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The Effect of Changes in Internal Control Systems on Audit Risk

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Abstract

Internal control weaknesses influence audit fees and audit risk, making their remediation a crucial aspect of corporate governance. While prior research focuses on auditors, this study examines the corporate perspective, analyzing how the remediation of internal control weaknesses affects audit fees and audit risk. Using a dataset of 450 observations, the audit fee model shows a significant negative association between audit fees and the remediation of internal control weaknesses, indicating that audit fees decrease as the company remediates its internal control weaknesses. The restatement model shows no significant relationship between abnormal audit fees and the probability of restatements, suggesting that changes in audit fees due to changes in internal control systems have no impact on audit risk. However, the remediation of internal control weaknesses is significantly negatively associated with the probability of restatements, meaning that firms that remediate their internal control weaknesses experience a lower audit risk and higher audit quality. These findings highlight the economic significance of internal control quality and its implications for firms, regulators, and auditors in mitigating audit risk.

Keywords: audit fee model; audit quality; audit risk model; internal control weaknesses; restatement model

1. Introduction

As a consequence of accounting scandals at Enron, WorldCom, and Tyco in the early 2000s, the United States Congress enacted the Sarbanes-Oxley Act of 2002 (SOX).[1] The U.S. government's goal with SOX is to regain public confidence and information quality by improving the accuracy of reported financial statements.[2] With the introduction of SOX, researchers and other stakeholders could evaluate approximately the quality of a firm's internal control systems.[3] In more detail, mandatory disclosure requirements for audit fees and internal control deficiencies make it possible to examine audit risk and its components.[4] However, SOX brings not only advantages. For example, companies must record additional costs in case of a negative report on internal control systems.[5] Furthermore, there is evidence that the implementation of SOX and the growing complexity of business transactions are causing increases in the number of restatements overall and the number of firms reporting a restatement.[6] These increases are mainly due to adjustments to revenues, costs, or expenses in the financial statements.[7] Specifically, the number of annual announcements of financial restatements increased by 67 percent between 2002 and 2005.[8] Also, with a more recent reference, the Public Com-

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[1] See therefore Guragai and Hutchinson (2019, p. 363); Hoag and Hollingsworth (2011, p. 173); Raghunandan and Rama (2006, p. 99).

[2] See therefore Ashbaugh-Skaife et al. (2008, p. 219); Guragai and Hutchinson (2019, p. 362); Hoag and Hollingsworth (2011, p. 174).

[3] See therefore Chalmers et al. (2019, p. 100).

[4] See therefore Seidel (2017, p. 1345).

[5] See therefore Munsif et al. (2011, p. 87).

[6] See therefore DeFond and Zhang (2014, p. 275); Kester et al. (2013, pp. 155-156).

[7] See therefore Kester et al. (2013, p. 156).

[8] See therefore United States Government Accountability Office (2006, p. 11).

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pany Accounting Oversight Board reported an alert due to a significant number of financial reporting control deficiencies in 2013.[9] This development underlines the interest of several stakeholders, like regulators, audit firms, and corporate boards.[10] For the latter, the consequences of internal control weaknesses and financial statement restatements are particularly significant, as stated in the following.

Internal control weaknesses can impact the firm itself and the firm's environment. On the one hand, internal control quality can impact decision-making and the actions taken by the management due to the reliability of forecasts.[11] For example, Chalmers et al. (2019) point out that weaknesses in internal control cause errors in the internal management report, which ultimately lead to uncertainty and lower accuracy of earnings forecasts and thus to changes in behavior.[12] On the other hand, as indicated above, adverse disclosures on the internal control system can impact the firm economically.[13] Negative stock price reactions, as well as the limited access to funds, are exemplary consequences of internal control weakness disclosures.[14] Among other things, this lies in the relationship between investors and the company. This relationship is affected since internal control weaknesses represent a relevant risk for investors.[15] Investors' risk is that the statements are not presented fairly and are therefore not credible.[16] In addition, credit-rating agencies like Moody's or Fitch Ratings have suggested that internal control weaknesses lead to less reliable financial statements.[17] Consequently, investors take advantage of internal control disclosures to value and allocate capital.[18] Therefore, companies and their managers have an incentive to reduce the risk of a misreporting financial statement by remediating internal control weaknesses so that creditors and other stakeholders fairly state their firms.[19]

Financial restatements can also negatively impact the firm and its value. This applies especially when the restated financial report is worse than the original.[20] Restatements indicate low reporting quality and greater information risk like internal control weaknesses.[21] Following that, restatements indicate weak reliability of a company's financial reporting system and therefore lead to a negative image for the firm.[22] Consequently, analysts have a lower forecast optimism and reduce their stock suggestions quicker.[23] As evidence, the Securities and Exchange Commission (SEC) lists financial restatements as a significant factor undermining investors' confidence in financial reporting.[24] This lower optimism and confidence causes that, in the end, restatement firms have significant negative stock returns and higher costs of capital.[25]

In summary, the consequences of internal control weaknesses and financial statement restatements are particularly significant for the companies due to the economic impact. Moreover, consequences exist not only when internal control weaknesses arise but also when internal control weaknesses remediate. Thus, examining these remediations effects from a corporate perspective is interesting because they can specifically try to eliminate their internal control weaknesses. Therefore, I want to examine how changes in internal control systems due to remediation of internal control weaknesses affect audit risk, respectively, the probability of restatements.

This study contributes to prior literature because many studies interpret their results from an auditor's perspective or as recommendations for regulators.[26] Whereas in this study, the focus is on the company. Thus, the study results interpret in a corporate sense.

As Hogan and Wilkins (2008) or Blankely et al. (2012) used, I first use an Audit Fee Model to determine the relationship between the remediation of internal control weaknesses and audit fees.[27] In the next step, I use a Restatement Model to examine the effect of abnormal audit fees and the remediation of internal control weaknesses on the overall audit risk.[28] Here, the probability of a financial statement restatement acts as a proxy for the audit risk.

This paper is structured as follows: The following section discusses the previous literature and presents the hypotheses. The subsequent section discusses the data, research methods, and results. The final section discusses interpretations and conclusions.

2. Theoretical Analysis and Derivation of Hypotheses

As mentioned above, section 404 of the SOX requires publicly traded companies to disclose a management and auditor report about the effectiveness of their internal control systems.[29] The disclosures are in the form of 10-K reports. According to the Committee of Sponsoring Organizations of the Treadway Commission (COSO), internal control is "a process, effected by an entity's board of directors, management, and

[9] See therefore Lawrence et al. (2018, p. 140); PCAOB (2013, p. 35).
[10] See therefore Romanus et al. (2008, p. 389).
[11] See therefore Chalmers et al. (2019, p. 95).
[12] See therefore Chalmers et al. (2019, p. 95).
[13] See therefore Albring et al. (2018, p. 485).
[14] See therefore Hammersley et al. (2012, p. 74); Hammersley et al. (2008, p. 141).
[15] See therefore Hoitash et al. (2008, p. 106).
[16] See therefore Bae et al. (2021, p. 587); DeFond and Zhang (2014, p. 276).
[17] See therefore Raghunandan and Rama (2006, p. 102).
[18] See therefore Hammersley et al. (2012, p. 74); Jonas et al. (2007, p. 1).
[19] See therefore Mitra et al. (2017, p. 240).
[20] See therefore Pittman and Zhao (2021, p. 129).
[21] See therefore Pittman and Zhao (2021, p. 129).
[22] See therefore Feldmann et al. (2009, p. 209); Kester et al. (2013, p. 155).
[23] See therefore Cao et al. (2012, p. 958); Fang and Yasuda (2009, p. 3735); Jackson (2005, p. 706).
[24] See therefore Archambeault et al. (2008, p. 966); Guragai and Hutchinson (2019, p. 364).
[25] See therefore H. Chen et al. (2011, p. 2); Hribar and Jenkins (2004, p. 337); Palmrose et al. (2004, p. 59).
[26] See therefore Ashbaugh-Skaife et al. (2008, p. 217); Elder et al. (2009, p. 543); Krishnan et al. (2011, p. 1).
[27] See therefore Hogan and Wilkins (2008, p. 227); Blankely et al. (2012, p. 83).
[28] See therefore Blankely et al. (2012, p. 84).
[29] See therefore Krishnan et al. (2011, p. 1).

other personnel, designed to provide reasonable assurance regarding the achievement of objectives relating to operations, reporting, and compliance."[30]

As part of the enactment of SOX, the Public Company Accounting Oversight Board (PCAOB) emerged. The PCAOB is a private non-profit organization that oversees the audits of public companies.[31] Therefore, the PCAOB established and amended auditing and quality control standards to fulfill its objectives. In the following, I refer to three of these auditing standards: Auditing Standard No. 5, Auditing Standard No. 8, and Auditing Standard No. 13.

