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The Effect of the Sarbanes-Oxley Act on Litigation Risk and Securities Class Action Lawsuits

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ABSTRACT: Literature suggests that the enactment of the Sarbanes-Oxley Act (SOX) in 2002 might have been a factor in increased litigation risk of management. However, such conclusions are reached without profound empirical evidence. This paper investigates whether this hypothesis is right by examining the effect of SOX on securities class action lawsuits from 1996 to 2017. It is found that in the post-SOX period there is a lagged increase in securities class action lawsuits. In contrast to prior literature, the results are not more or less profound for high litigation risk (FPS industries) firms, as opposed to non-FPS industries firms. Likewise, when the sample consists of only FPS industries firms, there is a lagged increase found in securities class action lawsuits after the enaction of SOX.

Keywords: *Financial market regulation, Sarbanes-Oxley Act, Securities litigation, Litigation risk.*

Data Availability: *Data are available from public sources as mentioned in the paper*.

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AUTHORSHIP DECLARATION

I hereby declare and confirm that this thesis is entirely the result of my own work except where otherwise indicated. I acknowledge the supervision and guidance I have received from Jarosław Bełdowski. This thesis is not used as part of any other examination and has not yet been published.

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1. INTRODUCTION

Due to the corporate governance failures in the early 2000s and the drop in investor confidence, the U.S. government decided to implement extensive changes in the financial reporting of American stock market listed companies by enacting the Sarbanes-Oxley Act (SOX, July 30, 2002). The main adjustments are formed of SOX Section 302, Section 404, and Section 802. Going into details, SOX Section 302 has increased managers' responsibilities regarding the firm's operations and financial statements, whereas SOX Section 404 prescribes that all firms have to comply with strict disclosure requirements regarding their own assessment of internal control procedures, and SOX Section 802 requires proper administrative procedures.

According to Coates and Srinivasan (2014), Iliev (2010), and Montana (2007), SOX increased investor confidence, increased compliance costs, and increased corporate governance, especially in the first few years after the enactment. In addition, Cohen, Dey, and Lys (2008) indicate that SOX causes decreased discretionary earnings for firms. However, Ribstein (2002) argues that SOX Section 404 could have increased the litigation risk of the firm's management. Empirical analyses on this matter are yet insufficient, especially with regard to litigation risk.

Prior research has shown that there is a relation between litigation risk and securities class action lawsuits (Brochet & Srinivasan, 2014; Francis, Philbrick, & Schipper, 1994; Johnson, Kasznik, & Nelson, 2000; Kasznik & Lev, 1995; Kim & Skinner, 2012; Rogers & Stocken, 2005). Therefore, it is interesting to see whether SOX's enactment leads to more or less securities class action lawsuits in the post-SOX period compared to the pre-SOX period. This leads to the following research question:

RQ: **Does the enactment of SOX have an effect on securities class action lawsuits?**

Following Kim and Skinner (2012), litigation risk is defined as the event of getting sued through a securities class action lawsuit. By using a research design similar to Cohen et al. (2008), Johnson et al. (2000), and Kim and Skinner (2012), this paper looks whether the post-SOX period has contributed to the number of securities class action lawsuits. In the opinion of preceding scholars it is plausible that litigation risk might increase as a result of the enactment of SOX. As a result, there are two greatly debated hypotheses about managers' behaviour when litigation risk increases, namely the 'disciplining hypothesis' and the 'pressure hypothesis'. The former supposes that the increased litigation risk leads to more disciplined managers, which

means that they will embark on more (risky) innovation investments. The latter expects that managers will be more pressured as a result of increased litigation risk, which causes managers to take less action in risky investments in order to prevent getting sued in case of investment failures (Holmstrom & Kaplan, 2003; Lin, Liu, & Manso, 2019; Tian & Wang, 2011). Due to the fact that most scholars suggest that the pressure hypothesis is likely to be the case, this hypothesis is expected in this research in the same way, i.e., securities class action lawsuits are expected to be lower in the post-SOX period. Moreover, considering the fact that the scandal period may have raised social awareness and of accounting and securities fraud, this paper examines whether the scandal period, which occurred in 2000 and 2001, has increased the securities class action lawsuits in that period. Finally, scholars have argued that firms operating in industries of biotechnology, computers, electronics and retail (i.e., the so-called FPS industries firms) experience higher litigation risk than non-FPS industries firms (Johnson et al., 2000; Kim & Skinner, 2012). Hence, this paper investigates also whether the results are more profound in the FPS industries compared to other industries.

There are two contributions accomplished in this paper. First, this is a novel research linking SOX with securities class action lawsuits from an empirical perspective. Second, two contested hypotheses in prior literature are tested once again to enhance their explanatory power.

However, the paper is subject to two limitations. Initially, not all filings in the Securities Class Action Clearinghouse (SCAC) database are usable due to either unmergeable financial data or unidentifiable stock exchange listing, which might cause sample selection bias. Additionally, the regressions could not be controlled by all firm characteristics as performed in prior literature due to unavailability of these data in the databases, which might contribute to omitted variable bias.

The remainder of the paper is organised in the following manner. Section 2 discusses prior literature regarding SOX and securities litigation. The predicted outcomes on the basis of preceding literature are hypothesized in section 3. Section 4 illustrates the research design used to model the data. Section 5 reviews the sample selection process. The results of the paper are shown and explained in section 6 and section 7 concludes.

2. BACKGROUND INFORMATION

2.1. An Overview of Accounting Scandals and the Sarbanes-Oxley Act (SOX)

The underlying reasons for the enactment of SOX were the notorious accounting scandals in the early 2000s of which the most publicly discussed was the Enron Corporation (hereafter, Enron) case. Because of its significance in terms of both fame and settlement amount (USD 7.2 billion, the highest securities class action settlement to date), Enron's case is discussed in detail in this paragraph.

Enron was once a large gas, electricity and communication services firm with over 20,000 employees at December 31, 2000 (Enron Corporation, 2001). These facts did not prevent Enron from bankruptcy after only a few months of the discovery of the accounting fraud in 2001. There were two major issues that led to the identification of this accounting fraud. Initially, Enron used long-term contracts to manipulate the actual income in the financial statements. When long-term contracts were settled, the difference between the net present value and the actual paid value of the contracts were regarded as profits. However, future cash flows needed to calculate the net present value of the contracts were overestimated, which led to overvalued profits (Li, 2010). In addition, Enron abused a specific U.S. accounting regulation using so-called Special Purpose Entities (SPEs). SPEs are usually used as a source of financing without being required to disclose the debt on the balance sheet. Enron used the SPEs to hide debts and to transfer distressed assets from its balance sheet, while increasing the revenue (Deakin & Konzelmann, 2004; Schwarz, 2001).

The accounting fraud accusations further spilled over to the securities market. Even though obvious disclosures were revealed about high debts and branch investments in the fiscal year of 2000, stock prices of Enron did not reflect the true value of the firm (Enron Corporation, 2001; Ribstein, 2002). The accounting flaws seemed to disperse its true value and the stock price even further (Li, 2010). Securities analysts and credit rating agencies amplified this effect by providing further 'buy' investment recommendations of Enron's stock and debt, even after the discovery of accounting fraud (Ribstein, 2002).

However, Enron's case was not the only big scandal in the early 2000s. Two others are those of Xerox Corporation in 2000 (hereafter, Xerox) and WorldCom in 2002. The latter was discovered just one month before the enactment of SOX.[1] Xerox's case concerns the breach of

[1] The scandal period in the research design comprises the fiscal years 2000 and 2001. This might seem remarkable as the scandal of Xerox was discovered in June 2000, Enron in October 2001 and WorldCom in June 2002. However, the scandal period is supposed to represent accounting fraud awareness, which is mainly assumed to be

the revenue recognition accounting principle over the period of 1997 to 2000, which the firm did by recognizing revenue before the revenue actually took place (Seipp, Kinsella, & Lindberg, 2011; U.S. Securities and Exchange Commission, 2003). WorldCom artificially reduced its expenses in fiscal year 2001 by recognizing operating costs as investments (Brickey, 2003). Even though in all of the fraud cases the firms used different methods to accomplish accounting manipulation, they all had the same motive for doing so, which is increasing profits and net assets.

