several reasons why a company would do this. For example, ignorance of how other companies did it. However, a more realistic theory as to why companies would do this is doing it on purpose.

Different structuring made it hard to extract information from 10-Ks by for example having pictures of the audit firms' signature, not signing the auditor's report or incorporating exhibits or reports by reference, and not including them in the 10-K. Structuring of the exhibit 21's that made it hard to extract information was for example using parentheses, unstructured lists instead of tables, and aggregated country names. These are measures that make it difficult to scrape information automatically and can easily be implemented by the firms. It is therefore very easy for the companies to make information less available for outsiders and if they wanted to hide something and make it more difficult for outsiders to know exactly what the company is doing, this is one way of accomplishing that.

7.3 Implications

Our research provides new and much needed insight into the relationship between corporate governance and crime. In some cases, our research confirms the indications that previous

literature gives regarding how crime companies might want to structure their corporate governance to enable and conceal crime. For instance, our results confirm that crime companies change board members more frequently after a crime. On the other hand, our results also suggest that companies do not always act in the manner that is expected and could use other methods that enable them to commit crime. For example, our results suggest that having female directors does not necessarily lead to less crime, even though research has found that female top-leaders lead to an increase in corporate social responsibility (Malerba, 2020). In addition, crime companies' use of tax havens is counterintuitive as they have a smaller share of tax haven subsidiaries when committing crime, in addition to acquiring more subsidiaries in tax havens after being convicted.

As our results both confirm and deviates from previous literature, an implication of our research is that there is a need for more investigations into how we can characterize companies who commit crime. In addition, even though we have highlighted how a selection of corporate governance features are related to crime, some of the results are unexpected and counterintuitive. For example, how secrecy jurisdictions subsidiaries are not related to crime. An implication of our thesis is hence that more features of corporate governance should be investigated in relation to crime. Furthermore, our research highlights how companies might not care about signaling organizational theory following the conviction of a crime. An implication of these results is that there is a need for further measures that ensure companies' compliance with the law after a conviction. Lastly, one of the most important implications that emerge from our discussion is that different types of crime have different ways of enabling and concealing, and there is a need for more specific investigations into each type of crime.

7.4 Limitations

In this section, we will consider the limitations of our study. The analysis and results heavily depend on the quality of the data used and it is therefore important to consider the weaknesses and limitations of our data. We will elaborate on the limitations of our paper caused by weaknesses in the data and the data extraction.

7.4.1 Underdetection of Corporate Crime

To achieve reliable results, it is important to have a sample that is accurate for the whole population that is under investigation. The main problem when analyzing companies who commit crime is the low detection rate of these crimes. Because of this, it is hard to be sure of the share of corporate crime cases that are discovered and convicted. If the detection rate is extremely low, it might be that companies who are able to conceal their crime use other methods than the companies in our sample, that are discovered.

7.4.2 The Nature of Textual Data Analysis

Due to the nature of textual data analysis, we are not able to capture all the details in the data that we want to extract. We gather data using web scraping, and this method depends on the structure of the website. The data is extracted from the unique website for the yearly 10-K form for all the companies. However, even though the structure of these sites is supposedly standardized, our analysis reveals that they are often not. When these sites are not standardized it makes web scraping cumbersome as it is harder to extract data based on a general code pattern. Even though the documents we read exist and are readable, different formulations and different structures apply to the documents and might not fit into the general pattern of the web scraper.

When using a web scraper, we get character strings that we use further in our analysis. However, if there are spelling errors or other inconsistencies in the documents, the quality of the output is not optimal. The unstandardized appearance of documents generated by different companies requires the search of unique patterns and the errors and inconsistencies make it harder to retrieve the same information from all documents. By inspecting different companies' filings, we discovered several repetitive patterns that the web scraper looks for, but a good amount of trial and error is needed to obtain a perfect output and capturing all patterns. The purpose of using textual data analysis is to be able to read and extract relevant information automatically from a large set of documents. However, because of inconsistencies, we cannot exclude the possibility of data loss in the automatic reading of the documents.