Auditing Standard No. 5 describes a top-down approach consisting of five phases of the internal control over financial reporting (ICOFR) audit: planning, scoping, testing, evaluation, and reporting.[32] This approach aims to make ICOFR audits more efficient and, therefore, more economical for the companies.[33] The PCAOB defines ICOFR as "a process [...] to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP."[34] Within the successive phases of this approach, the auditor should identify and evaluate areas that can lead to a material weakness.[35] A material weakness relates to "a deficiency [...] in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of the company's annual or interim financial statements will not be prevented or detected on a timely basis."[36] Consequently, the internal control system is considered ineffective due to one or more material weaknesses.[37] Moreover, the PCAOB distinguishes between material weaknesses and significant deficiencies. The latter ones are "deficienc[ies] [...] in internal control over financial reporting that [are] less severe than material weaknesses".[38] Nevertheless, prior research suggests distinguishing between significant deficiencies and material weaknesses is complex and challenging.[39] Moreover, there is no consensus in the literature concerning the impact of problem severity on the relationship between audit fees and internal control weaknesses. For example, Hoitash et al. (2008) compare the impact of material weaknesses and significant deficiencies on audit fees and find that only material weaknesses are significantly associated.[40] Whereas Raghunandan and Rama (2006) report, that audit pricing does not vary depending on the severity of material weaknesses.[41] These results support the condition in this study of not distinguishing between material weaknesses and significant deficiencies, respectively, the severity of deficiencies.

In summary, the objective of Auditing Standard No. 5 is to conduct the audit of financial statements in a reliable manner that reduces audit risk to an appropriately low level. Therefore, the PCAOB additionally includes the Audit Risk Model in their Auditing Standard No. 8.[42]

The Audit Risk Model is a framework for evaluating risks in the audit planning process.[43] This conceptual tool decomposes audit risk into inherent risk, control risk, and detection risk.[44]

Audit Risk Model:

$$\text{Audit Risk} = \text{Inherent Risk} * \text{Control Risk} * \text{Detection Risk}$$

Inherent risk "refers to the susceptibility of an assertion to a misstatement, due to error or fraud, that could be material, individually or in combination with other misstatements, before consideration of any related controls."[45] Whereas control risk refers to "the risk that a misstatement due to error or fraud [...] will not be prevented or detected on a timely basis by the company's internal control."[46] Inherent and control risk build together the risk of material misstatement.[47] In other words, they represent the risk that is coming from the company itself. In contrast, detection risk refers to "the risk that the procedures performed by the auditor will not detect a misstatement that exists and that could be material, individual or in combination with other misstatements."[48] The three risk components together form the audit risk which is "the risk that the auditor expresses an inappropriate audit opinion when the financial statements are materially misstated."[49] Closely related to the Audit Risk Model in Auditing Standard No. 8 is Auditing Standard No. 13. Its objective is that auditors "address the risks of material misstatement through appropriate overall audit responses and audit procedures."[50] In other words, this regulation requires that auditors adjust their effort put into audit to the previously assessed risk.[51] Regarding the Audit Risk Model, this would mean that if, for example, control risk increases, auditors would increase their audit effort to decrease detection risk and therefore keep audit risk at an appropriate level. Conversely, auditors will reduce their effort if the control risk decreases.

Several academic studies have examined this topic, given this regulatory emphasis and the importance of the Audit

[30] Committee of Sponsoring Organizations of the Treadway Comission (2012, p. 1).
[31] See therefore Elder et al. (2009, p. 544).
[32] See therefore Asare et al. (2013, pp. 3-4); Krishnan et al. (2011, p. 2); PCAOB (2007, p. 18).
[33] See therefore Hoag and Hollingsworth (2011, p. 176); Krishnan et al. (2011, p. 2).
[34] PCAOB (2007, pp. 57-58).
[35] See therefore Asare et al. (2013, p. 5).
[36] PCAOB (2007, p. 59).
[37] See therefore PCAOB (2007, p. 20).
[38] PCAOB (2007, p. 60).
[39] See therefore Hoitash et al. (2008, p. 123).
[40] See therefore Hoitash et al. (2008, p. 118).
[41] See therefore Raghunandan and Rama (2006, p. 99).
[42] See therefore PCAOB (2010, pp. 11-12).
[43] See therefore R. S. Chen (2019, p. 99).
[44] See therefore Elder et al. (2009, p. 544).
[45] PCAOB (2010, p. 11).
[46] PCAOB (2010, p. 12).
[47] See therefore PCAOB (2010, pp. 11-12).
[48] PCAOB (2010, p. 12).
[49] PCAOB (2010, p. 11).
[50] PCAOB (2010, p. 64).
[51] See therefore Feldmann et al. (2009, p. 207); Pittman and Zhao (2021, p. 130).

Risk Model and its components. For example, one set of studies examines the characteristics of companies reporting an internal control weakness, leading to higher control risk. Firms reporting internal control deficiencies tend to be "smaller, younger, financially weaker, more complex, growing rapidly, or undergoing restructuring."[52] Additionally, Y. Chen et al. (2014) report that information technology capabilities support internal control systems and signal lower business risk, leading to lower audit fees.[53]

Other studies, in turn, examine the relationship between audit effort, respectively audit fees, and internal control deficiencies. On the one hand, Albring et al. (2018) examine the impact of audit fees on internal control weaknesses. They suggest that prior year audit fees can function as a signal for future internal control weaknesses.[54] The explanation for this result is that internal control weaknesses in the previous year increase risk but do not yet warrant reporting. Nevertheless, audit fees increase due to the increased risk. In the following year, it changes, and the reporting of the internal control weaknesses occurs.[55] On the other hand, prior literature examines the impact of internal control weaknesses on audit fees. In general, empirical evidence supports the previously mentioned theoretical view of the Audit Risk Model that weaknesses in internal control are associated with higher audit effort and, therefore, higher audit fees.[56] Elder et al. (2009) also find that higher audit fees are associated with internal control weaknesses. Additionally, they suggest a pecking order among auditors' strategies to manage an increase in control risk.[57] Thus, at first, auditors adjust their fees, then modify their opinions, and at last resign.[58]

Another topic within this field of research is the effect of remediation of material weaknesses. In line with the literature and theoretical considerations of the Audit Risk Model, Krishnan et al. (2011) find that the remediation of internal control weaknesses is associated with a decrease in audit fees.[59] Following that, Hammersley et al. (2012) report that companies unable to remediate their material weaknesses notice higher audit fees and a higher likelihood of auditor resignation.[60] In addition to these findings, some suggest that companies continue to pay significantly higher audit fees even after the material weakness remediation was successful.[61] For example, Munsif et al. (2011) find audit fee risk premiums of 35% one year and 21% two years after the remediation of internal control weaknesses.[62] As an explanation, Calderon et al. (2012) state that the amount of audit fees determines within the initial risk assessment. Further, this initial risk assessment strongly considers audit results of prior periods.[63] A different explanation comes from Albring et al. (2012), who assert that auditors do not reduce their effort in the remediation year, which ultimately remains audit fees high.[64] From these explanations and results, the question arises whether audit effort or a risk premium are primary drivers for audit fees.

Several studies examine whether the change in audit fees results from a change in effort or a change in the risk premium. The theoretical foundation for this consideration lies in Simunic's (1980) audit pricing model.[65] This model suggests that audit efforts do not solely drive audit fees. There is also an expected future loss cost component representing litigation risk.[66] In other words, an increase in control risk through an internal control weakness leads to an increase in possible auditor litigation. Moreover, there is no possible reduction in litigation risk, and the auditor charges a risk premium.[67] Some previous literature supports the audit pricing model. Jiang and Son (2015) find that auditors consider adjustments in audit effort and risk premium in response to increasing control risk.[68] Bae et al. (2021) can confirm these results and further state that, next to a significantly higher audit effort, companies pay a 6 percent premium in response to internal control weaknesses.[69] Hoag and Hollingsworth (2011) report a 42 percent audit fee premium for Big4 clients.[70]

In summary, the literature supports the view that internal control weaknesses are positively associated with audit fees. This association also applies to the remediation of internal control weaknesses as it decreases audit fees. Further, there is a positive relationship between audit fees and audit effort. In addition to the effort component within the audit fee, there seems to be a risk premium component. In the context of this study, I conclude that a change in audit effort at least partially causes an audit fee change. Therefore, the first hypothesis considers this conclusion and states:

> H1: The remediation of an internal control weakness is associated with a decrease in audit fees for that firm.

As the Audit Risk Model indicates, the change of effort respectively the change in audit fees can affect the audit risk (PCAOB Auditing Standard No. 8 §3). However, previous literature often considers audit quality instead of audit risk. Furthermore, a negative relationship between audit risk and audit quality is assumed. This negative association is derived

[52] Doyle et al. (2007, p. 193).
[53] See therefore Y. Chen et al. (2014, p. 175).
[54] See therefore Albring et al. (2018, p. 499).
[55] See therefore Albring et al. (2018, p. 488).
[56] See therefore Bae et al. (2021, p. 616); Gaber et al. (2019, p. 16); Hay (2013, p. 163); Seidel (2017, p. 1342).
[57] See therefore Elder et al. (2009, p. 545).
[58] See therefore Elder et al. (2009, p. 543).
[59] See therefore Krishnan et al. (2011, p. 1).
[60] See therefore Hammersley et al. (2012, p. 73).
[61] See therefore Calderon et al. (2012, p. 693); Mitra (2009, p. 372).
[62] See therefore Munsif et al. (2011, p. 87).
[63] See therefore Calderon et al. (2012, p. 696).
[64] See therefore Albring et al. (2012, pp. 377, 380).
[65] See therefore Simunic (1980, p. 169).
[66] See therefore R. S. Chen (2019, p. 99); Jiang and Son (2015, p. 321).
[67] See therefore Jiang and Son (2015, p. 321).
[68] See therefore Jiang and Son (2015, p. 318).
[69] See therefore Bae et al. (2021, p. 616).
[70] See therefore Hoag and Hollingsworth (2011, p. 196).

from the definition of audit risk as it is "the risk that the auditor expresses an inappropriate audit opinion when the financial statements are materially misstated."[71] In other words, an increase in audit risk is associated with a deterioration of audit quality. Therefore, I examine the relationship between audit fees and audit quality in the following.