The immediate response to the accounting scandals was the enactment of SOX on July 30, 2002. The U.S. law's official name, the 'Public Company Accounting Reform and Investor Protection Act', is somewhat clearer about the intention of the act. The act has two main objectives:

(1) The first objective is to create an increase in investor confidence by providing more extensive regulation to auditors regarding accounting fraud of corporate financial officers (Coates & Srinivasan, 2014; Montana, 2007). The three most crucial sections of SOX are Section 302, Section 404 and Section 802. SOX Section 302 increases personal liability risk. It prescribes in a more severe approach than before that corporate financial officers are obliged to sign the financial statement and therefore are held liable for the firm's operations and reflection of the current financial state. If a firm's financial statement is signed and the corporate financial officer knows that it is presented inaccurately, this person could face criminal charges along with imprisonment. Besides increased liability risks, according to Iliev (2010) and Montana (2007), SOX Section 404 and Section 802 ensure better corporate governance and increased compliance costs by respectively mandatory assessment disclosure of a firm's own internal control process and strict requirements regarding proper (non-falsified) administration.

(2) The second objective is the foundation of the Public Company Accounting Oversight Board (PCAOB), which has replaced the prior system of self-regulation in the power of the American Institute of Certified Public Accountants (AICPA) (Coates & Srinivasan, 2014; Gunny & Zhang, 2013). The PCAOB manages the inspection of external auditors

perceived in 2000 and 2001. Also, considering the fact that SOX has been implemented in July 2002, 2002 onward is considered as the post-SOX period in the research design, in accordance with Cohen et al., 2008.

and audits of public firms and is supervised by the U.S. Securities and Exchange Commission (SEC).

After the enactment of SOX, the SEC received a significantly larger budget over the years, as well as the PCAOB. In fact, PCAOB's budget has also been increased relative to SEC's budget (Coates & Srinivasan, 2014). This suggests that both the SEC and the PCAOB have more resources for inspection and increased risk to analyse firms even further in case of irregularities when inspections or lawsuit complaints take place. The increased budget might have an effect on litigation risk, which is explained in the next paragraph.

2.2. Litigation Risk

Kartika and Nahumury (2014) describe the meaning of litigation risk as the risk of a firm being sued by one or multiple individuals having an interest in the firm who feel being treated unfairly (as cited in Juanda, 2006).[2] In the context of this paper it implies that the firm being audited is exposed to litigation risk rather than the auditor.[3]

Some scholars argue that SOX increases litigation risks to executive officers (Butler & Ribstein, 2006; Ribstein, 2002; Zhang, 2007). For instance, Ribstein (2002) supports this claim by indicating that people involved in the fraudulent accounting schemes are not more likely to share their stories with others, but rather people who are not involved in any fraudulent schemes are more likely to talk innocently about unfounded irregularities of firms, which leads to inefficient practice of investigation of those firms. He also argues that, due to lack of efficiency, SOX is supposed to urge lawyers to provide material evidence whenever any supposed type of securities fraud has been committed by their clients. Moreover, Zhang (2007) adds that executives are less likely to participate in risky opportunities after the enactment of SOX, which changes the business strategy of firms and could potentially harm the firm's growth (as cited in Wallison, 2003).

[2] As mentioned in the introduction, litigation risk in this paper is entirely determined as the event of a firm being sued through a class action lawsuit.

[3] This does not mean that an auditor cannot be exposed to litigation risk. In fact, in most class action lawsuits the auditor is liable in more or less the same way as the firm being audited. Some scholars even argue that auditors might face a higher liability risk than the firms themselves (Ge et al., 2017). However, this paper rather focusses on the firm being audited because the executives of these firms are the ones having incentives to be involved in a fraudulent accounting scheme in order to get some type of benefit out of the scheme. Also, when a firm is being sued, usually the name of this firm is being mentioned in the media and (academic) papers rather than the auditor (e.g., the accounting scandal cases of Enron and WorldCom), which makes it easier to understand.

In contrast, other scholars either argue that SOX does not cause any significant effect on litigation risk or the effect is ambiguous (Coates & Srinivasan, 2014; Cohen, Hayes, Krishnamoorthy, Monroe, & Wright, 2012; Ge, Koester, & McVay, 2017). In line with it, Cohen et al. (2012) claim that directors generally observe increased litigation risk, which, according to Coates and Srinivasan (2014) is generally justified considering the fact that class action settlement amounts over the period of 2002 to 2007 are higher than before. However, the class action settlement amounts went back to pre-SOX levels from 2008 onward. Therefore, they claim that SOX does not lead to the occurrence of litigation but the increased lawsuits settlements are rather a result of the underlying awareness of corporate scandals in the period 2000-2002. In comparison, Ge et al. (2017) are not confident whether SOX has an effect on litigation risk. On one hand, plaintiffs could use mandatory internal control disclosures provided by auditors under SOX Section 404 as hard evidence in case of a lawsuit regarding an accounting scandal, which shifts the liability from the firm to the auditor. On the other hand, if a firm has been exposed by ineffective internal control procedures, the firm is less likely to rehash its internal control disclosure but rather restate the financial statements, which might lead to lower stock prices and lower profits. At last, Amoah and Tang (2010) do find that a negative reaction of the market on restatements of the financial statement is in fact related to a higher chance of a class action lawsuit initiatives.

Prior research has also shown lawsuit effects before and after the enactment of SOX on directors' behaviour. Brochet and Srinivasan (2014) found that executive compensation increased after 2002 (i.e., the post-SOX period) for sued firms and named executives in lawsuits are more likely to leave the firm after 2002. A possibility that could explain this phenomenon in their opinion is that the sued firms want to manage continuity for non-named executives.

2.3. Litigation Cost Hypothesis

Healy and Palepu (2001) classify five hypotheses that might affect managers' disclosure behaviour, of which one of them is the litigation cost hypothesis. The latter assumes that if litigation risk increases, managers tend to increase voluntary disclosure and decrease disclosure in general, especially regarding predicted information about the firm. Prior scholars already found evidence that firms disclosing bad earnings announcements are more likely to pre-disclose bad earnings news (Skinner, 1994, 1997). On the contrary, Francis et al. (1994) suggest that firms are more likely to be sued if bad earnings news is pre-disclosed, even though Lev (1994) and Skinner (1994) argue that they should decrease litigation risk. This contradicting

evidence is caused by the fact that the relation between litigation risk and disclosure is subject to simultaneity bias, meaning that high litigation risk firms tend to pre-disclose bad earnings news and at the same time firms that pre-disclose them are able to decrease their litigation risk (Field, Lowry, & Shu, 2005).

2.4. High Litigation Risk (FPS) Industries

Francis et al. (1994) were first to introduce a study with an industry-based sample (hereafter, FPS industries firms) which might be more exposed to litigation risk, i.e., be sued more often than firms in other industries. FPS industries are defined as the whole market of firms operating in biotechnology, the computer market, electronics, and retail.

As reported by Kim and Skinner (20120, there is in fact a relation between stock price volatility/return and shareholder damages, which incentivizes shareholders to sue the firm. There are two reasons that contribute to the fact that these industries have a higher price volatility and return, which causes these firms to get caught up in lawsuits more easily than other industries. Initially, firms operating in FPS industries require detailed knowledge and understanding, e.g., electronics, which is hard to familiarize with to outsiders. Therefore, stock prices in these industries are based on 'soft stop orders', i.e., a mental price or percentage set by investors which determines whether they should buy or sell stocks but can be modified based on certain market conditions or events. This can cause an overreaction to certain announcements by investors, which accordingly causes stock price volatility (Francis et al., 1994). Additionally, earnings reported by FPS industries are in essence more arbitrary and, thus, correspond with higher stock price volatility (Kim & Skinner, 2012).