7.4.3 Auditors

One example of inconsistency is that we extract the company's auditor from a part of the form that is called "Report of Independent Registered Public Accounting Firm" by the SEC. However, in the 10-Ks this section is called numerous variations of this title. By trial and error, and checking random samples, we have managed to include many of these variations in our web scraper. However, there are reasons to believe that some formulations escape the web scraper and that we will lose some observations that are present, but not found.

7.4.4 Board Members

When extracting the names of the board members, spelling mistakes are revealed across several documents. One common spelling mistake is that two letters have changed position. Another common case of spelling issue is a difference in how the names are abbreviated over time. These differences will for example generate an extra change of board composition, when the reality is that the board member is the same as for the previous year.

Due to the nature of the web scraper, some noise is extracted from the 10-Ks. The purpose of the cleaning process is to remove all noise. However, some noise will still survive the cleaning. When the board names are matched to the gender dataset, this noise could be incorrectly matched to a name and receive a gender. An example is the state "North Carolina" that receives the gender male based on the first name "North". In instances like this, we must weigh whether the advantage of retaining more observations outweighs the disadvantage.

7.4.5 Subsidiaries

Another known limitation in the data is that the location of the subsidiaries is inconsistently reported. For example, the same country could be reported with different names. England is a victim of this type of inconsistency, as it can be referred to as for example UK, Britain and The United Kingdom. To counteract this issue, we added the variations of countries that appeared to have several names to our ISO-code dataset and gave the

different variations of the same country the same ISO code.

Another limitation of the subsidiary analysis is the choice of tax havens and secrecy jurisdiction in the analysis. We have used the top 10 most prominent countries, but the full list of tax havens is 70 havens, and the full list of secrecy jurisdictions is 133 jurisdictions. Because of the length of these lists, using the full length could give misleading results. In addition, the tax haven status is usually stable (OECD, 2000) and there are usually small changes from year to year in the index. However, an improved study could be done using correct yearly lists of tax havens and secrecy jurisdictions and other cut-offs for the number of countries to use.

7.4.6 Missing Filings

We experience a lack of filings in the early years of our observation window. This is explained by the fact that some companies were not listed on the stock exchange at time t . The lack of filings is observed in a greater manner for the control companies. The control groups were generated based on similarities as of today, and therefore, we do not have any assurance that they existed at the time of the crime. To counteract for this uncertainty, we included several control companies in the control groups.

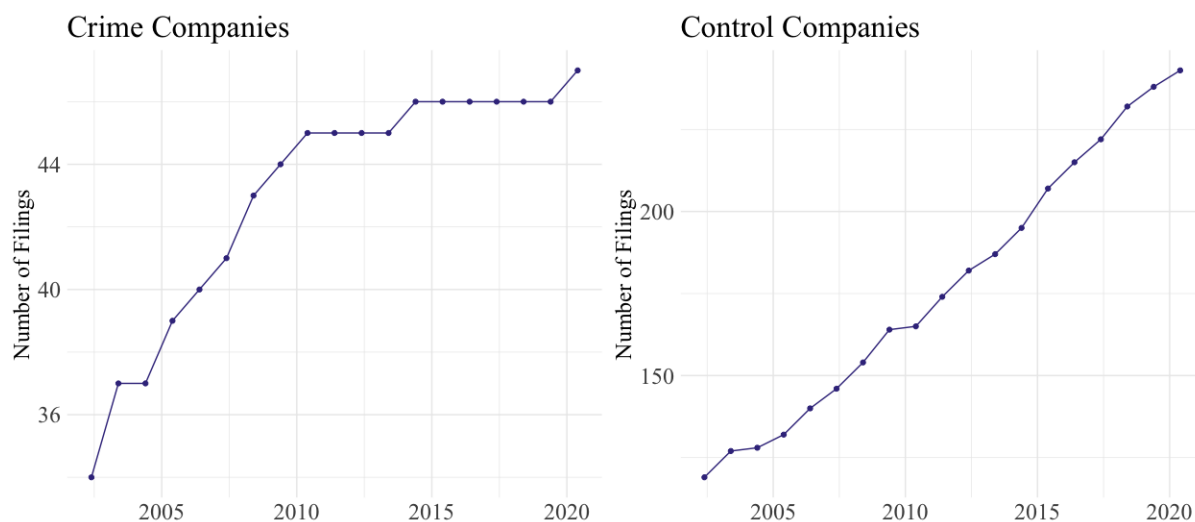


Figure 7.1: Plot of number of 10-K filings.

