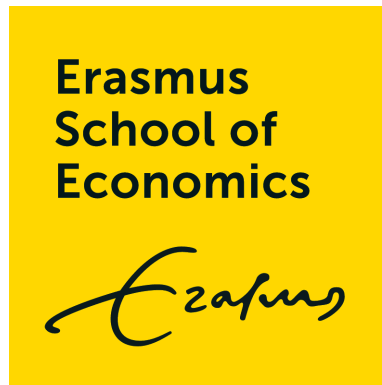


Erasmus School of Economics

Master thesis



Internal Control over Financial Reporting and Enterprise Risk Management

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Abstract

This paper aims to analyze the relation between the implementation of Enterprise Risk Management and the quality of internal controls, especially with regard to internal control over financial reporting. Two main indicators of the use of Enterprise Risk Management are identified: the existence of a Chief Risk Officer and a stand-alone risk committee either on the board of directors or consisting of independent directors. Using propensity-score matching, I match observations with internal control deficiencies after SOX section 404 (b) to suitable counterparts with no internal control deficiencies. I use logit models to analyze the relation between internal control quality and the Enterprise Risk Management indicators. The results suggest that there is only a relation between Enterprise Risk Management and internal control quality when there is stand-alone risk committee which is not part of the board of directors. Besides, the results show that hiring a Big 4 auditor has a negative effect on disclosing internal control deficiencies.

1. Introduction

Accounting fraud and scandals like WorldCom, Cendant or Enron showed the severe consequences of deficiencies in internal control over financial reporting and led to the introduction of a new regulation named the Sarbanes-Oxley Act (SOX) in 2002. Section 404 and 302 of this Act relate to the mandatory assessment and reporting of the effectiveness of internal control over financial reporting by public company management and auditors. This regulation aims to restore investor confidence deriving from improved disclosures of financial information and internal control. The monitoring and assessment of the internal control process to ensure reliable financial reporting for investors and other stakeholders can be a difficult task and previous literature has tried to find effective governance mechanisms by analyzing the characteristics of companies which reported internal control deficiencies. Meanwhile, risk management has become central to corporate governance and linked to the idea of internal control (Spira and Page (2002)). In this context, the concept of Enterprise Risk Management (ERM) has been evolving over the past years after the Committee of Sponsoring Organizations of the Treadway Commission (COSO) released the final version of its ERM framework, Enterprise Risk Management - Integrated Framework, which outlines internal auditing's role in supporting ERM. This research aims to investigate if companies with an integrated risk management system experience fewer deficiencies of internal controls over financial reporting.

Past literature so far stayed silent about the effect of ERM on the quality of internal controls. Thus, this research tries to close this gap by trying to find indicators for the use of an implemented ERM system which are the existence of a Chief Risk Officer, a stand-alone risk committee as part of the board of directors and a stand-alone risk committee which is not part of the board of directors, and then analyzing its effect on the probability of disclosing internal control deficiencies.

Furthermore, this study aims to contribute to two other streams of literature. First, it contributes to the existing literature on Corporate Governance. Especially, this study focuses on internal control reporting under SOX by trying to examine another determinant of disclosing deficiencies of internal control.

Second, this paper tries to give an implication about the consequences of the implementation of ERM systems and thereby contributing on the existing literature on Enterprise Risk Management.

I obtain a sample of 695 publicly traded U.S. firms from different industries from 2009 – 2012 using Compustat and Audit Analytics databases. Using propensity-score matching models, I

match firms with internal control deficiencies to comparable control firms that didn't disclose any internal control deficiencies. I collect additional information about the situation of risk oversight for each company. More precisely, I obtain information about whether a company employed a Chief Risk Officer (CRO) or has a stand-alone risk committee either as part of the board of directors or not. Then, I examine the relation between each ERM indicator and the existence of an internal control deficiency.

The remainder of this paper is structured as follows: In the second part, I give an overview of the existing literature and background of Internal Control over Financial reporting and ERM separately. In the third part I will explain how these two concepts relate to each other and develop the hypothesis. The fourth part of this paper is focused on the sample selection and methodology. Lastly, I will present the results and conclude.