Some scholars use samples of firms exclusively operating in FPS industries (e.g., Francis et al., 1994; Johnson et al., 2000), while others use a full sample added with a separate FPS indicator variable within the analysis (Brochet & Srinivasan, 2014; Kasznik & Lev, 1995; Kim & Skinner, 2012; Rogers & Stocken, 2005). The aim of this research is to provide results of both sample selections.

3. HYPOTHESIS DEVELOPMENT

The hypothesis development of this paper is split up into three parts. To begin with, the main aim of this research is to analyse the impact of the enactment of SOX on securities class action lawsuits through litigation risk. Next, because the effect of the scandals leading to the enactment of SOX might have an effect on litigation risk on its own, this is taken into consideration. Lastly, as examined in previous literature, litigation risk is related to involvement in specific (FPS) industries. Therefore, the results might be more substantial in those industries, which is analysed in this paper.

Suppose that χ is the shareholder damage that one or more individuals[4] experience as a result of unfair treatment by a firm they are having interest in, and *SOX* is the period after the enactment of the Sarbanes-Oxley Act, which is 2002 onward. Litigation risk, given as *LR*, can be written in a simplified way as a function (*f*) of these two variables:

$$LR = f(SOX, \chi). \tag{1}$$

where *LR* increases by cause of both χ and *SOX*, which is given as:

$$\frac{\partial LR}{\partial \chi} > 0. \tag{2}$$

$$\frac{\partial LR}{\partial SOX} > 0. \tag{3}$$

There are five arguments as to why litigation risk might increase as a result of the enactment of SOX as shown in formula (3). First, the new set of rules regarding the role of the corporate officer as a signatory (in SOX Section 302), mandatory disclosure requirements of internal control procedures (in SOX Section 404), and expanded administrative requirements (in SOX Section 802) create increased compliance and personal liability risks (Coates & Srinivasan, 2014; Iliev, 2010; Montana, 2007). Second, in case of exposure of ineffective internal control procedures, the firm is likely to restate its financial statement, which might

[4] The hypothesis development specifically refers to one or more individuals because litigation risk may comprise all types of shareholder lawsuits. However, from a legal point of view, there are two types of shareholder lawsuits: derivative suits and direct suits. The main difference is that in a derivative suit one or more shareholders can initiate a lawsuit and represent the shareholders as a whole, whereas in a direct suit one or more shareholders can initiate a lawsuit which represent only a subset of the shareholders (Ferris, Jandik, Lawless, & Makhija, 2007). When two or more shareholders initiate a direct suit it is called a class action lawsuit. This research exclusively looks at the effect on securities class action lawsuits due to data limitations. (Securities) class action lawsuits are only a subdivision of all shareholder lawsuits and, thus, this may lead to a bias.

incentivize shareholders to sue the firm (Amoah & Tang, 2010; Ge et al., 2017). Third, the budget of both the SEC and the PCAOB increased greatly in the years following the enactment of SOX in 2002[5], which might increase the risk and resources of investigation in case of irregularities, e.g., class action filings (Coates & Srinivasan, 2014). Fourth, SOX causes people not involved in a fraudulent schemes to talk innocently about unfounded irregularities about firms, which might lead to more (inefficient) investigation by the SEC and PCAOB (Ribstein, 2002). Fifth, SOX tries to achieve more efficient uncovering of fraud by urging lawyers to pass on information about and proof of securities fraud committed by clients (Ribstein, 2002).

Prior research has shown a twofold of contradictory theories regarding the behaviour of corporate officers if litigation risk increases, which Lin et al. (2019) define as the 'disciplining hypothesis' and the 'pressure hypothesis'.[6] The former predicts that litigation risk will lead to increased discipline of executives and consequently riskier investments in the form of innovation follow (Lin et al., 2019). In contrast, the latter supposes that executives will allocate their resources more carefully due to the lack of shareholder tolerance in case of investment failure (Holmstrom & Kaplan, 2003; Lin et al., 2019; Tian & Wang, 2011). The pressure of litigation risk could also contribute to decreased participation in risky investments by executives to protect themselves and the firm against probable future lawsuits (Zhang, 2007). Conforming to the speculations of the majority of researchers, this paper follows the pressure hypothesis, which is expected to decrease the probability of being sued by shareholders in class action lawsuits and leads to the following hypothesis:

***Hypothesis 1*: Securities class action lawsuits decrease after the enactment of SOX.**

Scholars already noted that the occurrence of litigation risk might not be the result of SOX, but rather of the underlying consciousness due to the accounting scandal exposure (Coates & Srinivasan, 2014). It makes sense considering Ribstein's (2002) observation that, in the case of Enron, the stock prices did not reflect obvious misstatements in the financial statements even before the discovery of the scandal, but started to reflect it only after the exposure of the accounting fraud. It suggests that there might be a relation between corporate

[5] See also data provided by the U.S. Securities and Exchange Commission (2019).

[6] The research of Lin et al., 2019 has a design with a focus on derivative suits, whereas this research focusses only on (securities) class action lawsuits (direct suits), which is a different branch of shareholder litigation but still relevant for the hypothesis development.

accounting scandal awareness and increased shareholder incentives to sue the firm through a class action lawsuit, which leads to the second hypothesis:

***Hypothesis 2*: Securities class action lawsuits increase in the scandal period.**

Following prior research, FPS industries firms might be more exposed to litigation risk for two reasons. First, investors consider the process of buying and selling stocks in FPS industries as 'soft stop orders', which causes overreactions to firm events, triggering to stock price volatility accordingly (Francis et al., 1994). Second, FPS industries firms' earnings reported are a priori more unpredictable, causing increased stock price volatility (Kim & Skinner, 2012). This stock price volatility incentivizes shareholders to initiate a class action lawsuit, so it is fair to say that FPS industries firms are more likely than firms in other industries to experience higher litigation risk. It is hypothesized that higher litigation risk in FPS industries firms will lead to even more pressure on executives to protect themselves and the firm against potential class action lawsuits in the post-SOX period. This leads to the third hypothesis (a):

***Hypothesis 3a*: FPS industries firms are less likely than non-FPS industries firms to be involved in securities class action lawsuits after the enactment of SOX.**

The higher litigation risk which executives face might also contribute to more awareness of scandals focussed on firms operating in FPS industries. Hence, it is reasonable to predict that FPS industries firms are sued more often in the scandal period (i.e., 2000-2001) compared to non-FPS industries firms. Therefore, the third hypothesis is split up into two parts. The third hypothesis (b) is given as follows:

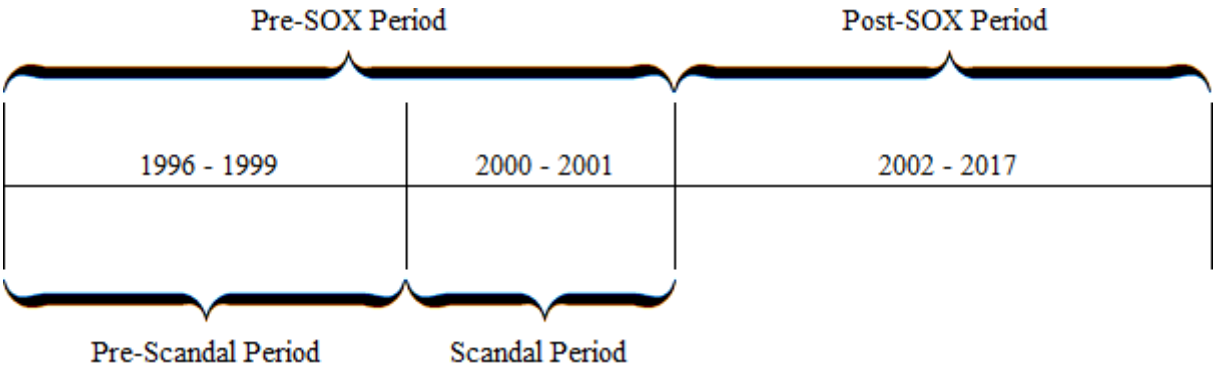
***Hypothesis 3b*: FPS industries firms are more likely than non-FPS industries firms to be involved in securities class action lawsuits in the scandal period.**

4. RESEARCH DESIGN

4.1. Observation Window

Figure 1 illustrates the observation period used in this paper.[7] The main focus of this research is the comparison between the pre-SOX period (1995 - 2001) and the post-SOX period (2002 - 2017). By further differentiating the pre-SOX period[8] in the pre-scandal period (1995 - 1999) and the scandal period (2000 - 2001), the effect of the scandal period in particular becomes clear when taking it into consideration in the research model.