Because of the differences in data availability, we have an unequal number of companies in each control group, which raises a concern as to whether this contributes to the variations and results of our analysis.

7.4.7 EDGAR

In March 2021, EDGAR established a new “fair access” policy that limits the request rate to 10 requests per second. The purpose of the limitation is to preserve fair access to all users. This is not a limitation for our code; however, this new policy causes the reading of the documents to fail randomly when reaching the URLs in R. This implies that our code cannot run without failing.

When this policy was implemented, we had extracted most of the data, except for data on control groups for tax havens and secrecy jurisdictions. However, by ignoring the error message, the web scraper worked. The problem with this solution is that for the URLs that failed randomly we were not able to extract the subsidiaries and these observations were therefore removed from the dataset.

7.5 Future Research

During our research of the topic of corporate governance and crime we have discovered different elements that our analysis does not capture, in addition to interesting new elements and expansions that could be explored for this topic. In this section, we will shortly describe these elements.

Firstly, improving the web scraper that is used for extracting information from the SEC documents and using additional information from the 10-K could yield more interesting analyses. Our research investigates how textual data from sites such as the SEC can be used to get valuable information about firms. However, there are still many challenges with this type of data that should be explored further. For example, if one has more time to spend on the code for the web crawler, one could get a lot more observations for the companies. Therefore, more research should be done on the extraction of information from 10-Ks, especially as we think that this is a method that is becoming increasingly relevant and where data for the later years are more easily extracted. Furthermore, there

is also more valuable textual information found in 10-Ks than what we have focused on. This could for example be information related to risk factors that companies face or information from the management's discussion.

Secondly, our analysis for auditor change is based on changes in auditing firms. We think that more interesting research could be done on the relationship between the lead auditor and crime, as this is a feature that companies might change more often. There is not necessarily any information about the lead auditor in 10-Ks, but with such information, more research could be done on this.

Thirdly, the tax haven and secrecy jurisdiction analysis are highly dependent on what list of countries is used to define tax havens and secrecy jurisdictions. Our analysis is based on definitions as of 2019 and 2020 and even though OECD (2000) report that tax havens status is usually stable, more interesting results could be found if yearly lists of tax havens and secrecy jurisdictions could be used.

Lastly, the most important element discovered in our thesis that could be an element for future research is crime types. The discussion of our results leads us to believe that the structuring of different corporate governance features could be differently related to different crime types. With a bigger sample of specific crimes, more research could be done to further explore the relationship between corporate governance and crime.

8 Conclusion

By exploring whether corporate governance failures facilitate crime, we have highlighted some features that relate to either crime initiation or conviction. As companies who commit crime structure these corporate governance features in a different way than other similar companies, the reason could be to facilitate crime. We find that the change in the share of female directors and the share of tax haven subsidiaries are related to crime initiation and that the change of audit firm, the change in board members and the share of tax haven subsidiaries are related to crime conviction. On the other hand, for the share of secrecy jurisdiction subsidiaries, we do not find any evidence of a relationship with either crime initiation or conviction. If a crime is committed through the different structuring of these features, the misuse of them indicates a corporate governance failure.

Companies who commit crime are characterized by having an increased change in the share of female directors and a decreasing share of tax haven subsidiaries during the crime. They also seem to have a decreasing change in audit firm and increasing change in board members and share of tax haven subsidiaries after the crime conviction.