High audit quality represents the "assurance that financial statements faithfully reflect the firm's underlying economics, conditioned on its financial reporting system and innate characteristics."[72] This definition includes auditor error detection as well as compliance with auditing standards.[73] Instead of total audit fees, the literature considers abnormal audit fees since "normal fees are mainly determined by factors that are common across different clients [...], while abnormal fees are determined by factors that are idiosyncratic to a specific auditor-client relationship."[74] Abnormal audit fees are the "difference between actual audit fees [...] and the expected, normal level of audit fees."[75] There are two contradictory approaches in the literature, the effort, and the economic bonding view, explaining the relationship between abnormal audit fees and audit quality.

The effort view refers to the view of the PCAOB in Auditing Standard No. 13. Theoretically, it describes that more effort is associated with higher audit fees, and due to more audit effort, the audit quality increases.[76] Additionally, the effort view assumes that increased or reduced audit effort causes abnormal audit fees.[77] Therefore, in other words, abnormal audit fees are positively associated with audit quality. Empirically, there is some evidence for the effort view. Eshleman and Guo (2014) find a negative relationship between the abnormal audit fees and the likelihood that companies use income-increasing discretionary accruals. This result implies that companies and their managers lose discretion in choosing accruals by increasing the abnormal audit fees.[78] Moreover, this result suggests a positive relationship between abnormal audit fees and audit quality which eventually supports the effort view.[79] The findings from Blankely et al. (2013) also align with the effort view. Here, they examine the effect of abnormal audit fees on future restatements and find a negative relationship. [80] Therefore, they conclude that lower abnormal audit fees indicate lower audit effort, resulting in a higher likelihood of restatements, respectively, in lower audit quality.[81] Lobo and Zhao (2013) support this view by finding a robust negative association between audit efforts and restatements.[82] In addition, they argue that the discrepant results are due because pre-audit misstatement risk is not constant.[83] Alhadab (2018) finds supporting results but uses a different explanatory approach.[84] He argues by using the productive theory, which states that additional audit fees lead to additional audit procedures by the audit firm, which ultimately increases the efficiency and effectiveness of the companies' operating system. This increase in the efficiency and effectiveness of the companies' operating system leads to less ability for earnings manipulation by managers and, therefore, to higher audit quality and higher financial reporting quality.[85]

Economic bonding stems from the theoretical consideration that high audit fees bond the auditor to its client, the company. Due to this bond, the auditor loses his or her independence and, therefore, also his or her professional skepticism, which ultimately results in auditors giving companies more discretion in questionable accounting practices.[86] According to the economic bonding view, the auditor's independence to the entity determines the ability to detect a misstatement and not the effort the auditor exerts.[87] In terms of the association between abnormal audit fees and audit quality, this would mean that there is a negative relationship between them. Several papers support the economic bonding view and provide empirical evidence. Hribar et al. (2014) find a significant positive relationship between unexplained audit fees, which equal abnormal audit fees, and the occurrence of restatements.[88] Here, it is worth mentioning that they reverse the direction of correlation and therefore argue that high audit fees result from a low-quality accounting system.[89] Despite this, they cannot rule out the economic bonding effect between poor quality accounting and fees.[90] Hoitash et al. (2007) report a negative relation between total fees and audit quality, suggesting that higher fees increase the economic dependence of auditors.[91] There is also evidence explicitly rejecting the economic bonding view. Blankely et al. (2014) state that restating firms have longer abnormal audit report lags and thus a more significant number of days between the fiscal year-end and the audit report date.[92] They argue that there should be a negative relationship between future restatements and audit report lags in the case of economic bonding.[93] The idea is that a less skeptical auditor, due to his or her missing independence, fails to adjust his or her effort, resulting in a shorter audit report lag. Literature also differentiates between positive and negative abnormal audit fees when considering economic bonding effects. Choi et al.

[71] PCAOB (2010, p. 11).
[72] DeFond and Zhang (2014, p. 276).
[73] See therefore Rajgopal et al. (2021, p. 560).
[74] Choi et al. (2010, p. 116).
[75] Choi et al. (2010, p. 116).
[76] See therefore Eshleman and Guo (2014, p. 120).
[77] See therefore Blankely et al. (2013, p. 18); Eshleman and Guo (2014, p. 135).
[78] See therefore Eshleman and Guo (2014, p. 129).
[79] See therefore Eshleman and Guo (2014, p. 129).
[80] See therefore Blankely et al. (2013, p. 18).
[81] See therefore Blankely et al. (2013, p. 18).
[82] See therefore Lobo and Zhao (2013, p. 1385).
[83] See therefore Lobo and Zhao (2013, p. 1388).
[84] See therefore Alhadab (2018, p. 395).
[85] See therefore Alhadab (2018, pp. 395, 397).
[86] See therefore Blankely et al. (2014, p. 30); Eshleman and Guo (2014, p. 120).
[87] See therefore Blankely et al. (2013, p. 16); Hoitash et al. (2007, p. 762).
[88] See therefore Hribar et al. (2014, pp. 516, 517, 528).
[89] See therefore Hribar et al. (2014, p. 514).
[90] See therefore Hribar et al. (2014, p. 535).
[91] See therefore Hoitash et al. (2007, pp. 761-762).
[92] See therefore Blankely et al. (2014, p. 27).
[93] See therefore Blankely et al. (2014, pp. 27, 30).

(2010) and Krauß et al. (2015) find only a significant negative association between audit quality and positive abnormal audit fees, consistent with the economic bonding view.[94] Negative abnormal fees do not affect the audit quality. They argue that auditors do not compromise audit quality since they have no monetary incentives.[95] At the same time, audit quality deteriorates if the monetary benefits exceed the associated costs for a misstated audit report.[96] Different results for negative abnormal audit fees are in the paper of Asthana and Boone (2012). They report a negative relationship between audit quality and negative abnormal audit fees. They argue that companies with low audit fees have greater bargaining power, giving them more freedom for questionable accounting practices.[97]

In summary, there is no clear relation between abnormal audit fees and audit quality. Neither the effort nor economic bonding view is a generally prevailing explanatory approach. However, the effort view and its assumption better suit the context of the first hypothesis. Thus, I assume that increased or reduced audit effort causes abnormal audit fees.[98] Accordingly, in the context of this study and related to hypothesis 1, I expect lower audit fees due to the remediation of internal control weaknesses, implying reduced effort and thus poorer audit quality, respectively higher audit risk.[99] Finally, this suggests a negative association between abnormal audit fees and audit risk, which represents the second hypothesis:

> H2a: Abnormal audit fees are negatively associated with audit risk.

In addition to the indirect examination of the effects of changes in internal control systems on audit risk via audit fees, I examine the direct impact of remediating an internal control weakness on audit risk. Therefore, I expect that the remediation of an internal control weakness is associated with lower audit risk. The last hypothesis is:

> H2b: The remediation of an internal control weakness is associated with a decrease in audit risk.

3. Empirical Analysis of the Effect of Changes in Internal Control Systems on Audit Risk

3.1. Research Methods

In the following, I present the two regression models examining the hypotheses. The first one, for hypothesis 1, is an Audit Fee Model to examine the relationship between the remediation of internal control weaknesses and audit fees. For hypotheses 2a and 2b, the second one is a Restatement Model to examine the effect of remediating internal control weaknesses and abnormal audit fees on audit risk, respectively, the probability of a restatement. In addition, this chapter considers the sample attrition and composition.