2. Background and Literature

2.1 Responsibilities and disclosure requirements on the quality of internal controls

The introduction of the Sarbanes-Oxley Act in 2002 by the Securities and Exchange Commission resulted in a change of auditors' and managers' responsibilities referring to the assessment of internal controls over financial reporting (ICOFR). Section 302 and 404 (a) and (b) of the Sarbanes-Oxley Act (SOX) are specifically dealing with these ICOFR requirements (US Congress, 2002). Under SOX section 302 management is required to disclose any significant internal control deficiencies in quarterly and annual financial statements. This section emphasizes the responsibility of the signing officer to evaluate internal controls within the previous ninety days and report on their findings including a list of all deficiencies in internal controls and any significant changes in internal controls that could have a negative impact on the quality of internal controls.

Furthermore, SOX section 404 requires auditors to provide an opinion on the management's assessment. Section 404 (a) specifically enforces issuers to "publish information in their annual reports concerning the scope and adequacy of the internal control structure and procedures for financial reporting" and "assess the effectiveness of such internal controls and procedures."¹ Section 404 (b) additionally requires registered audit firm, in the same report, to attest to and report on the effectiveness of the internal control over financial reporting structures and procedures. Consequently, companies are required to report on any material weaknesses in their financial statements under both SOX sections mentioned above.

In order to comply with these standards, the Public Company Accounting Oversight Board (PCAOB) was simultaneously created to provide more accurate rules and regulations in overseeing the audit of public companies by requiring the auditor to comply with all applicable auditing and related professional practice standards of the PCAOB. Especially, Auditing Standard No. 5 deals with an Audit of Internal Control Over Financial Reporting. It states that "Effective internal control over financial reporting provides reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes. If one or more material weaknesses exist, the company's internal control over financial reporting cannot be considered

¹ www.soxlaw.com

effective.”² A material weakness is defined as “a deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of a company’s annual or interim financial statements will not be prevented or detected on a timely basis.” In other words, a material weakness exists, when a deficiency in internal control over financial reporting leads to financial misstatement with a reasonable possibility. A deficiency in internal control over financial reporting furthermore “exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent or detect misstatements on a timely basis.”

To sum up, section 302 deals with disclosure controls, whereas section 404 focuses on the assessment of internal controls. In this research, I will focus on the managements’ and auditors’ assessment of the internal control quality, thus the disclosure requirements of section 404, especially 404 (b), play the relevant role in this paper.

2.2 Characteristics of firms disclosing material weaknesses under SOX section 404

Existing literature on the effectiveness of internal control over financial reporting has already tried to examine the determinants of internal control deficiencies. In this research, I also focus on the question of what drives the quality of internal controls by contributing to this stream of literature and consequently help to answer the question of how companies can improve the quality of internal control and avoid the reporting of internal control deficiencies.

To find an answer to this question is highly important as the reporting of deficiencies in ICFR can have negative consequences for a company. Doyle et al. (2007) for instance find a negative relation between earnings quality, in the form of lower quality of accruals, and the reporting of material weaknesses under both SOX section 302 and 404. However, research on the relation between internal control deficiencies and earnings quality is somewhat mixed. Ogneva et al (2007), in contrast, did not find any relation only focusing on section 404. Overall research however agrees on a negative reaction of markets to the disclosure of internal control deficiencies. Some studies only found a negative stock price reaction to disclosures of significant deficiencies and material weaknesses under section 302 (Hammersley et al., 2008; Beneish et al., 2008).

² www.pcaobus.org/Standards/Auditing/Pages/Auditing_Standard_5.aspx#_ftnref4

Ashbaugh-Skaife et al. (2009) however documented negative reactions to internal control deficiencies disclosure under both section 302 and 404. Furthermore, several studies found evidence that internal control deficiencies reporting is related to higher cost of debt (Elbannan, 2009).

Since companies were required to report on the effectiveness of their internal controls, literature on internal control over financial reporting has grown substantially due to the availability of data that were not previously available. Zhang et al. (2007) investigate the relation between audit committee quality, auditor independence, and the disclosure of internal control weaknesses. They found that companies with less financial expertise in their audit committees and more independent audit committees are more likely to report material weaknesses in their financial statements. In addition, they state that firms with recent auditor changes are more likely to have internal control weaknesses. Their analysis is based on reporting under section 302 as well as under section 404. Krishnan and Visvanathan (2007) also examined the role of corporate governance and auditors in reporting internal control deficiencies. After controlling for various firm characteristics their results show that a higher number of meetings of the audit committee, less financial expertise in the audit committee and more auditor changes are associated with companies that control material weaknesses in comparison to companies that do not report material weaknesses. Furthermore, Hoitash, Hoitash, and Bedard (2009) found that under section 404, disclosure of material weaknesses was negatively related to board strength and committee financial expertise. Doyle, Ge and McVay (2007) also examined the determinants of disclosing material weaknesses under SOX section 404 with a sample of 779 firms using more general firm characteristics and found that these firms tend to be smaller, younger, financially weaker, more complex, growing rapidly or undergoing restructuring when disclosing deficiencies of internal control.