Our results complement previous literature regarding this topic but also elaborates on the complexity of the processes that happen to facilitate corporate crime. Our thesis provides further evidence that corporate governance failures and inefficiencies are both dependent on the type of corporate crime and the companies who committed them. Regarding the relationship between corporate governance and crime, there are still unanswered questions and further investigations to be done as there are most likely composite processes and relationships that are hard to entirely uncover. Nevertheless, our thesis enlightens this topic and contributes to the characterization of firms who commit crime, whilst the result of our analysis indicates that the use of features such as audit firm, board members, female directors and tax haven subsidiaries can serve as indicators of crime.

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Appendix

A1 Crime Codes

Type of Fraud	Description
1 Accounting Fraud	Federal crimes relating to false statements or entries, such as under 18 U.S.C. § 1001 (a)(3).
2 Antitrust	Prosecutions brought under the Sherman Antitrust Act's criminal provisions.
3 Act to Prevent Pollution from Ships (APPS)	Violations of the Act to Prevent Pollution from Ships (APPS), 33 U.S.C. §§ 1905-1915.
4 Bank Secrecy Act	Prosecutors brought under the Bank Secrecy Act, including 18 U.S.C. § 5331-5332 regarding failure to file reports of financial transactions or lack of adequate controls to prevent money laundering.
5 Bribery	Violations of federal bribery and gratuities statutes such as 18 U.S.C. § 201.
6 Controlled Substances	These include violations of the Controlled Substances Act (CSA).
7 Environmental	These include prosecutions brought under any of the range of federal environmental statutes, including the Clean Air Act, the Clear Water Act, the Resource Conservation and Recovery Act, and statutes regulating marine pollution, handling of hazardous waste, and others.
8 FCPA (Foreign Corrupt Practices Act)	These include criminal prosecutions brought under the FCPA's bribery provisions and willful violations of the internal controls and books and records provisions, 15 U.S.C. §§ 78dd-1, et seq. A useful federal resource guide explaining these provisions is available at: https://www.justice.gov/sites/default/files/criminal-fraud/legacy/2015/01/16/guide.pdf
9 False Statements	These include prosecutions for making false statements to federal authorities under statutes including 18 U.S.C. § 1001.
10 Firearms	Violations of federal criminal firearms registration and sales statutes.
11 Food	Criminal violations of federal food safety laws including for adulterating or misbranding under the Federal Food, Drug, and Cosmetic Act (FDCA).
12 Fraud	These include mail fraud and wire fraud prosecutions brought under 18 U.S.C. § 1341 and 1343, as well as other fraud crimes, such as conspiracy to defraud the federal government, 18 U.S.C. §371. However, health care fraud, securities fraud, and tax fraud cases are listed separately.
13 Gambling	Illegal gambling business under 18 U.S. Code § 1955 or violations of other federal gambling laws.
14 Health Care Fraud	These include prosecutions brought under 18 U.S.C. § 1347.
15 Immigration	These include prosecutions brought for violating immigration rules concerning employment of noncitizens and unlawful employment practices under 8 U.S.C. §1324a and b, as well as crimes concerning bringing in and harboring illegal aliens under 8 U.S.C. §1324.
16 Import / Export	These include violations of U.S. customs regulations concerning imports and exports as well as violations of U.S. sanctions regarding international trade and financial transactions, including violations of the International Emergency Economic Powers Act (IEEPA).
17 Kickbacks	Violation of the federal anti-kickback statutes, including 42 U.S. Code § 1320a-7b.
18 Money Laundering	These include prosecutions brought under 18 U.S.C. §1956-1957 and under 18 U.S.C. §5324 regarding structuring transactions to evade reporting requirements.
19 Obstruction of Justice	These include prosecutions brought under 18 U.S.C. § 1503 and companion statutes.
20 OSHA	Workplace safety crimes, involving the willful violation of a worker safety standard in the Occupational Safety and Health Act, as well as other workplace safety statutes such as and the Federal Mine Safety and Health Act.
21 Other	Additional federal crimes, of which there are many, that do not fall within the categories described here.
22 Pharmaceutical	These include prosecutions brought under the Federal Food, Drug, and Cosmetic Act (FDCA) as well as anti-kickback and other related claims involving pharmaceutical sales and branding.
23 Securities Fraud	These include prosecutions brought under 18 U.S.C. § 1348.
24 Tax Fraud	These include prosecutions brought under 26 U.S.C. § 7201 and 7201 regarding attempted federal tax evasion and fraud and false statements to tax authorities.
25 Wildlife	Prosecutions under wildlife conservation laws including under Endangered Species Act and the Lacey Act.