3.1.1. Audit Fee Model

The first hypothesis addresses the relationship between the remediation of internal control weaknesses and audit fees. In constructing the model, I rely on previous models concerning audit fees. In these Audit Fee Models, the dependent variable is the natural log of audit fees (*LNAFEE*).[100] The explanatory variable is the occurrence of remediation of internal control weaknesses (ΔICW). This variable will eventually allow me to examine the effect of remediation in internal control systems on audit fees. Therefore, I initially test the first hypothesis using the following regression model:

Audit Fee Model:

$$\begin{aligned} LNAFEE_{i,t} = {} & \beta_0 + \beta_1 \Delta ICW_{i,t} + \beta_2 LNTA_{i,t} \\ & + \beta_3 LNSALES_{i,t} + \beta_4 MERGER_{i,t} \\ & + \beta_5 INVREC_{i,t} + \beta_6 CA_{i,t} + \beta_7 INTANG_{i,t} \\ & + \beta_8 ROA_{i,t} + \beta_9 LOSS_{i,t} + \beta_{10} CR_{i,t} \\ & + \beta_{11} LEV_{i,t} + \beta_{12} BIG4 + \beta_{13} BUSY_{i,t} \\ & + \beta_{14} OPINON_{i,t} + \beta_{15-23} INDCON_{i,t} \\ & + \beta_{24-33} YEAR_{i,t} + \varepsilon_{i,t} \end{aligned}$$

The primary variable of interest (ΔICW) concerns changes in internal control systems. Instead of considering the simple occurrence of internal control weaknesses, I consider the remediation of them because, in the first case, the previous level of weaknesses is unknown. For example, it could be possible that companies have internal control weaknesses but do not have to disclose them because their occurrence is below a particular threshold.[101] Another scenario would be if the company remediated the internal control weakness before disclosing it.[102] Thus, it would be unclear to which extent the internal control system has changed. Moreover, the effect of the occurrence of internal control weaknesses would be biased.[103] In the latter case, the disclosure of internal control weakness makes known the initial level of internal control weaknesses. Therefore, I use ΔICW as a dummy variable that takes the value of 1 if a firm reports an internal control weakness in $t = 0$ but does not report this weakness in $t = 1$. In other words, the dummy variable takes the value of 1 if a firm remediates its internal control weakness. Consistent with previous studies, I expect a negative relationship between *LNAFEE* and ΔICW, indicating that

[94] See therefore Choi et al. (2010, p. 116); Krauß et al. (2015, pp. 45, 48).
[95] See therefore Choi et al. (2010, p. 116); Krauß et al. (2015, p. 49).
[96] See therefore Choi et al. (2010, p. 121); Krauß et al. (2015, p. 49).
[97] See therefore Asthana and Boone (2012, pp. 1, 15); Casterella et al. (2004, p. 123).
[98] See therefore Blankely et al. (2013, p. 18); Eshleman and Guo (2014, p. 135).
[99] See therefore Eshleman and Guo (2014, p. 120).
[100] Overview in Hay (2013, pp. 165-166).
[101] See therefore Seidel (2017, p. 1370).
[102] See therefore Seidel (2017, p. 1370).
[103] See therefore Seidel (2017, p. 1370).

the remediation of an internal control weakness is associated with a decrease in audit fees for that firm.[104]

In the Audit Fee Model, I add several control variables to control for the effect of ΔICW on *LNAFEE*. The control variables resemble companies', auditor, and engagement attributes.[105] Within the companies' attributes, I control for size (*LNTA*, *LNSALES*), complexity (*MERGER*), inherent risk (*INVREC*, *CA*, *INTANG*), profitability (*ROA*, *LOSS*), and leverage and liquidity (*CR*, *LEV*). *LNTA* is the logarithm of the company's total assets, whereas *LNSALES* is the logarithm of sales made by the company. *MERGER* is a dummy variable with the value of 1 if the firm's acquisition value is not equal to zero. *INVREC* is the sum of inventories and receivables divided by total assets. *CA* represents the current-asset ratio and *CR* the current ratio. *INTANG* calculates by dividing intangibles by total assets. *ROA* is the return on assets and calculates by dividing EBIT by total assets. *LEV* is the leverage ratio or long-term debt divided by total assets. LOSS is a dummy variable with the value of 1 if the current year's net income is negative. For *LNTA*, *LNSALES*, *MERGER*, *INVREC*, *CA*, *INTANG*, *LOSS*, and *LEV*, I expect a significant positive association with audit fees. The intuition behind this is that audit fees increase as the scope of audit increases due to a larger and more complex company.[106] For *ROA* and *CR*, I expect a negative correlation with audit fees, as profitable and liquid companies are usually less likely to be affected by internal control weaknesses.[107] Within the auditors' attributes and engagement attributes, I control for auditor quality (*BIG4*), busy season (*BUSY*), and audit problems (*OPINION*). *BIG4* is a dummy variable that takes the value of 1 if the auditor is one of the big four audit firms (i.e., KPMG, EY, Deloitte, PWC). *BUSY* is a dummy variable that takes the value of 1 if the fiscal year ends in December. *OPINION* is a dummy variable with a value of 1 if the auditor issues a going concern audit opinion. For the *BIG4* variable, I expect a positive association since there is empirical evidence that audit fee premiums for Big4 clients exist.[108] The *BUSY* variable is also positively associated because audits are more expensive at the end of the year.[109] In addition, a positive association is expected if the auditor issues a going-concern opinion (*OPINION*), as this is associated with a more significant effort.[110] I also control for fixed effects in different industries (*INDCON*) and different years (*YEAR*).

3.1.2. Restatement Model

Hypothesis 2a addresses the relationship between abnormal audit fees and audit risk. Moreover, hypothesis 2b addresses the relationship between the remediation of internal control weaknesses and audit risk. The problem with examining relationships concerning audit risk is that the assurance auditors provide is not observable.[111] Thus, it is challenging to measure audit risk directly. Therefore, I use the probability of restatements as a proxy for audit risk. The strengths of this proxy are low measurement errors, and it serves as solid evidence for poor audit quality respectively high audit risk.[112] In line with that, Rajgopal et al. (2021) report that restatements are a helpful predictor of poor audit quality.[113] Furthermore, the relationship between restatements and audit risk is positive. In other words, the higher the probability of a restatement, the higher the audit risk. Analogous to the Audit Fee Model, I rely on previous models concerning restatements. In these Restatement Models, the dependent variable is a dummy variable that takes the value of 1 if the company has issued a financial statement restatement for the respective year.[114] The independent explanatory variables are the abnormal audit fees (*ABAFEE*) and the remediation of internal control weaknesses (ΔICW). Consequently, I examine hypotheses 2a and 2b by the following regression model:[115]

Restatement Model:

$$\begin{aligned} REST_{i,t} = {} & \beta_0 + \beta_1 ABAFEE_{i,t} + \beta_2 \Delta ICW_{i,t} + \beta_3 LNTA_{i,t} \\ & + \beta_4 EARNINGSGROW_{i,t} + \beta_5 XSCORE_{i,t} \\ & + \beta_6 LOSS_{i,t} + \beta_7 ROA_{i,t} + \beta_8 MERGER_{i,t} \\ & + \beta_9 FREEC_{i,t} + \beta_{10} LEV_{i,t} + \beta_{11} BIG4_{i,t} \\ & + \beta_{12-20} INDCON_{i,t} + \beta_{21-30} YEAR_{i,t} + \varepsilon_{i,t} \end{aligned}$$

The definition of ΔICW is the same as in the Audit Fee Model. Therefore, I expect a negative association between the remediation of internal control weaknesses and the probability of restatements.[116] The intuition behind this is that due to the remediation of internal control weaknesses, audit risk decreases, and thus the probability of restatements decreases. Abnormal audit fees equal the differences between the actual audit fees paid and the expected audit fees. Thus, the residuals from the Audit Fee Model correspond to the abnormal audit fees (*ABAFEE*). Therefore, hypothesis 2a proposes that abnormal audit fees are negatively associated with audit risk and thus negatively with the probability of restatement.[117]

Analogous to the Audit Fee Model, I add control variables in the Restatement Model to control for the effect of the explanatory variables (ΔICW, *ABAFEE*) on *REST*. The control variables concern the company's size (*LNTA*), complexity (*MERGER*), inherent risk (*XSCORE*, *EARNINGSGROW*,

[104] See therefore Albring et al. (2018, p. 499); Elder et al. (2009, p. 545); Hay (2013, pp. 170-171); Krishnan et al. (2011, p. 1).
[105] See therefore Hay (2013, pp. 170-171).
[106] Analogous to Doyle et al. (2007, p. 193).
[107] See therefore Doyle et al. (2007, p. 193).
[108] See therefore Hoag and Hollingsworth (2011, p. 196).
[109] See therefore Hay (2013, p. 173).
[110] See therefore Hay (2013, p. 171).
[111] See therefore DeFond and Zhang (2014, p. 283); Seidel (2017, p. 1370).
[112] See therefore DeFond and Zhang (2014, p. 285).
[113] See therefore Rajgopal et al. (2021, p. 595).
[114] See therefore Pittman and Zhao (2021, p. 133); Rajgopal et al. (2021, p. 573).
[115] See therefore DeFond and Zhang (2014, p. 290).
[116] Analogous to the findings of Guragai and Hutchinson (2019, p. 363).
[117] See therefore Doogar et al. (2015, p. 1278).

FREEC), profitability (*ROA*, *LOSS*), and leverage (*LEV*) as well as the quality of the auditor (*BIG4*). The control variable *XSCORE* is equivalent to Zmijewski's (1984) financial distress model.[118] Within this model, values greater than zero predict that the company will go bankrupt. Therefore, I expect a positive association between *XSCORE* and *REST*.[119] *FREEC* captures the demand for external financing. It measures the company's ability to cover its capital expenditures through holding assets by dividing net cash flow from operating activities less capital expenditures by total assets.[120] As previous findings show, I expect a positive relationship between *FREEC* and *REST*.[121] Finally, *EARNINGSGROW* is a dummy variable that takes the value 1 if the net income in $t = 1$ is greater than in $t = 0$. This control variable addresses the pressure managers face to retain earnings growth.[122] Furthermore, earnings pressure leads managers to opportunistically accounting procedures that eventually lead to restatements.[123] Therefore, I expect a positive association between *EARNINGSGROW* and *REST*. Like in the Audit Fee Model, additionally, I control for fixed effects in different industries (*INDCON*) and different years (*YEAR*).