2.3 COSO risk-based approach and Enterprise Risk Management

In order to comply with section 404 of SOX the SEC rules that management must decide on a control framework to base its assertion regarding the effectiveness of internal controls on. In the U.S. the Committee of Sponsoring Organizations (COSO) provides such an Integrated Framework which satisfies the requirements of the SEC and provides a guidance for managements' assertion of internal controls. It defines internal control as "process, effected by an entity's board of directors, management and other personnel, designed to provide reasonable assurance regarding

the achievement of objectives in the following categories: (a) reliability of financial reporting, (b) effectiveness and efficiency of operations, and (c) compliance with applicable laws and regulations.”³ The integrated framework includes five components for effective internal control over financial reporting that provides the context for evaluation. The component relevant for this paper is the “risk assessment” of internal controls over financial reporting which means the identification and evaluation of relevant risks that may threaten the achievement of the objectives regarding financial reporting. Therefore, internal control that are specifically designed to provide reasonable assurance that the company’s financial statements are reliable and are prepared in accordance with GAAP must be evaluated. Inaccuracies can occur due to mathematical errors, misapplication of GAAP, or fraud.⁴ Thus, management’s and auditor’s assessment should be focused on the risk that these inaccuracies may occur under the condition that the misstatement is material. This means, management and internal auditing must determine whether the internal controls implemented are adequately address the risk that a material misstatement in the company’s financial report can not be prevented or detected on a timely basis and whether these controls are operating effectively. The risk-based approach recommended by the SEC is a top-down approach which means management should first focus on the identification and evaluation of risks at the entity-level and after at an activity-, or process-level.

Also PCAOB audit standard No. 5 encourages a risk-based, top-down implementation of SOX section 404 and defines the internal control evaluation as a risk-assessment process. It states that an auditor has to perform an audit on management’s assessment of the effectiveness of internal control over financial reporting where the risk assessment has to underlie the entire audit process described by the standard.⁵

As as result the requirements of evaluating company’s internal control risk have increased since the introduction of the Sarbanes-Oxley Act in 2002 and companies need to implement tools to meet these requirements. In recent years, the concept of enterprise risk management (ERM) has emerged as a concept to manage the total risk of a company (Dickinson, 2001). ERM enables firms to manage a wide range of risks with an entity wide focus. In contrast, the individual risk categories

³ <http://www.coso.org/documents/internal%20control-integrated%20framework.pdf>

⁴ http://www.thecaq.org/docs/reports-and-publications/caq_icfr_042513.pdf?sfvrsn=2

⁵ http://pcaobus.org/Standards/Auditing/Pages/Auditing_Standard_5.aspx

in traditional risk management are separately managed in risk “silos” (Hoyt; Liebenberg, 2011). While there is no universally accepted definition and framework that provides a definite guide for the implementation and use of ERM, the roles played by the different parties are the most widely used ERM standard as defined by the COSO.

The so called Enterprise Risk Management – Integrated Framework extends the Internal Control- Integrated Framework by providing a more extensive focus on the broader subject of enterprise risk management. It defines ERM as “a process, effected by an entity’s board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives (COSO, 2004).” The primary purpose of the framework is to help management to achieve the company’s strategic, operational, reporting, and compliance objectives. It states that the objectives related to the reliability of reporting and compliance with laws and regulations are within the company’s control, ERM can provide reasonable assurance of achieving these objectives.

However, empirical research in the field of ERM is still limited. There exist studies only focusing on specific branches. A study by Yusuwan et al. (2008) shows that ERM affects productivity, performance, quality, and project budget in construction firms when integrating ERM into construction projects. Rasid and Rahman (2009) investigated ERM in the financial sector and concluded that firm size is not related to ERM development and that financial institutions tend to adopt ERM as a result of requirements set by the regulators. Manab et al. (2010) examined the drivers that contribute to the success of ERM in financial and non-financial institutions. They found five main drivers of ERM. These were corporate governance, mandate from the board of directors, shareholder value, improved decision making and good business practices. All these studies used primary data in their research.