Table A1.1: Explanations of the different crime types.

A2 Crime Companies

	Ticker	Company	Primary Crime Code	Year
1	ABT	abbott laboratories	FDCA / Pharma	2012
2	ADM	archer daniels midland co.	FCPA	2013
3	ALV	autoliv, inc.	Antitrust	2012
4	AMGN	amgen, inc.	FDCA / Pharma	2012
5	BAC	merrill lynch commodities, inc.	Fraud - Securities	2019
6	BEAM	beam suntory, inc.		2020
7	BIO	bio-rad laboratories, inc.	FCPA	2014
8	BSX	guidant, llc	FDCA / Pharma	2011
9	CCI	citicorp	Antitrust	2017
10	CHSCP	chs, inc.	Environmental	2013
11	CMG	chipotle mexican grill, inc.	Food	2020
12	CVS	custom wristbands, inc.	Other	2017
13	DBD	diebold, inc.	FCPA	2013
14	FALC	falconstor software, inc.	Other	2012
15	GM	general motors	Fraud - General	2015
16	GS	the goldman sachs group, inc.	FCPA	2020
17	HON	honeywell international, inc.	Environmental	2011
18	IOSP	innospec, inc.	FCPA	2010
19	JEF	jefferies group, llc	Fraud - General	2014
20	JNJ	johnson & johnson	FCPA	2011
21	JPM	jpmorgan chase & co.	Antitrust	2011
22	LL	lumber liquidators, inc.		2019
23	LVS	las vegas sands corp.	FCPA	2017
24	MET	metropolitan life insurance co. (metlife)	Other	2010
25	MGI	moneygram international, inc.	Bank Secrecy Act	2012
26	MRK	merck & co., inc.	FDCA / Pharma	2011
27	NI	nisource, inc.		2020
28	OFIX	orthofix international n.v.	FCPA	2012
29	ORLY	csk auto corp.	Fraud - Securities	2011
30	PDCO	patterson companies, inc.	FDCA / Pharma	2020
31	PPG	ppg industries	Import / Export	2010
32	PROG	progenity, inc.	Fraud - Health Care	2020
33	PSIX	power solutions international, inc.	Fraud - Accounting	2020
34	RAD	rite aid corp.	Controlled substances / Drugs / Meth Act	2018
35	RL	ralph lauren corp.	FCPA	2013
36	SAIC	science applications international corp.	Fraud - General	2012
37	SCHN	schnitzer steel	FCPA	2010
38	SCU	och-ziff capital management group, llc	FCPA	2016
39	SMG	scotts miracle-gro co.	Environmental	2012
40	THC	tenet healthcare	Fraud - General	2016
41	TSN	tyson foods, inc.,tyson de mexico	FCPA	2011
42	UPS	united parcel service, inc.	Controlled substances / Drugs / Meth Act	2013
43	USB	u.s. bancorp	Bank Secrecy Act	2018
44	UVV	universal corp.	FCPA	2010
45	WFC	wells fargo & company,wells fargo bank, n.a.	Fraud - General	2020
46	WMT	wal-mart stores, inc.	Environmental	2013
47	WU	the western union co.	Bank Secrecy Act	2017
48	ZBH	zimmer biomet holdings, inc.	FCPA	2017

Table A2.1: List of crime companies.