Figure 1: Graphical illustration of the observation window.



4.2. Research Model and Parameters

The research model in this paper is conducted by examining the effect of SOX on securities class action lawsuits. As mentioned by Coates and Srinivasan (2014) and Cohen et al. (2008), the scandal period might influence the results by the simple fact that litigation risk could be determined by the underlying accounting fraud awareness among shareholders. Therefore, both SOX and the scandal period have been taken into consideration in the research

[7] Note that the observation window depicts year *t* of which the firm characteristics are measured. The actual securities class action filings are measured in both year *t* and *t*+1. See the subsection 'Research Model and Parameters' for the explanation of the full model used.

[8] Following Cohen et al. (2008), there might be a bias coming along with the separation of the pre-SOX period into the pre-scandal period and the scandal period. Therefore, in accordance with their design, the results are rerun by taking only into consideration the pre-SOX period and the post-SOX period and find similar results. The only major difference is that, when only taking into account the pre-SOX and post-SOX period, SOX is in fact positively and significantly related to the probability of getting sued in the same year for all three of the tests, as opposed to the results in Table 3.

design. Variables used in the research model are defined in Appendix A. By following a research design similar to Cohen et al. (2008), Johnson et al. (2000), and Kim and Skinner (2012), the following logistic regressions is modelled for firm *i* and event year *t*:[9]

$$\Pr(SUED_{i,t} = 1) = \beta_1 + \beta_2 SOX_t + \beta_3 SCA_t + \beta_4 FPS_{i,t} + \beta_5 SOX_t * FPS_{i,t} + \beta_6 SCA_t * FPS_{i,t} + \epsilon_{i,t}, \quad (4)$$

$$\Pr(SUED_{i,t} = 1) = \beta_1 + \beta_2 SOX_t + \beta_3 SCA_t + \beta_4 FPS_{i,t} + \beta_5 SOX_t * FPS_{i,t} + \beta_6 SCA_t * FPS_{i,t} + \beta_7 LNASSETS_{i,t} + \beta_8 \Delta TURN_{i,t} + \beta_9 RET_{i,t} + \beta_{10} RETSKEW_{i,t} + \beta_{11} RETSTDEV_{i,t} + \beta_{12} TURN_{i,t} + \epsilon_{i,t}, \quad (5)$$

$$\begin{aligned}\Pr(SUED_{i,t} = 1) = {} & \beta_1 + \beta_2 SOX_t + \beta_3 SCA_t + \beta_4 FPS_{i,t} + \beta_5 SOX_t * FPS_{i,t} + \\ & \beta_6 SCA_t * FPS_{i,t} + \beta_7 LNASSETS_{i,t} + \beta_8 \Delta TURN_{i,t} + \beta_9 RET_{i,t} + \\ & \beta_{10} RETSKEW_{i,t} + \beta_{11} RETSTDEV_{i,t} + \beta_{12} TURN_{i,t} + \beta_{13} NYSE_{i,t} + \\ & \beta_{14} USINC_{i,t} + \beta_{15} WCAP_{i,t} + \beta_{16} ROA_{i,t} + \beta_{17} R\&D_{i,t} + \\ & \beta_{18} GOODWILL_{i,t} + \beta_{19} PPE_{i,t} + \beta_{20} ALTMANZ_{i,t} + \beta_{21} MB_{i,t} + \\ & \beta_{22} EQUITYPRO_{i,t} + \beta_{23} DEBTPRO_{i,t} + \epsilon_{i,t}. \quad (6)\end{aligned}$$

The first ones to use control variables on the probability of getting sued through class action lawsuits are Johnson et al. (2000). Their predictions and results suggest that there is a positive relation between turnover growth ($\Delta TURN_{i,t}$), stock return ($RET_{i,t}$), turnover ($TURN_{i,t}$), and the probability of getting sued by shareholders ($\Pr(SUED_{i,t} = 1)$). Their research also suggests that there is a negative relation between stock return skewness ($RETSKEW_{i,t}$), stock return standard deviation ($RETSTDEV_{i,t}$), and the probability of getting sued by shareholders. This rests on the assumption that the larger the size, profitability and the (negative) stock return, the larger the stockholder damage, and, thus, the higher the incentive of the stockholder lawyers to sue the firm (Kim & Skinner, 2012; Zhang, 2007). It also explains why the natural logarithm of assets ($LNASSETS_{i,t}$) and return on assets ($ROA_{i,t}$) are positively related to the probability of getting sued, according to Kim and Skinner (2012). Altman Z Score is a proxy of financial distress, which is positively related to the probability of getting sued (Altman, 1968; Kim &

[9] Unfortunately, not all control variables found in prior literature could be found in the databases used. For example, the percentage of total market value owned by institutional investors, the amount of insider shares owed and the amount of insider turnover are unidentifiable in Compustat. Leaving out those variables might result in omitted variable bias in the logit models.

Skinner, 2012). The amount of expenses on research and development ($R\&D_{i,t}$), the market to book ratio ($MB_{i,t}$), the value of property, plant, and equipment ($PPE_{i,t}$), and the working capital ($WCAP_{i,t}$) all represent investment behaviour which is likely to influence litigation risk. R&D expenses and market to book ratio are likely to be negatively related to the probability of getting sued, whereas the value of property, plant, and equipment, and working capital are likely to be positively related to the probability of getting sued. If the firm is founded in the U.S. ($USINC_{i,t}$), the chance of getting sued is likely to be lower. It is expected that there is a positive relation between recent equity issuance ($EQUITYPRO_{i,t}$), recent debt issuance ($DEBTPRO_{i,t}$), and the probability of getting sued. Goodwill ($GOODWILL_{i,t}$) shows the degree of involvement in M&A activities, which increases the chance of getting sued. Finally, firms listed on the New York Stock Exchange ($NYSE_{i,t}$) might be more exposed to class action lawsuits than firms listed on the NASDAQ and the AMEX (Kim & Skinner, 2012).

Due to delayed characteristics of class action lawsuits, there might be a lagged effect of the SOX act and/or the underlying accounting scandals on class action lawsuits. In the following tests, the same logit models are performed but with a lagged effect on the dependent variable as follows for firm *i* and event year *t*:

$$\begin{aligned}\Pr(SUED_{i,t+1} = 1) = {} & \beta_1 + \beta_2 SOX_t + \beta_3 SCA_t + \beta_4 FPS_{i,t+1} + \beta_5 SOX_t * FPS_{i,t+1} + \\ & \beta_6 SCA_t * FPS_{i,t+1} + \epsilon_{i,t}, \end{aligned} \tag{7}$$

$$\begin{aligned}\Pr(SUED_{i,t+1} = 1) = {} & \beta_1 + \beta_2 SOX_t + \beta_3 SCA_t + \beta_4 FPS_{i,t+1} + \beta_5 SOX_t * FPS_{i,t+1} + \\ & \beta_6 SCA_t * FPS_{i,t+1} + \beta_7 LNASSETS_{i,t} + \beta_8 \Delta TURN_{i,t} + \beta_9 RET_{i,t} + \\ & \beta_{10} RETSKEW_{i,t} + \beta_{11} RETSTDEV_{i,t} + \beta_{12} TURN_{i,t} + \epsilon_{i,t}, \end{aligned} \tag{8}$$

$$\begin{aligned}\Pr(SUED_{i,t+1} = 1) = {} & \beta_1 + \beta_2 SOX_t + \beta_3 SCA_t + \beta_4 FPS_{i,t+1} + \beta_5 SOX_t * FPS_{i,t+1} + \\ & \beta_6 SCA_t * FPS_{i,t+1} + \beta_7 LNASSETS_{i,t} + \beta_8 \Delta TURN_{i,t} + \beta_9 RET_{i,t} + \\ & \beta_{10} RETSKEW_{i,t} + \beta_{11} RETSTDEV_{i,t} + \beta_{12} TURN_{i,t} + \beta_{13} NYSE_{i,t} + \\ & \beta_{14} USINC_{i,t} + \beta_{15} WCAP_{i,t} + \beta_{16} ROA_{i,t} + \beta_{17} R\&D_{i,t} + \\ & \beta_{18} GOODWILL_{i,t} + \beta_{19} PPE_{i,t} + \beta_{20} ALTMANZ_{i,t} + \beta_{21} MB_{i,t} + \\ & \beta_{22} EQUITYPRO_{i,t} + \beta_{23} DEBTPRO_{i,t} + \epsilon_{i,t}. \end{aligned} \tag{9}$$