Hoyt and Liebenberg play a dominant role in the research field of ERM using secondary data. Their research in 2003 aimed to determine factors that influenced companies to practice ERM. As a signal that companies use ERM they focus on the appointment of a Chief Risk Officer (CRO) who is in charge of implementing and managing the ERM program within a company. Their results suggest that firms who hire CRO are more likely to be more highly leveraged than firms who don’t hire a CRO. They also emphasize the important role of a CRO to reduce the information asymmetry (Hoyt; Liebenberg, 2003). In another study, Hoyt and Liebenberg examined the determinants of ERM and the relation between ERM and firm value for insurance companies in

the U.S. The results show that institutional ownership, size and international diversification are important determinants of implementing ERM programs (Hoyt; Liebenberg, 2006). The results of Liebenberg and Hoyt 2003 and 2006 were partially confirmed by Pagach and Warr (2007) using a bigger sample of firms that hired a CRO. Their results also indicate that bigger firms with a higher leverage are more likely to hire a CRO. In addition, they found a positive relation between the appointment of a CRO and earnings of a company. To my knowledge, there is no evidence so far of the influence of ERM on the effectiveness of internal control over financial reporting.

3. Internal control over Financial Reporting and ERM

So far, research has ignored the link between the financial reporting process and risk management. However, to discover the coherences between those two fields is important because it is essential that the financial statement of a company represents its financial performance along with its risks. The inability of adequately identifying and portraying important business risks might give a false picture of the company's performance and mislead stakeholders. Despite the fact that there is no evidence on how exactly ERM affects the financial reporting process, the COSO framework does not discuss how managers and auditors might consider ERM in their evaluation and reporting process. In addition, there is limited understanding of how the different parties involved in the evaluation and reporting process interact amongst each other and with others to develop effective ERM practices that impact the quality of the internal reporting process (Cohen et al., 2014).

In order to prevent the reporting of internal control deficiencies, the firm and/or the auditor must be able to detect any risks in internal controls that could lead to such a deficiency or material weakness in internal controls in a timely manner so that appropriate remedial actions can be taken before annual financial statements will be published. Qualitative and quantitative methods exist for the evaluation of internal controls. Auditors use qualitative methods such as questionnaires, checklists, flow charts, test of transactions for evaluation. However, these methods are seen as ineffective tools for the evaluation of internal controls. Also quantitative models, like the stochastic model and the reliability model do not provide an appropriate basis for the SOX 404 assessment (Mock et al., 2009).

Mock et al. (2009) define control risk as a control system to be ineffective. A control system is considered to be ineffective when there are three possible conditions of ineffectiveness as stated by the PCAOB Audit Standard No. 5: control deficiency, significant deficiency, and material weakness. Which condition occurs depends on the probability of the belief that a control system is ineffective. In this research the exact numbers of these probabilities are not substantial but rather the question how ERM can help to evaluate these probabilities. Mock et al. (2009) developed a model for the assessment of control risk based upon a Big 4 firm's model of risk assessment as implemented under Auditing standard no. 5. The model depicts a hierarchy that relates to the aggregation of control risks assessments from the significant accounts to the overall consolidated company under the condition that internal controls are designed to control risks specific to management's assertion concerning the accounting information effectiveness. The main assertion to reach is that the consolidated entity in terms of its internal control over financial reporting is

effective. This in turn depends on the assertions of the effectiveness of internal controls of each subsidiary. To acquire an assertion about the effectiveness of internal controls for the subsidiaries the assessor must test the effectiveness of significant accounts. The model provides an approach for an entity level evaluation of internal control over financial reporting and focuses on the aggregation of risks. In this paper I argue that Enterprise Risk Management can help to successfully aggregate the risks on the different levels of the model to an entity wide risk evaluation. Traditional risk management, where the risks are managed in separate silos, has the disadvantage of creating inefficiencies due to a lack of coordination between the various risk management functions (Hoyt, Liebenberg (2011)). In comparison, firms that engage in ERM should be able to better understand the aggregated risk inherent in different account specific control risks.

Also the COSO enterprise risk management – integrated framework, as described in section 2.3.1, calls for a top-down and holistic risk management approach which traditional risk management is not able to provide.

3.1 Chief Risk Officers

The appointment of a CRO can be viewed as a signal that a company has implemented a ERM program (Beasley et al. (2005); Hoyt, Liebenberg (2003)). The CRO is responsible for overseeing the overall company's risks and in many instances reports to the CFO or CEO. Despite the argument mentioned above why ERM could increase the effectiveness of internal controls there are advantages that specifically relate to the appointment of a CRO. One argument is that ERM could increase the board's and senior management's ability to oversee the portfolio of risks that an enterprise is facing (Stoh, 2005).