A3 Control Companies

	Ticker	SIC		Ticker	SIC		Ticker	SIC		Ticker	SIC		Ticker	SIC
1	AAP	5531	51	COF	6712	101	HGV	7011	151	NAV	3711	201	SRGA	3842
2	ABBV	2834	52	COHR	3826	102	HLT	7011	152	NBIX	2836	202	SSD	3312
3	AGFY	762	53	COST	5331	103	HRC	3841	153	NCR	3578	203	SSY	8062
4	AIG	6311	54	CPS	3714	104	HRL	2011	154	NTIC	2899	204	STRR	3845
5	AKAM	7389	55	CRS	3312	105	HSIC	5047	155	NUVA	3841	205	STT	6712
6	ALGN	3842	56	CRWD	7371	106	HZO	5531	156	OMI	5047	206	SXC	3312
7	ALL	6311	57	CSGP	7389	107	IART	3826	157	ORBC	4899	207	SYF	6712
8	ALPP	7372	58	CTLT	2834	108	IBM	7373	158	ORCC	6282	208	SYK	3841
9	ALTR	7371	59	CUTR	3845	109	IBRX	8731	159	OSK	3711	209	SYKE	7373
10	ALXN	2834	60	CYH	8062	110	ICUI	3841	160	OTTV	5912	210	TECH	2836
11	ALYE	7372	61	CZR	7011	111	IIN	3845	161	PACB	3826	211	TEN	3714
12	ANDE	5159	62	DAN	3714	112	ILMN	3826	162	PAR	3578	212	TFC	6712
13	ANIP	2836	63	DG	5331	113	INOV	7371	163	PCAR	3711	213	TGT	5331
14	ANTM	6311	64	DLTR	5331	114	IRBT	7373	164	PCYG	7372	214	TMST	3312
15	ANVV	7372	65	DNLI	2836	115	IRTC	8062	165	PENN	7011	215	TNET	7389
16	APAM	6282	66	DPZ	5812	116	ISDR	7372	166	PETS	5912	216	TNL	7011
17	APDN	2899	67	DRI	5812	117	ISRG	3842	167	PFE	2834	217	TRV	6311
18	ARES	6282	68	DUOT	7372	118	ITGR	3845	168	PGR	6311	218	TSLA	3711
19	ARMK	5812	69	DXC	7373	119	IVC	3842	169	PINC	5047	219	TWER	4899
20	ARTH	5531	70	DXCM	3841	120	JKHY	7373	170	PNC	6712	220	TWI	3312
21	AVNS	3842	71	EAT	5812	121	JRSS	8062	171	PPC	2015	221	TXG	2836
22	AXL	3714	72	ELAN	2834	122	KERN	7372	172	PRFT	7371	222	UAN	2873
23	AXP	5047	73	EPAM	7373	123	KGJI	7389	173	PRTS	5531	223	UGRO	762
24	AZO	5531	74	ESI	2899	124	KTOS	4899	174	PRU	6311	224	UHS	8062
25	AZPN	7371	75	EVR	6282	125	KWBT	2873	175	PSMT	5331	225	UIS	7373
26	BAX	3841	76	EVTC	7371	126	LAKE	3842	176	QLYS	7371	226	USAP	3312
27	BDX	3841	77	EW	3842	127	LCII	3714	177	QTRX	3826	227	USM	4899
28	BIG	5331	78	F	3711	128	LDOS	7373	178	RDVT	7372	228	VC	3714
29	BIIB	2836	79	FBRX	8731	129	LEA	3714	179	REGN	2834	229	VCTR	6282
30	BIMI	5912	80	FICO	7389	130	LLY	2834	180	REKR	7372	230	VERO	3845
31	BK	6712	81	FIVE	5331	131	LNC	6311	181	REVG	3711	231	VNE	3711
32	BKNG	7389	82	FIXX	5912	132	LNTH	3845	182	RGA	6311	232	VRTX	2834
33	BLBD	3711	83	FLDM	3826	133	LYFT	7389	183	RGEN	2836	233	VSBC	8731
34	BLMN	5812	84	FLT	7389	134	MAR	7011	184	RHP	7011	234	WAT	3826
35	BMY	2834	85	FOE	2851	135	MASI	3845	185	RKDA	2873	235	WBA	5912
36	BRKR	3826	86	FSI	2899	136	MCD	5812	186	RNET	4899	236	WIFI	4899
37	BSIG	6282	87	FZMD	5047	137	MD	8062	187	RPM	2851	237	WOR	3312
38	BTHE	8731	88	GILD	2836	138	MGM	7011	188	RYI	3312	238	WST	3841
39	BWA	3714	89	GKOS	3842	139	MGPI	2041	189	SAFM	2015	239	WYNN	7011
40	C	6712	90	GLPH	8731	140	MMS	7389	190	SBAC	4899	240	XRAY	5047
41	CBRL	5812	91	GLUU	7371	141	MMSI	3841	191	SBUX	5812	241	YUM	5812
42	CCI	4899	92	GNMK	3845	142	MORN	6282	192	SCHW	6712	242	YUMC	5812
43	CCMP	2899	93	GOGO	4899	143	MS	6712	193	SCWX	7371	243	ZG	7389
44	CF	2873	94	GRA	2899	144	MSA	3842	194	SGEN	2836	244	ZGSI	8731
45	CGA	2873	95	GSAT	4899	145	MSCI	7389	195	SGMS	7373	245	ZTS	2834
46	CJJD	5912	96	H	7011	146	MSGM	7372	196	SGRY	8062			
47	CMC	3312	97	HALO	2836	147	MTD	3826	197	SHYF	3711			
48	CMD	3841	98	HAYN	3312	148	MTOR	3714	198	SMGI	2899			
49	CNA	6311	99	HCA	8062	149	MULG	2873	199	SPNE	3842			
50	CNMD	3845	100	HEWA	5912	150	MYO	5047	200	SPSC	7371			