5. SAMPLE SELECTION

5.1. Data Collection

Data are collected from two databases: Compustat and SCAC. Compustat is used to obtain all U.S. firms' financial accounting, stock price and market data for the fiscal years of 1995 to 2017. Securities class action filing data are obtained from SCAC by a web scraping technique using Python for the fiscal years of 1996 to 2017.[10] Securities class action filing data are only available back to 1996. Compustat data are collected for an extra year in 1995 as opposed to SCAC data due to lagged variables needed to calculate variables in 1996.

5.2. Data Preparation

The data of both databases are merged by ticker symbol and fiscal year. Initially, firms without an identified ticker symbol are dropped from the sample, as well as firms not listed on the three main stock exchanges New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and National Association of Securities Dealers Automated Quotation (NASDAQ). In addition, sued firms without matching Compustat data are excluded from the sample due to unavailable financial data. Furthermore, data errors causing double firm-years for the same firm are excluded.[11] Lastly, observations with missing assets for a specific fiscal year are excluded from the sample because assets are needed for nearly every calculation (as seen in the variable definitions overview in Appendix A, each continuous variable is scaled by total assets in order to make the variables proportional to the size of the firm). The (full) sample size equals 34,061 observations (used for formula 4 and 7). However, for the extended models with more control variables, the sample size is significantly smaller (29,401 for formula 5 and 8 and 25,802 for formula 6 and 9). A complete overview of the sample selection process can be found in Table 1 in Appendix B.

After compositing the sample, variables are modified by removing the outliers. There are two ways used to minimize the presence of outliers: either taking the natural logarithm of variables or winsorizing the variables. Following prior literature, the natural logarithm of assets is taken for a better fitting model (e.g., Cohen et al., 2008; Kim & Skinner, 2012). The yearly stock return ($RET_{i,t}$), yearly stock return skewness ($RETSKEW_{i,t}$), return on assets ($ROA_{i,t}$), and

[10] SCAC is an initiative of Stanford Law School together with Cornerstone Research, consisting of researchers who collect filings from the Public Access to Court Electronic Records (PACER) database. The filing data provided by SCAC which are web scraped can be found at http://securities.stanford.edu/filings.html.

[11] These first three exclusions of the sample leads to a limitation to this paper because it might contribute to sample selection bias.

Altman Z score ($ALTMANZ_{i,t}$) are winsorized at the 1% level and at the 99% level. Due to the fact that some variables do not have negative values for any given observation, winsorizing at only the 99% level is performed for yearly stock return standard deviation ($RETSTDEV_{i,t}$), turnover ($TURN_{i,t}$), research and development expenses ($R\&D_{i,t}$), goodwill ($GOODWILL_{i,t}$), property, plant, and equipment value ($PPE_{i,t}$), market to book ratio ($MB_{i,t}$), proceeds of equity ($EQUITYPRO_{i,t}$), and proceeds of debt ($DEBTPRO_{i,t}$). Correspondingly, turnover growth ($\Delta TURN_{i,t}$) and working capital accruals ($WCAP_{i,t}$) hold no positive values for any given observation. Hence, these two variables are only winsorized at the 1% level.

5.3. Descriptive Statistics

Descriptive statistics and (Pearson and Spearman) correlation statistics are provided in Table 2. Panel A shows the mean, standard deviation, minimum, median, and maximum of the sample used in the logit models shown in Table 3 and 4. The amount of FPS industries firms represents 40.5% (40.4%) of total firms. The average amount of total assets in the sample is equal to USD 591.700 (median USD 533.255).[12] The stock return standard deviation is on average 43.026 (median 8.986). Overall, the descriptive statistics are roughly comparable to prior literature's statistics (e.g., Johnson et al., 2000; Kim & Skinner, 2012), except for stock return, stock return skewness, stock return standard deviation, and the market to book ratio. One reason for that is different calculation methods for these variables. For example, Johnson et al. (2000) use cumulative daily stock return values in percentages, while in this paper annual price close values are used together with adjustment factors and dividend in USD (see Appendix A for the detailed calculation method). Kim and Skinner (2012) do not provide detailed information about their stock return calculations and market to book ratio.

Panel B of Table 2 shows the correlation coefficients of each variable used in the sample. The class action filing dummy variables are all significantly correlated with the FPS dummy variables, at the 5% level. This suggests that FPS industries firms might be more likely to be sued. As expected, the discrete FPS variable is perfectly correlated with the discrete FPS variable in the next period (1.00).[13] The data in panel b of Table 2 show that all other variables

[12] This calculation is done by taking the inverse of the natural logarithm. Suppose the following function: $f(x) = ln(x)$, where $x > 0$. Taking the inverse function leads to the following exponential function: $f'(x) = e^x$. Then the mean (median) value of total assets is calculated as: $f'(6.383) = e^{6.383} = 591.7$ ($f'(6.279) = e^{6.279} = 533.3$).

[13] These two variables are not modelled in the same logit model, which prevents the models from being exposed to multicollinearity.

are not perfectly correlated with each other, i.e., they all have an absolute value below 1.00. This suggests that there is no multicollinearity issue in the logit models used.

TABLE 2

Descriptive Statistics and Correlation Statistics

Panel A: Descriptive Statistics of Full Sample (n = 34,061 | Variables Model 1; n = 29,401 | Variables Model 2; n = 25,802 | Variables Model 3)

	Mean	Standard Deviation	Minimum	Median	Maximum
Variables Model 1					
$SUED_{i,t}$	0.063	0.242	0.000	0.000	1.000
$SUED_{i,t+1}$	0.052	0.222	0.000	0.000	1.000
SOX_t	0.754	0.431	0.000	1.000	1.000
SCA_t	0.087	0.282	0.000	0.000	1.000
$FPS_{i,t}$	0.405	0.491	0.000	0.000	1.000
$FPS_{i,t+1}$	0.404	0.491	0.000	0.000	1.000
Variables Model 2					
$LNASSETS_{i,t}$	6.383	2.485	-6.908	6.279	14.697
$\Delta TURN_{i,t}$	-0.066	1.368	-10.723	0.048	53.974
$RET_{i,t}$	-0.469	20.172	-132.000	0.000	64.280
$RETSKEW_{i,t}$	-0.245	1.007	-3.367	-0.191	2.158
$RETSTDEV_{i,t}$	43.026	217.929	0.003	8.986	2,041.645
$TURN_{i,t}$	21.385	34.422	-3.714	9.228	220.058
Variables Model 3					
$NYSE_{i,t}$	0.364	0.481	0.000	0.000	1.000
$USINC_{,t}$	0.874	0.332	0.000	1.000	1.000
$WCAP_{i,t}$	0.270	0.284	-0.787	0.244	1.000
$ROA_{i,t}$	-0.081	0.367	-2.376	0.028	0.310
$R\&D_{i,t}$	0.079	0.139	-0.006	0.017	0.811
$GOODWILL_{i,t}$	0.104	0.146	-0.007	0.027	0.600
$PPE_{i,t}$	0.226	0.221	0.000	0.142	0.872
$ALTMANZ_{i,t}$	4.683	10.405	-35.331	3.174	58.873
$MB_{i,t}$	3,890.615	11,953.265	0.001	269.737	83,601.820
$EQUITYPRO_{i,t}$	0.413	1.500	0.000	0.079	12.834
$DEBTPRO_{i,t}$	0.091	0.185	-0.045	0.000	1.070