3.1.3. Sample and Data Selection

My analyses use data from several 10-K, 10-Q, and 8-Q reports and proxy statements between 2010 to 2020, with overall 66,500 observations from 9,869 individual companies. To create the sample, I first eliminated all firms whose restatement announcement was not later than 2018, leaving 65,677 observations. This filtering is standard in the literature, as previous studies find an average lag of two years between the end of the reporting period and the restatement announcement.[124] In the following, I eliminate firms that do not have an internal report and have a different accounting standard than the United States Generally Accepted Accounting Principles (U.S. GAAP), leaving 25,300 observations. Next, I eliminate observations with no audit fee data or missing data to calculate regression model variables, leaving 17,061 observations. In the final step, I eliminate financial firms and regulated firms. That is because financial firms have different financial structures and, therefore, different audit production functions.[125] At the same time, the capital regulation is different for regulated firms, which also separates them from other industries.[126] Panel A from Table 1 shows that this procedure leaves 15,326 observations from 2,609 individual firms.

I identify all observations that show remediation of internal control weaknesses from this filtered data set, resulting in 225 observations representing the treatment group for my analyses. Then, to form an appropriate control group, I randomly pick 225 observations that show internal control weaknesses but no remediation. Finally, Panel B of Table 1 shows that my final sample has 450 observations.

The sample indicates that most firms are affected for two years by restatements (see Panel C of Table 1). This indication aligns with my condition to leave a lag of two years between the end of the reporting period and the restatement announcement. Furthermore, from the 450 sample observations, 102 exhibit a restatement. This ratio of approximately 22.7% is appropriate, as restatements are rare events.[127]

The descriptive analysis in Table 2 gives additional information about the sample. The average company has total assets worth approximately $564.03 million and makes sales of $439.66 million. Regarding the distribution of the different asset types, approximately half of the assets correspond to current assets for the average company. In terms of leverage and liquidity, the current ratio of approximately 2.52 shows that the average company has the financial resources to remain solvent in the short term. Additionally, a long-term debt-to-assets ratio (*LEV*) of only approximately 23.9% shows that, on average, the companies are in a healthy position. However, in nearly 45% of the cases, the company has incurred a loss. The mean return on assets is negative, implying that the average company is not profitable. Moreover, the average company has an increased inherent risk. A negative mean of the *FREEC* variable indicates that the average company cannot cover its capital expenditures through holding assets. In contrast, the negative mean of *XSCORE* from the Zmijewski (1984) model means that the average company is predicted not to go bankrupt.[128] Lastly, the earnings of the average company grow with a probability of approximately 55.6%.

Regarding auditors, on average, companies pay approximately $1.42 million for audit fees. Furthermore, in approximately 65% percent of the cases, the auditor is a Big4 auditor.

In addition, Table 3 gives a summary of the correlations among regression. These indicate possible associations for the Audit Fee and Restatement Model.

Table 3 states a correlation coefficient of -0.04 between *LNAFEE* and ΔICW, indicating a negative relationship. This association would be in line with the first hypothesis. Furthermore, a correlation of -0.06 between *REST* and *ABAFEE* also suggests a negative relationship in line with hypothesis 2a. Finally, the correlation coefficient of -0.12 between *REST* and ΔICW indicates the relationship expected in hypothesis 2b. In summary, the correlations among the regression variables are consistent with the expected relationships.

[118] See therefore Zmijewski (1984, pp. 65-66).
[119] See therefore Viciwati (2020, p. 797).
[120] See therefore Aier et al. (2005, p. 129); Blankely et al. (2012, pp. 84-85).
[121] See findings of Aier et al. (2005, p. 133); Blankely et al. (2012, p. 92).
[122] See therefore Blankely et al. (2012, p. 85).
[123] See therefore Garcia Osma (2008, p. 117).
[124] See therefore Blankely et al. (2012, p. 85); Kester et al. (2013, pp. 163-164); Lobo and Zhao (2013, pp. 1394-1395); Pittman and Zhao (2021, p. 134).
[125] See therefore Albring et al. (2018, p. 492); Doogar et al. (2015, p. 1260); Fields et al. (2004, p. 53); Stein et al. (1994, p. 128).
[126] See therefore Albring et al. (2018, p. 492).
[127] See therefore DeFond and Zhang (2014, p. 284).
[128] See therefore Viciwati (2020, p. 797); Zmijewski (1984, pp. 65-66).

Table 1: Sample Attrition and Composition

Sample Attrition and Composition

Panel A: Sample Attrition

	Firms	**Observations**
Restatement Period 2010-2018	9,869	65,677
Less:		
No Internal Report	(5,000)	(36,036)
Different Accounting Standard	(715)	(4,341)
No Audit Fee Data	(0)	(83)
Missing Calculation Data	(1,237)	(8,156)
Financial and Regulated Firms	(308)	(1,735)
	2,609	15,326

Panel B: Sample Composition

Change in Internal Control Quality (= Treatment Group)	225
No Change in Internal Control Quality (= Control Group)	225
	450

Panel C: Total Years Affected by Restatements

1 year	11
2 years	25
3 years	22
4 years	13
5 years	18
6 years	10
7 years	2
9 years	1
Total Number of unique Restatements	102

3.2. Results and Interpretation

Analogous to Blankely et al. (2012), the first regression of this analysis examines the relationship between the remediation of internal control weaknesses and audit fees and forms the residuals representing the abnormal audit fees from the audit fee model.[129] Table 4 shows the regression results.

The model shows moderate significance ($R^2 = 69.14\%$) by 450 observations. For all years except 2010, 2015, 2016, and 2020 the year controls show a significant negative coefficient (not tabulated). I only find a significant negative coefficient for the food and transportation industry regarding fixed industry effects. All other industries also show a negative coefficient but no significance. The median of the residuals is positive, proposing that the amount of audit fees companies pay is slightly higher than the amount of audit fees the regression model is expecting.

Furthermore, not all control variables are significant. The regression variables *BUSY*, *LEV*, *ROA*, *INVREC*, *MERGER*, and *LNSALES* do not indicate an effect on audit fees. Contrary to expectations, *OPINION* is significantly negative.[130] This result suggests that audit fees decrease if the auditor reports

[129] See therefore Blankely et al. (2012, p. 87).

[130] See therefore Hay (2013, p. 171).

Table 2: Descriptive Analysis

Descriptive Analysis

Cont. Variables	Mean	Std. Dev.	Min	Q1	Median	Q3	Max
LNAFEE	0.3513	1.1925	-4.6861	-0.4125	0.3837	1.0462	4.1658
ABAFEE	0.0000	0.6625	-3.9301	-0.2791	0.0427	0.3888	2.4587
LNTA	6.3351	1.5916	0.9314	5.3600	6.3973	7.3711	11.5273
LNSALES	6.0860	1.7856	-1.7960	5.0800	6.2500	7.2370	10.4410
CR	2.5220	2.2897	0.1550	1.2700	1.8660	2.9300	24.8450
CA	0.4729	0.2219	0.0263	0.2893	0.4563	0.6313	0.9791
INVREC	0.2543	0.1573	0.0000	0.1371	0.2340	0.3612	0.7896
ROA	-0.0262	0.3368	-4.7344	-0.0193	0.0467	0.0841	0.7384
LEV	0.2392	0.2456	0.0000	0.0148	0.1874	0.3796	1.4931
INTANG	0.2434	0.2308	0.0000	0.0365	0.1801	0.4073	0.8489
FREEC	-0.0117	0.2883	-1.4606	-0.0466	0.0192	0.0599	4.7384
XSCORE	-0.5776	3.6286	-18.1406	-2.2538	-0.5776	0.1564	37.5157

Indicator Variables	Mean	Std. Dev.	0	1
ΔICW	0.5000	0.5006	225	225
REST	0.2267	0.4191	348	102
EARNINGSGROW	0.5556	0.4975	200	250
LOSS	0.4467	0.4977	249	201
MERGER	0.3489	0.4771	293	157
BUSY	0.6933	0.4616	138	312
OPINION	0.7133	0.4527	129	321
BIG4	0.6511	0.4771	157	293

a going-concern opinion. In line with previous studies, like DeFond and Zhang (2014), auditor quality and size (BIG4) is strong and significant positive with audit fees.[131] As DeFond and Zhang (2014) state, this result indicates that companies pay a premium on the fee if their auditor company is either KPMG, Ernst & Young, PricewaterhouseCoopers, or Deloitte. The current ratio (*CR*) is significantly negatively associated with audit fees.[132] Thus, the better the company can pay its short-term liabilities, the lower the audit fees, suggesting that auditors pay less attention to highly liquid firms. In terms of profitability, a negative net income (*LOSS*) increases audit fees by approximately $1.28 million (exponential value of 0.250). The intangibles ratio and the current-assets ratio are also significantly positively associated with audit fees, proposing that the ratio of specific asset types to total assets influences audit fees. At last, company size in the form of total assets is strongly significant and positively associated with audit fees. This result aligns with the consensus in the literature that audit fees increase as the work of scope that comes with the size of the company increases.[133]

In line with the analyses of Hammersley et al. (2012), Hoag and Hollingsworth (2011), Mitra (2009), and Munsif et al. (2011), I find a significant negative association between the remediation of internal control weaknesses and audit fees.[134] This result is consistent with hypothesis 1 and indicates that if the company remediates its internal control weakness, the audit fees decrease by approximately $1.19 million (exponential value of 0.175) in the year of remediation. Furthermore, the result purposes that an investment in the remediation of internal control weaknesses decreases control risk. The reason for that is that according to the Audit

[131] See therefore DeFond and Zhang (2014, p. 300).
[132] See therefore Hay (2013, p. 170).
[133] See therefore Albring et al. (2012, p. 388); Bae et al. (2021, p. 606); Calderon et al. (2012, pp. 696-697); Hay (2013, p. 170); Hoag and Hollingsworth (2011, p. 191); Krishnan et al. (2011, p. 14); Mitra (2009, p. 379).
[134] See therefore Hammersley et al. (2012, p. 73); Hoag and Hollingsworth (2011, p. 173); Mitra (2009, p. 369); Munsif et al. (2011, p. 87).