Table A3.1: List of control companies.

A4 Tax Havens

Number of crime companies that have used the different tax havens in the years from 2002-2020.

	Tax Haven	Frequency
1	Hong Kong	26
2	Netherlands	25
3	Singapore	25
4	Switzerland	23
5	Luxembourg	22
6	Bermuda	18
7	Cayman Islands	18
8	British Virgin Islands	9
9	Jersey	6
10	Bahamas	4

Table A4.1: The use of the top 10 tax havens.

A5 Secrecy Jurisdictions

Number of crime companies that have used the different secrecy jurisdictions in the years from 2002-2020.

	Secrecy Jurisdiction	Frequency
1	United States	45
2	Hong Kong	26
3	Netherlands	25
4	Singapore	25
5	Japan	24
6	Switzerland	23
7	Luxembourg	22
8	Cayman Islands	18
9	British Virgin Islands	9
10	United Arab Emirates	7

Table A5.1: The use of the top 10 secrecy jurisdictions.

A6 T-tests

	t
Test statistic	-0.1446398
DF	39
p value	0.8857402
Alternative hypothesis	two.sided

Paired t-test: auditors\$mean and auditors\$mean_industry

Table A6.1: T-test for change of audit firm.

	t
Test statistic	-0.1857686
DF	41
p value	0.8535423
Alternative hypothesis	two.sided

Paired t-test: board_members\$mean and board_members\$mean_industry

Table A6.2: T-test for change of board members.

	t
Test statistic	0.06095588
DF	41
p value	0.9516905
Alternative hypothesis	two.sided

Paired t-test: female_directors\$mean and female_directors\$mean_industry

Table A6.3: T-test for change in the share of female directors.

	t
Test statistic	1.735069
DF	39
p value	0.09062598
Alternative hypothesis	two.sided

Paired t-test: tax_havens\$mean and tax_havens\$mean_industry

Table A6.4: T-test for change in the share of tax haven subsidiaries.

	t
Test statistic	-0.5168328
DF	39
p value	0.6081916
Alternative hypothesis	two.sided

Paired t-test: secrecy_jurisdictions\$mean and secrecy_jurisdictions\$mean_industry

Table A6.5: T-test for change in the share of secrecy jurisdiction subsidiaries.