TABLE 2 (continued)

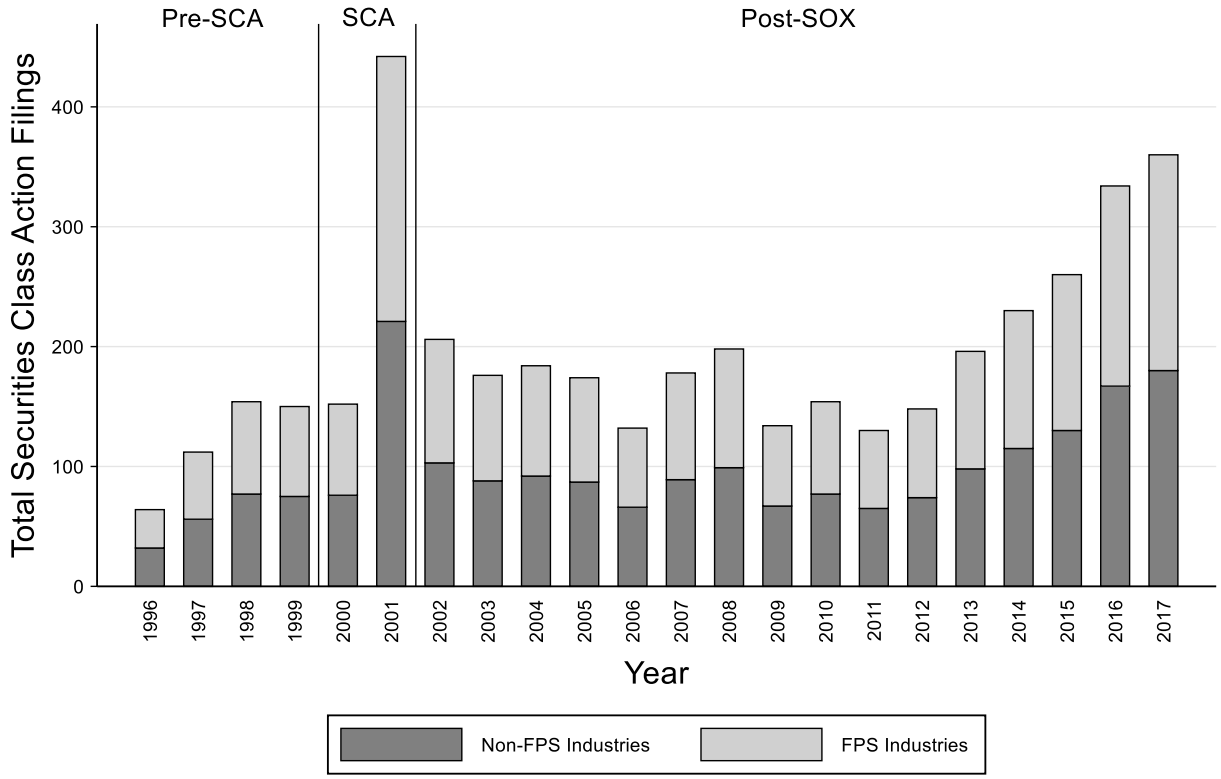
Panel B: Pearson Correlation Statistics (n = 34,061 | Variables Model 1; n = 29,401 | Variables Model 2)

	$SUED_t$	$SUED_{t+1}$	SOX_t	SCA_t	FPS_t	FPS_{t+1}	$LN\ ASSETS_t$	$\Delta TURN_t$	RET_t	$RET\ SKEW_t$	$RET\ STDEV_t$	$TURN_t$
$SUED_{i,t}$	1.00	-0.02*	-0.00	0.05*	0.03*	0.03*	0.04*	0.01	-0.12*	-0.02*	0.00	-0.02*
$SUED_{i,t+1}$	-0.02*	1.00	0.05*	-0.01	0.03*	0.03*	0.03*	0.01	-0.02*	-0.02*	0.00	-0.02*
SOX_t	-0.00	0.05*	1.00	-0.54*	-0.03*	-0.03*	0.14*	0.09*	0.04*	0.01	0.01*	0.02*
SCA_t	0.05*	-0.01	-0.55*	1.00	0.02*	0.02*	-0.04*	0.02*	-0.10*	-0.01*	-0.00	-0.01*
$FPS_{i,t}$	0.03*	0.03*	-0.01*	0.02*	1.00	1.00*	-0.22*	-0.03*	-0.04*	0.02*	0.03*	-0.20*
$FPS_{i,t+1}$	0.03*	0.03*	-0.01*	0.02*	1.00*	1.00	-0.22*	-0.03*	-0.04*	0.02*	0.03*	-0.20*
$LNASSETS_{i,t}$	0.03*	0.02*	0.14*	-0.04*	-0.23*	-0.23*	1.00	0.15*	0.11*	0.05*	-0.14*	0.40*
$\Delta TURN_{i,t}$	-0.04*	-0.07*	-0.10*	0.02*	0.03*	0.03*	-0.01*	1.00	0.02*	0.02*	-0.02*	0.07*
$RET_{i,t}$	-0.13*	-0.03*	0.05*	-0.07*	-0.05*	-0.05*	0.16*	0.15*	1.00	0.08*	-0.27*	0.08*
$RETSKEW_{i,t}$	-0.02*	-0.02*	0.01	-0.01*	0.04*	0.04*	0.00	0.05*	0.02*	1.00	-0.11*	0.05*
$RETSTDEV_{i,t}$	0.02*	0.02*	-0.02*	0.02*	0.11*	0.11*	0.14*	-0.01	0.02*	-0.12*	1.00	-0.04*
$TURN_{i,t}$	-0.02*	-0.02*	0.02*	-0.04*	-0.31*	-0.31*	0.65*	0.15*	0.17*	0.06*	0.06*	1.00

Model 1 represents formula 4 and 7, model 2 represents formula 5 and 8 and model 3 represents formula 6 and 9. For each correlation, the correlation coefficient is reported. * indicates the p-value for each correlation coefficient at 5%. The p-values are two-tailed. Pearson correlations are shown in the upper-right corner and Spearman correlations are shown in the bottom-left corner. Variable definitions can be found in Appendix A.

Figure 2 shows the amount of securities class action filings which are included in the sample for each year over the period of 1996 to 2017.[14] Three noticeable findings can be determined in regard to this figure. To start with, in each year, roughly 50% of the total sued firms are FPS industries firms. This implies that a substantial portion of firms that are sued are in fact high litigation risk firms. Next, the total amount of firms sued in the years of the scandal period (2000-2001) are considerably higher than in the pre-scandal period (1996-1999) and in the post-SOX period (2002-2017). To finish, since 2011, the amount of securities class action filings is steadily rising up to an amount which is notably higher than in the period 2002-2011 (in the post-SOX period).

Figure 2: Graphical illustration of securities class action filings count over the period of 1996 to 2017.



Source: Data are obtained from Compustat and SCAC.

[14] When comparing figure 2 to the chart of actual amount of filings per year provided by SCAC on their website 'http://securities.stanford.edu/charts.html', the amount of filings in this paper is noticeably lower than the actual amount of filings but shows roughly the same pattern. Also, the findings in this paper regarding figure 2 might be applicable to SCAC's chart in the same way as it is derived from figure 2.