Table 3: Correlations among Regression Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1.LNAFEE	1.00																			
2.ABAFEE	0.56	1.00																		
3.LNTA	0.75	0.00	1.00																	
4.LNSALES	0.70	0.00	0.89	1.00																
5.EARNINGSGROW	-0.02	0.03	0.01	0.05	1.00															
6.CR	-0.23	0.00	-0.18	-0.26	0.00	1.00														
7.CA	-0.21	0.00	-0.38	-0.29	0.02	0.39	1.00													
8.INVREC	0.03	0.00	-0.07	0.19	0.03	-0.02	0.51	1.00												
9.ROA	0.24	0.00	0.41	0.49	0.06	0.03	-0.10	0.14	1.00											
10.LEV	0.34	0.00	0.40	0.34	-0.02	-0.17	-0.39	-0.17	0.05	1.00										
11.INTANG	0.27	0.00	0.28	0.19	-0.04	-0.18	-0.56	-0.30	0.11	0.18	1.00									
12.FREEC	0.08	-0.01	0.18	0.19	0.09	0.01	-0.04	0.11	0.36	-0.03	0.07	1.00								
13.XSCORE	0.03	0.04	-0.12	-0.09	-0.02	-0.29	0.00	-0.04	-0.59	0.39	-0.06	-0.43	1.00							
14.ΔICW	-0.04	0.00	-0.09	0.07	0.03	0.12	0.04	-0.02	0.01	-0.01	-0.02	0.07	-0.10	1.00						
15.REST	0.02	-0.06	-0.01	0.10	-0.10	-0.05	-0.09	0.04	0.06	0.06	0.03	0.00	-0.01	-0.12	1.00					
16.LOSS	-0.04	0.00	-0.31	-0.30	-0.28	-0.06	-0.03	-0.12	-0.36	0.08	0.07	-0.27	0.29	-0.11	0.00	1.00				
17.MERGER	0.21	0.00	0.28	0.19	-0.07	-0.11	-0.24	-0.12	0.13	0.06	0.33	0.07	-0.06	-0.04	0.06	-0.07	1.00			
18.BUSY	0.05	0.00	0.01	-0.05	-0.03	-0.14	-0.12	-0.12	-0.04	0.08	0.07	-0.04	0.08	0.01	-0.04	0.01	0.01	1.00		
19.OPINION	-0.15	0.00	-0.07	-0.02	0.01	0.06	0.02	0.03	0.13	-0.07	-0.04	0.04	-0.10	0.03	0.03	-0.09	0.02	-0.04	1.00	
20.BIG4	0.55	0.00	0.51	0.49	-0.05	-0.14	-0.09	0.05	0.15	0.25	0.10	0.02	0.06	0.12	0.04	-0.13	0.06	0.03	-0.10	1.00

Table 4: Results from the Audit Fee Model

Results: Audit Fee Model

Residuals:

	Min	Q1	Median	Q3	Max
	-3.930	-0.279	0.043	0.389	2.459

Coefficients:

	Estimate	Std. Error	t-Value	p-Value	
Intercept	-2.930	0.579	-5.063	0.000	***
$\triangle$ICW	**-0.175**	**0.069**	**-2.533**	**0.012**	**
LNTA	0.430	0.062	6.924	0.000	***
LNSALES	0.010	0.060	1.634	0.103	
MERGER	0.082	0.075	1.094	0.275	
INVREC	0.290	0.332	0.872	0.384	
CA	0.676	0.256	2.639	0.009	***
INTANG	0.551	0.198	2.786	0.006	***
ROA	-0.196	0.124	-1.585	0.114	
LOSS	0.250	0.074	3.359	0.001	***
CR	-0.036	0.018	-1.957	0.051	*
LEV	0.168	0.016	1.040	0.299	
BIG4	0.447	0.084	5.342	0.000	***
BUSY	0.117	0.079	1.487	0.138	
OPINION	-0.174	0.083	-2.082	0.038	**
Fixed Industry Effects	Included				
Fixed Year Effects	Included				
Multiple R^2	0.6914				
Observations	450				

Notes: ***, **, and * indicate significance level at 1, 5, and 10 percent.
Bold text indicates variable of interest.

Risk Model, lower audit fees relate to higher detection risk, which is just appropriate if the control risk of the company is low.[135] In summary, I conclude that the remediation of internal control weaknesses is an effective way to improve the internal control systems and, thus, an effective way to decrease control risk. Moreover, companies must pay a lower amount of audit fees if they remediate their internal control weaknesses.

Analogous to Blankely et al. (2012), the second regression of my analysis examines the relationship between the probability of restatements and abnormal audit fees on the one hand and the remediation of internal control weaknesses on the other hand.[136] Table 5 shows the regression results.

The model shows a multiple R^2 of 13.78% by 450 observations. This significance is in line with other Restatement Models of previous studies.[137] For all years except 2010, 2019, and 2020 the year controls show a significant positive coefficient (not tabulated). The industry controls do not show a significant association with the occurrence of restatements (not tabulated).

Only *EARNINGSGROW* exhibits a significant relationship with the dependent variable *REST* in terms of control variables. In more detail, if the company's net income has increased from last year to the current year, then the probability of restatements decreases by approximately 7.7 percentage points. This result suggests that successful companies are

[135] See therefore Elder et al. (2009, p. 545); PCAOB (2010, p. 64).
[136] See therefore Blankely et al. (2012, p. 84).
[137] See therefore Blankely et al. (2012, p. 92); Krauß et al. (2015, p. 76); Lawrence et al. (2018, p. 151).

Table 5: Results from the Restatement Model

Results: Restatement Model

Residuals:

	Min	Q1	Median	Q3	Max
	-0.612	-0.262	-0.164	-0.090	0.968

Coefficients:

	Estimate	Std. Error	t-Value	p-Value	
Intercept	-0.384	0.327	-1.173	0.241	
ABAFEE	**-0.037**	**0.029**	**-1.301**	**0.194**	
ΔICW	**-0.095**	**0.040**	**-2.362**	**0.019**	**
LNTA	0.021	0.017	1.239	0.216	
EARNINGSGROW	-0.077	0.042	-1.860	0.064	*
XSCORE	-0.005	0.008	-0.571	0.568	
LOSS	-0.000	0.045	-0.008	0.994	
ROA	0.044	0.083	0.525	0.560	
MERGER	0.019	0.042	0.440	0.660	
FREEC	-0.019	0.076	-0.250	0.802	
LEV	0.080	0.105	0.767	0.444	
BIG4	0.006	0.049	0.122	0.903	
Fixed Industry Effects	Included				
Fixed Year Effects	Included				
Multiple R^2	0.1378				
Observations	450				

Notes: ***, **, and * indicate significance level at 1, 5, and 10 percent.
Bold text indicates variable of interest.

less likely to announce and disclose a restatement of financial statements. In other words, successful companies have a lower audit risk. Contrary to expectations, *LNTA*, *XSCORE*, *LOSS*, *ROA*, *MERGER*, *FREEC*, *LEV*, and *BIG4* do not show significance.

Not in line with hypothesis 2a, there is no significant association between abnormal audit fees (*ABAFEE*) and the likelihood of restatements (*REST*), respectively, audit risk and audit quality. Similar to the sign of their correlation in Table 3, the sign of the regression coefficient is negative. The negative sign would indicate that abnormal audit fees are associated with a lower probability of restatements, lower audit risk, and thus higher audit quality, but since there is no significance, abnormal audit fees have no impact on audit risk and audit quality. This result contradicts the results of studies concerning the effort view and the economic bonding view.[138] Thus, abnormal audit fees represent no additional audit effort and no economic bond to the auditor, making the auditor less independent. In the overall perspective, this would suggest for companies that changes in audit fees due to changes in internal control systems have no impact on audit risk.

In contrast to this proposal, I find a significant negative association between the remediation of internal control weaknesses (ΔICW) and the probability of restatements (*REST*). This result suggests that the remediation of internal controls is associated with a lower probability of restatements. More precisely, the likelihood of restatement decreases by 9.5 percentage points if the company remediates its internal control weaknesses. Further, the remediation of internal control weaknesses reduces audit risk, consistent with hypothesis 2b. From a general point of view, this implies that the remediation of internal control weaknesses effectively reduces audit risk and improves audit quality. Furthermore, assuming a close relationship between audit quality and financial reporting quality, this result implies that a company can significantly improve its financial reporting

[138] See therefore Blankley et al. (2014, p. 30); Eshleman and Guo (2014, p. 120).

quality by remediating its internal control weaknesses.[139] Consequently, the remediation of internal control weaknesses is associated with improving the relationship between the company and its investors. Due to the remediation, financial statements are more credible and thus improve investor confidence.[140]

In conclusion, the remediation of internal control weaknesses is associated with a decrease in audit fees and audit risk and thus an improvement of audit and financial reporting quality. These effects of changes in internal control systems on audit risk represent important implications for companies, as internal control weaknesses and restatements, in particular, impact the company and its value.[141]

3.3. Additional Analysis

Previous literature suggests that audit fees consist of an effort and a risk premium component.[142] As a result of this risk premium component, the interpretation of changes in audit fees is ambiguous.[143] More specifically, it is unknown how much audit fees change due to changes in effort or risk premium. Therefore, to interpret the Audit Fee Model appropriately, I conduct an additional analysis examining risk premium effects. Analogous to Albring et al. (2012), I use an adjusted Audit Fee Model.[144] The explanatory variables in this model are *REMY1*, *REMY2*, and *REMY3*. These variables are dummy variables that take the value of 1 if the firm remediated an internal control weakness and it is the first, second, or third year after the disclosure of the internal control weakness.[145] Moreover, this definition assumes that the remediation of the internal control weaknesses is in the year following their disclosure. Therefore, *REMY1* takes the value of 1 if it is the year the firm remediated its internal control weakness. Different from the previous models in this analysis is the sample. The treatment group consists of the remediation and the following two years, resulting in 108 observations. The control group represents firms that never disclosed an internal control weakness.[146] Overall, the sample has 216 observations. Thus, the regression equation for this additional analysis is:

Audit Risk Premium Analysis:

$$\begin{aligned} LNAFEE_{i,t} = {} & \beta_0 + \beta_1 REMY1_{i,t} + \beta_2 REMY2_{i,t} \\ & + \beta_3 REMY3_{i,t} + \beta_4 LNTA_{i,t} + \beta_5 LNSALES_{i,t} \\ & + \beta_6 MERGER_{i,t} + \beta_7 INVREC_{i,t} + \beta_8 CA_{i,t} \\ & + \beta_9 INTANG_{i,t} + \beta_{10} ROA_{i,t} + \beta_{11} LOSS_{i,t} \\ & + \beta_{12} CR_{i,t} + \beta_{13} LEV_{i,t} + \beta_{14} BIG4 \\ & + \beta_{15} BUSY_{i,t} + \beta_{16} OPINON_{i,t} \\ & + \beta_{27-25} INDCON_{i,t} + \beta_{26-35} YEAR_{i,t} + \varepsilon_{i,t} \end{aligned}$$

The results in Table 6 are partially consistent with the findings of Albring et al. (2012).[147] *REMY1* is significantly positive, indicating that the audit fees remain high in the year of remediation. Regarding the results of ΔICW in the Audit Fee Model, this result indicates that audit fees decrease due to the remediation of internal control weaknesses but do not decrease to the level that the firm would have had in the absence of internal control weaknesses. Moreover, this implies a risk premium component in the audit fees in the year of remediation. *REMY2* is also positively significant and thus suggesting that audit fees remain high one year after remediation. Furthermore, this implies that the risk premium components are also present in the second year after internal control disclosure. The coefficient of *REMY2* is smaller than that of *REMY1*. This finding indicates that the risk premium decreases in the year after the remediation. There is no risk premium effect in the second year following the remediation of internal control weaknesses since *REMY3* is insignificant. These results conclude that the results of the Audit Fee Model contain a risk premium component, and therefore the interpretation of *LNAFEE* is ambiguous.[148]

3.4. Robustness Tests

The results indicate that the remediation of internal control weaknesses is associated with an increase in audit fees and audit quality. For the underlying regression models, I use a sample of 450 observations. I filtered the data set only for essential parts to obtain this sample, such as observations with the internal control report. This procedure keeps the number of observations as high as possible to maintain a reasonable statistical power. In contrast, Blankely et al. (2012) filter the data set even more to exclude additional effects on audit fees and restatements.[149] In more detail, they eliminate firms with multiple restatements and non-Big4 auditors. With these executions, they want to guarantee a certain homogeneity of audit quality in the sample.[150] Therefore, I test my results on robustness concerning this additional sample filtering. Consequently, the treatment and control group size decreases to 59 observations each, resulting in overall 118

[139] See therefore DeFond and Zhang (2014, p. 287).
[140] See therefore Hammersley et al. (2012, p. 74).
[141] See therefore Pittman and Zhao (2021, p. 129).
[142] See therefore Albring et al. (2012, p. 377); DeFond and Zhang (2014, p. 290); Munsif et al. (2011, p. 89); Simunic (1980, p. 169).
[143] See therefore DeFond and Zhang (2014, p. 290).
[144] See therefore Albring et al. (2012, p. 382).
[145] See therefore Albring et al. (2012, p. 383).
[146] See therefore Albring et al. (2012, p. 377).
[147] See therefore Albring et al. (2012, p. 389).
[148] In line with DeFond and Zhang (2014, p. 290).
[149] See therefore Blankely et al. (2012, p. 85).
[150] See therefore Blankely et al. (2014, p. 37); Blankely et al. (2012, p. 85).

Table 6: Audit Fee Premium Analysis

Results: Audit Fee Premium Analysis

Residuals:

	Min	Q1	Median	Q3	Max
	-2.854	-0.217	0.036	0.294	0.095

Coefficients:

	Estimate	Std. Error	t-Value	p-Value	
Intercept	-3.483	0.521	-6.687	0.000	***
REMY1	**0.265**	**0.113**	**2.351**	**0.020**	**
REMY2	**0.201**	**0.116**	**1.723**	**0.087**	*
REMY3	**0.046**	**0.120**	**0.379**	**0.705**	
LNTA	0.376	0.093	4.060	0.000	***
LNSALES	0.066	0.098	0.675	0.500	
MERGER	0.134	0.094	1.429	0.155	
INVREC	-0.114	0.391	-0.293	0.770	
CA	0.694	0.381	1.820	0.070	*
INTANG	0.190	0.283	0.672	0.502	
ROA	0.071	0.330	0.215	0.830	
LOSS	0.203	0.100	2.024	0.044	**
CR	-0.071	0.021	-3.358	0.000	***
LEV	0.383	0.180	2.130	0.034	**
BIG4	0.635	0.107	5.954	0.000	***
BUSY	-0.032	0.089	-0.364	0.716	
OPINION	-0.004	0.109	-0.038	0.970	
Fixed Industry Effects	Included				
Fixed Year Effects	Included				
Multiple R^2	0.8122				
Observations	216				

Notes: ***, **, and * indicate significance level at 1, 5, and 10 percent.
Bold text indicates variable of interest.

sample observations. The conduct of the two regression models is the same as in my previous analysis. The results of the explanatory variables are in Table 7.

The result of the adjusted Audit Fee Model confirms the previous results. Therefore, it suggests a robust negative association between the remediation of internal control weaknesses and audit fees. The results of the adjusted Restatement Model deviate from the previous results. On the hand, I now find a significant negative association between abnormal audit fees and restatements which confirms the negative sign of the correlation coefficient in my first analysis. On the other hand, I find deviating results for ΔICW. One reason for this could be that the standard errors are larger than the coefficient itself, resulting from a too small sample. Thus, this robustness test shows that the applied procedure of filtering the data set to maintain a reasonable statistical power is appropriate.

In addition, Blankely et al. (2012) only consider restatements with a negative effect.[151] In this analysis sample, there are 83 negative but also 19 positive effects of restatements. Therefore, I check if the results from the Restatement Model change by only considering adverse restatements. Following that, the size of the treatment and control group decreases to 212 observations each, resulting in 424 observations over-

[151] See therefore Blankely et al. (2012, p. 86).

Table 7: Results of Robustness Test on Sample

Results: Audit Fee Model

Coefficients:

	Estimate	Std. Error	t-Value	p-Value	
ΔICW	**0.186**	**0.104**	**-1.785**	**0.078**	*
Control Variables	Included				
Fixed Industry Effects	Included				
Fixed Year Effects	Included				
Multiple R^2	0.8226				
Observations	118				

Results: Restatement Model

Coefficients:

	Estimate	Std. Error	t-Value	p-Value	
ABAFEE	**-0.167**	**0.061**	**-2.723**	**0.008**	***
ΔICW	**0.032**	**0.056**	**0.580**	**0.563**	
Control Variables	Included				
Fixed Industry Effects	Included				
Fixed Year Effects	Included				
Multiple R^2	0.2635				
Observations	118				

Notes: ***, **, and * indicate significance level at 1, 5, and 10 percent.
Bold text indicates variable of interest.

all.[152] Table 8 shows the results.

The results of this robustness test are consistent with the results of the Restatement Model in the analysis. This result indicates that it is not mandatory only to consider negative restatements when regarding the associations of abnormal audit fees and the remediation of internal control weaknesses on the probability of restatements.