6. RESULTS

6.1. Securities Class Action Filings

Table 3 shows the logit models for the full sample of the effect of SOX on securities class action lawsuits. The logit models are roughly split up into two segments: the effect on securities class action filings in the same year and in the second year. For each of these segments, three different models are performed to control for any variable potentially influencing the effect on being sued. Correspondingly, this reduced the number of observations from 34,061 in model 1 and 4 to 29,401 in model 2 and 5, and 25,802 in model 3 and 6 as shown in Table 3. A few considerable results can be found in Table 3.

First, the effect of SOX on class action filings is different than expected. As expounded upon Table 3, all models except for test (3) yield a positive and significant association between SOX and securities class action filings, rather than a negative association. The relation between SOX and being sued in the same year (i.e., year *t*) is positive but not significant for all models. However, the relation between SOX and being sued in the next year (i.e., year *t*+1) is positive and significant for all models, even when adding all available control variables.

Second, Table 3 shows that the awareness of corporate scandals, the underlying reason of the enactment of SOX, has a positive and significant relation with securities class action filings, except for test (3) once again. It implies that the relation between the scandal period and being sued in the same year (i.e., year *t*) is positive but not significant for all models. Conversely, the relation between the scandal period and being sued in the next year (i.e., year *t*+1) remains positive and significant even when control variables are added to the logit model.

Third, the interaction effect of SOX and the FPS dummy, and the scandal period and the FPS dummy in Table 3 do not remain significant in all models. When all firm characteristics are added to the models, the interaction effects are insignificant for the both the effect on being sued in the same year (i.e., year *t*) and being sued in the next year (i.e., year *t*+1). This suggests that the effect of FPS industries firms is more profound on being sued neither in the post-SOX, nor in the scandal period.

TABLE 3

Logit Model Results for Tests of the Effect of SOX on Securities Class Action Lawsuits

		Securities Class Action Filing					
	Exp.	***SUED*$_{i,t}$**			***SUED*$_{i,t+1}$**		
Variable	**Sign**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
INTERCEPT	?	-3.128***	-3.712***	-3.922***	-3.651***	-4.112***	-4.098***
SOX$_t$	-	0.360***	0.311**	0.102	0.752***	0.717***	0.604***
SCA$_t$	+	0.392**	0.311*	0.167	0.517**	0.499**	0.438*
FPS$_{i,t}$	+	0.124	0.287*	0.113			
SOX$_t$ * *FPS*$_{i,t}$	-	0.007	-0.105	-0.057			
SCA$_t$ * *FPS*$_{i,t}$	+	0.894***	0.533**	0.404			
FPS$_{i,t+1}$	+				0.216	0.347*	0.283
SOX$_t$ * *FPS*$_{i,t+1}$	-				0.042	-0.024	-0.075
SCA$_t$ * *FPS*$_{i,t+1}$	+				0.008	-0.137	-0.382
LNASSETS$_{i,t}$	+		0.103***	0.188***		0.084***	0.144***
ΔTURN$_{i,t}$	+		0.013	0.019		-0.008	-0.049*
RET$_{i,t}$	+		-0.018***	-0.015***		-0.005***	-0.002
RETSKEW$_{i,t}$	-		-0.036	-0.034		-0.090***	-0.090***
RETSTDEV$_{i,t}$	-		-0.001***	-0.001***		-0.000	-0.000
TURN$_{i,t}$	+		-0.004***	-0.003**		-0.004***	-0.003**
NYSE$_{i,t}$	+			-0.152*			-0.121
USINC$_{,t}$	-			0.026			0.085
WCAP$_{i,t}$	+			0.338*			0.127
ROA$_{i,t}$	+			-1.049***			-0.763***
R&D$_{i,t}$	-			-0.321			-0.228
GOODWILL$_{i,t}$	+			-0.031			-0.704**
PPE$_{i,t}$	+			-0.446**			-0.536**
ALTMANZ$_{i,t}$	+			-0.001			-0.011**
MB$_{i,t}$	-			-0.000*			-0.000
EQUITYPRO$_{i,t}$	+			-0.138***			-0.137***
DEBTPRO$_{i,t}$	+			-0.179			-0.197
Pseudo R^2		1.1%	3.9%	5.2%	0.9%	1.6%	2.4%
No. of obs.		34,061	29,401	25,802	34,061	29,401	25,802

This table shows logit model results of the effect of SOX on Securities Class Action Lawsuits, i.e., filings in the same year (year *t* in test (1), test (2), and test (3)), as well as in the next year (year *t*+1 in test (4), test (5), and test (6)). Coefficients are shown in the table, where * represents significance at the 10% level, ** represents significance at the 5% level, and *** represents significance at the 1% level. The p-values are two-tailed. All t-statistics are calculated using robust standard errors. Variable definitions can be found in Appendix A. Expected signs are based on prior literature.

6.2. Alternative Sample

To provide robustness and more insightful information, the logit model of Table 3 is rerun in Table 4 with a different sample. Table 4 provides the effect of SOX on securities class action lawsuits with a sample consisting of only FPS industries firms, following the sample selections of Francis et al. (1994) and Johnson et al. (2000). Surprisingly, the results in Table 4 differ slightly from the results in Table 3.

First, Table 4 shows that relation between SOX on securities class action filings is positive and significant for all models, except for tests (2) and (3). The results indicate that the association between SOX and the being sued in the same year (i.e., year *t*) is positive but insignificant, but the association between SOX and the being sued in the next year (i.e., year *t*+1) is positive and significant, similar to the results in Table 3.

Second, as shown in Table 4, the relation between the scandal period on securities class action filings is positive and significant for all models, except for models (5) and (6). The association between the scandal period and being sued in the same year (i.e., year *t*) is positive and significant, even when controlling for all feasible variables, contrary to the results in Table 3. However, the relation between the scandal period and being sued in the next year (i.e., year *t*+1) does not remain positive and significant, the more control variables are included. This indicates that the sample with FPS industries firms only is more sensitive to get sued in the same period (i.e., year *t*) as opposed to the next period (i.e., year *t*+1) due to the corporate scandal awareness, compared to the full sample.

TABLE 4

Logit Model Results for Tests of the Effect of SOX on Securities Class Action Lawsuits for High Risk Firms

		Securities Class Action Filing					
	Exp.	$SUED_{i,t}$			$SUED_{i,t+1}$		
Variable	Sign	(1)	(2)	(3)	(4)	(5)	(6)
INTERCEPT	?	-3.004***	-3.559***	-4.084***	-3.435***	-3.869***	-3.943***
SOX_t	-	0.368***	0.180	-0.014	0.794***	0.647***	0.519***
SCA_t	+	1.286***	0.828***	0.567***	0.525**	0.282	0.025
$LNASSETS_{i,t}$	+		0.137***	0.224***		0.120***	0.162***
$\Delta TURN_{i,t}$	+		0.004	0.009		0.016	-0.036
$RET_{i,t}$	+		-0.017***	-0.013***		-0.006***	-0.003
$RETSKEW_{i,t}$	-		-0.077*	-0.055		-0.110***	-0.097**
$RETSTDEV_{i,t}$	-		-0.001**	-0.001***		-0.000	-0.000
$TURN_{i,t}$	+		-0.009***	-0.007**		-0.011***	-0.011***
$NYSE_{i,t}$	+			0.000			-0.007
$USINC_{,t}$	-			-0.038			0.076
$WCAP_{i,t}$	+			0.648***			0.220
$ROA_{i,t}$	+			-1.128***			-0.753***
$R\&D_{i,t}$	-			-0.363			-0.308
$GOODWILL_{i,t}$	+			0.348			-0.389
$PPE_{i,t}$	+			0.008			0.036
$ALTMANZ_{i,t}$	+			-0.006			-0.012*
$MB_{i,t}$	-			-0.000*			-0.000
$EQUITYPRO_{i,t}$	+			-0.135**			-0.175***
$DEBTPRO_{i,t}$	+			-0.312			-0.414
Pseudo R^2		1.7%	5%	6.7%	0.8%	2%	2.8%
No. of obs.		13,801	12,947	11,981	13,768	12,928	11,964

This table shows logit model results of the effect of SOX on Securities Class Action Lawsuits, i.e., filings in the same year (year *t* in test (1), test (2), and test (3)) as well as in the next year (year *t*+1 in test (4), test (5), and test (6)). The sample in this table is restricted to only FPS industries firms, as opposed to the full sample shown in Table 3. Coefficients are shown in the table, where * represents significance at the 10% level, ** represents significance at the 5% level, and *** represents significance at the 1% level. The p-values are two-tailed. All t-statistics are calculated using robust standard errors. Variable definitions can be found in Appendix A. Expected signs are based on prior literature.

7. CONCLUSION

This paper investigates whether SOX has an effect on securities class action lawsuits. The rationale for analysing this relation is that scholars speculate that litigation risk has increased since the enactment of SOX in 2002, without providing empirical results. The litigation risk might contribute to either increased securities class action filings according to the disciplining hypothesis, or decreased securities class action filings according to the pressure hypothesis (Lin et al., 2019). The disciplining hypothesis foresees increased discipline of managers as a result of increased litigation risk, thus proceeding to invest in risky innovation projects even more, whereas the pressure hypothesis predicts less participation in risky innovation investments due to absence of shareholder tolerance if litigation risk increases (Holmstrom & Kaplan, 2003; Lin et al., 2019; Tian & Wang, 2011).

The results point out that there is a lagged positive relation between SOX and securities class action lawsuits, which supports the disciplining hypothesis, but is in contrast to the pressure hypothesis as pointed out in prior literature. This implies that there is a lagged increase in securities class action lawsuits after the enactment of SOX. There is also a lagged positive relation between the scandal period and securities class action lawsuits, which means a lagged increase in securities class action lawsuits in the scandal period. However, the results do not show any indication of FPS industries firms being more or less likely to be sued after the enactment of SOX than non-FPS industries firms. Neither does the data suggest that FPS industries firms are more or less likely than non-FPS industries firms to be sued in the scandal period. Surprisingly, when the sample is restricted to only FPS industries firms, there is a lagged positive relation between SOX and securities class action lawsuits, but there is a direct positive relation between the scandal period and securities class action lawsuits. This suggests that the FPS industries firms sample results is comparable with the full sample with regard to the effect of SOX. However, the FPS industries firms sample is more likely to be sued in the same year as a result of accounting fraud awareness, whereas firms in the full sample are more likely to be sued in the next year as a result of accounting fraud awareness.

This research contributes to existing literature in two ways. First, the paper links two well-defined concepts with each other in an empirical setting, which has not been done before. Second, two highly debated hypotheses, namely the disciplining hypothesis and the pressure hypothesis, are tested in a different setting, which strengthens the explanatory power of these hypotheses. A suggestion to future research would be to further analyse the interpretation of the two hypotheses.

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APPENDIX A

VARIABLE DEFINITIONS

Accounting and Finance Data

Altman Z Score ($ALTMANZ_{i,t}$) = Altman Z Score, based on the following calculation of Altman (1968):

$ALTMANZ_{i,t} = 1.2A + 1.4B + 3.3C + 0.6D + 1.0E$,

where:

$A = \frac{Working\ Capital}{Total\ Assets}$;

$B = \frac{Retained\ Earnings}{Total\ Assets}$;

$C = \frac{Earnings\ Before\ Interest\ and\ Tax\ (EBIT)}{Total\ Assets}$;

$D = \frac{\text{Market Value of Equity}}{\text{Total Liabilities}}$;

$E = \frac{Turnover}{Total\ Assets}$;

Goodwill ($GOODWILL_{i,t}$) = value of goodwill, divided by total assets;

Market to Book Ratio ($MB_{i,t}$) = ratio of the market price per share divided by the book value per share, calculated as;

Natural Logarithm of Total Assets ($LNASSETS_{i,t}$) = natural logarithm of the total assets of a firm;

New York Stock Exchange Listed ($NYSE_{i,t}$) = indicator variable equal to 1 if a firm is listed on the New York Stock Exchange;

Proceeds of Debt ($DEBTPRO_{i,t}$) = total amount of debt proceeds issued by a firm during the year (in USD), divided by total assets;

Proceeds of Equity ($EQUITYPRO_{i,t}$) = total amount of equity proceeds issued by a firms during the year (in USD), divided by total assets;

Property, Plant, and Equipment ($PPE_{i,t}$) = value of property, plant, and equipment, divided by total assets;

Research & Development Expenses ($R\&D_{i,t}$) = total research and development (R&D) expenses, divided by total assets;

Return on Assets ($ROA_{i,t}$) = ratio of total net income, divided by total assets;

Stock Return ($RET_{i,t}$) = market-adjusted ex-dividend stock return (in USD) over a period of 12 months, calculated as:

$RET_{i,t} = \frac{PCLOSE_{i,t}}{ADJ_{i,t}} - \frac{PCLOSE_{i,t-1}}{ADJ_{i,t-1}} + DIV_{i,t}$,

where:

$PCLOSE_{i,t}$ = annual price close in year t;

$PCLOSE_{i,t-1}$ = annual price close in year t-1;

$ADJ_{i,t}$ = firm adjustment factor in year t;

$ADJ_{i,t-1}$ = firm adjustment factor in year t-1;

$DIV_{i,t}$ = dividends per share in year t;

Stock Return Skewness ($RETSKEW_{i,t}$)	=	skewness of the market-adjusted stock return over a period of 12 months;
Stock Return Standard Deviation ($RETSTDEV_{i,t}$)	=	standard deviation of the market-adjusted stock return over a period of 12 months;
Turnover ($TURN_{i,t}$)	=	turnover, divided by shares outstanding at the end of the year;
Turnover Growth ($\Delta TURN_{i,t}$)	=	difference between current turnover and turnover of prior year, divided by total assets;
U.S. Incorporated ($USINC_{i,t}$)	=	indicator variable equal to 1 if a firm is founded in the United States of America (U.S.);
Working Capital Accruals ($WCAP_{i,t}$)	=	total current assets minus total current liabilities, divided by total assets.

Economic Data

FPS Industries Firm ($FPS_{i,t}$)	=	indicator variable equal to 1 if a firm operates in the biotechnology industry (SIC 2833-2836 and SIC 8731-8734), computer industry (SIC 3570-3577 and SIC 7370-7374), electronics industry (SIC 3600-3674), or retail industry (SIC 5200-5961) in year *t*, in accordance with Francis et al., 1994;
FPS Industries Firm ($FPS_{i,t+1}$)	=	indicator variable equal to 1 if a firm operates in the biotechnology industry (SIC 2833-2836 and SIC 8731-8734), computer industry (SIC 3570-3577 and SIC 7370-7374), electronics industry (SIC 3600-3674), or retail industry (SIC 5200-5961) in year t+1, in accordance with Francis et al., 1994;
Scandal Period (SCA_t)	=	the accounting scandal period, which is an indicator variable equal to 1 if the year equals 2000 or 2001.

Law Data

Sarbanes-Oxley Act (SOX_t)	=	post-SOX period, which is an indicator variable equal to 1 if the year equals 2002 until 2018;
Securities Class Action Filing ($SUED_{i,t}$)	=	indicator variable equal to 1 if a firm is sued through a securities related class action lawsuit in year *t*;
Lagged Securities Class Action Filing ($SUED_{i,t+1}$)	=	indicator variable equal to 1 if a firm is sued through a securities related class action lawsuit in year t+1.

APPENDIX B

SAMPLE SELECTION PROCESS

TABLE 1

Composition of Sample Observations

Securities class action filings from SCAC in period of 1996 to 2017	**5,512**
Less: Firms with unidentified ticker symbol	(35)
Less: Firms which are not listed on the NYSE, AMEX, or NASDAQ	(481)
Less: Unidentified match with Compustat data	(2,587)
Useable filings before merging with firm-years without class action filings	**2,409**
Firm-years without class action filings	38,763
Useable observations after dataset merger	**41,172**
Less: Double firm-years for the same firm	(1,465)
Less: Observations with missing assets	(5,646)
Observations used for tabulated results	**34,061**