Furthermore, I follow the suggestion of DeFond and Zhang (2014) and examine audit quality with a different proxy.[153] Therefore, I use discretionary accruals to examine the relations between audit quality, audit fees, and the remediation of internal control weaknesses. Thus, analogous to Eshleman and Guo (2014), I calculate total accruals using the Jones (1991) Model, as modified by Ball and Shivakumar (2006), to finally estimate the residuals from this model corresponding to discretionary accruals.[154]

Total Accruals:

$$TACC_{i,t} = \beta_0 + \beta_1 \Delta SALE_{i,t} + \beta_2 PPE_{i,t} + \beta_3 OCF_{i,t} + \beta_4 DCF_{i,t} + \beta_5 OCF_{i,t} * DCF_{i,t}$$

I then replaced the restatement model's dependent variable *REST* with the new proxy for audit quality *DAC* (discretionary accruals). Table 8 reports the results of this procedure.

The results from the Discretionary Accruals Model are contrary to the Restatement Model. Nevertheless, I adhere to the results of the Restatement Model since discretionary accruals suffer from significant measurement errors, which ultimately lead to biases.[155] These measurement errors seem to be particularly the case when the sample firms are not homogeneous within an industry.[156] However, in the context of

[152] The reduction in observations is greater than 19 to maintain that the treatment and control group are evenly sized. Within the control group, there are 13 positive restatement observations whereas 6 observations in the treatment group. 225 control group observations less 13 equal 212 observations each.

[153] See therefore DeFond and Zhang (2014, p. 276).

[154] See therefore Ball and Shivakumar (2006, p. 226); Eshleman and Guo (2014, p. 126); Jones (1991, p. 221).

[155] See therefore DeFond and Zhang (2014, p. 288).

[156] See therefore Dopuch et al. (2012, p. 408).

Table 8: Negative Restatements in the Restatement Model

Results: Restatement Model					
Coefficients:					
	Estimate	Std. Error	t-Value	p-Value	
ABAFEE	**-0.016**	**0.031**	**-0.516**	**0.606**	
ΔICW	**-0.085**	**0.039**	**-2.189**	**0.029**	**
Control Variables	Included				
Fixed Industry Effects	Included				
Fixed Year Effects	Included				
Multiple R^2	0.1241				
Observations	424				

Notes: ***, **, and * indicate significance level at 1, 5, and 10 percent.
Bold text indicates variable of interest.

this study, I cannot rule out the possibility that the industries of the sample firms may or may not be heterogeneous.

4. Discussion of Results

In this analysis, I examine the effects of changes in internal control systems on audit risk. In this study, using the Audit Fee Model, I find that the remediation of internal control weaknesses associates with a decrease in audit fees. Moreover, using the Restatement Model, I find no significant association between abnormal audit fees and the probability of restatements. However, I report a significant negative relationship between the remediation of internal control weaknesses and restatements. This result indicates that the remediation decreases audit risk and thus increases audit quality. At this point, a few limitations, and open questions, are worth mentioning.

At first, limitations concerning the sample. Instead of picking the observations of the control group randomly, there would also be the possibility of conducting a propensity score matching process. The studies from Guragai and Hutchinson (2019) and Mitra et al. (2017) also examine associations concerning internal control weaknesses and use a propensity score matching process to determine a matched-pair sample of the treatment group.[157] The advantage of this approach is that the treatment group is better represented, and thus the effect that comes from the treatment group can be better shown. However, with my data set, it is very unclear if this approach would improve the representation of the control group. This concern arises because the propensity score is obtained from a regression with the dependent variable resembling my ΔICW variable would be low. This assertion turns out from the fact that the correlations of all other variables with ΔICW are weak (Table 3). Another limitation concerning the sample is the general amount of remediations of internal control weaknesses in the data set. Before filtering the data set, only approximately 2.2%, and after filtering, approximately 2.8% of the observations show remediation of internal control weaknesses (not tabulated). Finally, this small number of observations eventually leads to high standard errors of the variables in the descriptive analysis (Table 2), which affects their statistical significance.[158]

Second, limitations concerning the Audit Fee Model. Due to data set constraints, it was impossible to determine several variables for the Audit Fee Model. Analyses concerning Audit Fee Models often include variables like the number of foreign subsidiaries, foreign assets, and the number of business segments to depict a company's complexity.[159] Moreover, corporate governance variables like the number of outside directors are not in the data set. The use of these additional variables could increase the representation of the model. Another limitation associated with the audit fee model is the interpretation of audit fees. As shown in the additional analysis part of this study, audit fees consist of an effort and a risk premium component.[160] Moreover, audit fees still include a risk premium even after the remediation of internal control weaknesses. The risk premium in audit fees after remediation limits the ΔICW's interpretation in the way that the \$1.19 million is not the difference of audit fees between the case of the company disclosing and the case of never disclosing an internal control weakness. Thus, I can only interpret the regression coefficient of ΔICW with caution. Another general limitation is the high standard error in the Audit Fee Model,

[157] See therefore Guragai and Hutchinson (2019, p. 366); Mitra et al. (2017, p. 246).

[158] Analogous to DeFond and Zhang (2014, p. 284).

[159] See therefore Blankely et al. (2012, p. 83); DeFond and Zhang (2014, p. 291); Hay (2013, p. 170).

[160] See therefore Simunic (1980, p. 169).

Table 9: Discretionary Accruals Robustness Test

Results: Total Accruals Model

Coefficients:

	Estimate	Std. Error	t-Value	p-Value	
Intercept	-0.061	0.016	-3.751	0.000	***
ΔSALE	0.053	0.039	1.375	0.170	
PPE	-0.075	0.018	-4.100	0.000	***
OCF	0.162	0.072	2.237	0.026	**
DCF	0.109	0.027	4.104	0.000	***
OCF:DCF	0.148	0.087	1.708	0.088	*
Multiple R^2	0.1321				
Observations	450				

Results: Discretionary Accruals Model

Coefficients:

	Estimate	Std. Error	t-Value	p-Value	
ABAFEE	**0.029**	**0.013**	**2.219**	**0.027**	**
ΔICW	**0.025**	**0.018**	**1.352**	**0.177**	
Control Variables	Included				
Fixed Industry Effects	Included				
Fixed Year Effects	Included				
Multiple R^2	0.3260				
Observations	450				

Notes: ***, **, and * indicate significance level at 1, 5, and 10 percent.
Bold text indicates variable of interest.

shown in the results of Table 4.

Third and finally, there are limitations concerning the Restatement Model. Even though restatements as a proxy of audit risk have relatively low measurement errors, they still suffer from interpretation problems. Therefore, the absence of restatements does not directly equate to high audit quality. The reason is that low-quality audits can prevent serious errors but not necessarily detect minor errors, which is necessary for high audit quality.[161] Therefore, regarding my analysis, I can only suggest that the remediation of internal control weaknesses is associated with an increase in audit quality but not with high audit quality. In addition, the reduced likelihood of restatements can only imply a reduction in audit risk since actual audit risk is unobservable.[162] Other limitations come with the explanatory variable *ABAFEE*. On the one hand, *ABAFEE* is dependent on this specific Audit Fee Model in this study.[163] Therefore, this leaves the possibility that different Audit Fee Models with different variables have different residuals and thus a different *ABAFEE*. This concern limits the generalizability of the results in the Restatement Model. On the other hand, there is concern that the residuals from the Audit Fee Model contain an additional error component which would bias the results of the Restatement Model.[164]

5. Conclusion

This study examines the effect of changes in internal control systems on audit risk. This analysis considers the relationships between the remediation of internal control weak-

[161] See therefore DeFond and Zhang (2014, p. 284).
[162] See therefore Seidel (2017, p. 1370).
[163] See therefore Eshleman and Guo (2014, p. 134).
[164] See therefore Eshleman and Guo (2014, p. 134).

nesses, audit fees, and the probability of restatements. Understanding these relations is essential since internal control weaknesses and restatements can impact the firm, its environment, and its value.[165] Significantly, the negative economic consequences are primary drivers for companies to pay attention to internal control systems and audit risk.[166] Therefore, I examine how changes in internal control systems due to remediation of internal control weaknesses affect audit risk. I conduct an audit fee and a restatement regression model to examine this relationship. The Audit Fee Model considers the associations between the audit fees and the remediation of internal controls weaknesses. Whereas the Restatement Model considers the effects of abnormal audit fees and the remediation of internal control weaknesses on the probability of restatements as an audit risk proxy. For both regression models, I use a sample of 450 observations. The sample is composed of a treatment group and a control group. The treatment group represents all observations that show remediation of internal control weaknesses. At the same time, the control group comprises companies that have disclosed an internal control weakness but have not remediated it.

In the Audit Fee Model, I find a significant negative association between audit fees and the remediation of internal control weaknesses. This result indicates that audit fees decrease as the company remediates its internal control weaknesses. The Restatement Model shows no significant relationship between abnormal audit fees and restatements. This result suggests that changes in audit fees due to changes in internal control systems have no impact on audit risk. Finally, the Restatement Model shows a significant negative relationship between the remediation of internal control weaknesses and the probability of restatements. In other words, this means that the remediation of internal controls is associated with a lower probability of restatements and, therefore, with reductions in audit risk and increases in audit quality.

These results are significant as companies can directly influence their internal control systems. Thus, for further research, it might be interesting to examine the direct effect of the remediation of internal control weaknesses on economic variables such as the cost of capital.

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[165] See therefore Pittman and Zhao (2021, p. 129).

[166] See therefore Albring et al. (2018, p. 485); H. Chen et al. (2011, p. 2); Hribar and Jenkins (2004, p. 337); Palmrose et al. (2004, p. 59).

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