Another argument is that it is doubtful whether the audit committee which is mostly responsible for monitoring and overseeing the financial reporting process have the expertise to identify and evaluate all risks that could reduce the effectiveness of internal controls that could lead to a deficiency in financial reporting. As mentioned above, Zhang et al. (2007) found that firms with less financial expertise and more independent directors are more likely to report material weaknesses in their financial statements. Thus, the quality of the audit committee can have an impact on the ability of the audit committee to detect weaknesses in internal controls thus on the ability to take remedial actions to remove those deficiencies before financial statements are published. Furthermore, Cohen et al. (2014) state that external auditors are not manifested with enough financial expertise nor do they appropriately focus on ERM.

Under an agency-theory point of view it can be argued that ERM can function as a mechanism to reduce the information asymmetry between the audit committee and management by providing a more formal and transparent perspective on risk and thus allowing audit committee members to better monitor the CEO's and management's risk taking behavior that is not in the interest of stakeholders. All these implications lead to the first hypothesis:

Hypothesis 1: Companies that have appointed a Chief Risk Officer are less likely to report material weaknesses in internal control over financial reporting.

3.2 Stand-alone risk committees

In general, the full board has the responsibility of risk-oversight (COSO, 2009). However, there are different approaches to provide the optimal risk-oversight board structure. While some companies maintain risk-oversight as a full board function, most of the companies delegate the main risk-oversight responsibility to the audit committee and other committees depending on their function and the type of risk. Financial and accounting risks are usually assigned to the audit committee.

Another approach is to create a stand-alone risk committee which alone is fully in charge of risk-oversight. A risk committee can be seen as an indicator for an implemented ERM system as it assigns the responsibility for the overall company risk oversight to only one unit. However, it is still unclear if a risk committee has a positive effect on a company's risk oversight. Arguments for and against its use makes it difficult for companies to decide whether to establish a risk committee or leave the responsibility to the audit committee and/or the board of directors. It can be argued that the audit committee is not best suited to oversee risk management because it uses all its resources for other duties it has to fulfill such as routine cash management transactions and monitoring cash investment safety, along with their financial reporting monitoring duties (Hines et al., 2015). A separate risk committee could in this case strengthen the company's risk oversight by relieving the burdened audit committee of direct risk oversight of non-financial risk management.

Furthermore, it can be argued that a risk committee has a broader risk focus than an audit committee by providing a more specialized knowledge of the risks associated with all operations of a company, while audit committee members are mostly selected based upon their skills and experience related to financial reporting and accounting. Assigning some of the risk oversight responsibility to a risk committee could therefore help the audit committee to focus on the risks related to financial reporting and internal control.

Creating a risk committee can also create risk management synergies between different committees due to overlapping membership with other committees by reducing the likelihood of risks slipping through the cracks. The risk committee member hereby acts as a coordinator with other board committees to ensure that risks are properly attended (Bates et al., 2009). In general, regulators and practitioners agree that the main risk oversight should remain as part of the board of directors because it provides a more complete perspective on critical risks. Some companies are able to form a separate risk committee from existing board members while other companies with more complex risk profiles may need to form a risk committee consisting of independent directors with the necessary expertise. It is argued that the creation of a risk committee which consists of independent board members and which is not part of the board of directors could add an additional layer of bureaucracy to the board and makes the board lose its focus on risk oversight by over relying on the risk committee. Therefore, a risk committee that is not part of the board of directors could be contra productive for a holistic, top-down approach required by ERM. However, the main argument related to risks in internal controls over financial reporting is that it helps the audit committee to focus on these risks by assigning other risk oversight responsibilities to the risk committee. This leads to the two following hypotheses:

H2: Companies that have a stand-alone risk committee as part of the board of directors are less likely to report material weaknesses in internal control over financial reporting.

H3: Companies that have a stand-alone risk committee as part of the board of directors are less likely to report material weaknesses in internal control over financial reporting.

4 Research Design

4.1 Sample selection

For my analysis, I use firm-year data from 2009 - 2012. I restrict my analysis to this time period because information about the board's role in risk oversight are only available in the proxy statements required by the Security and Exchange Commission from 2010 onwards. I limit the time frame to three years as information about the situation of risk oversight inside a company needed to be hand-collected and collecting more firm-year observations would go beyond the scope of this research in the given timeframe. I obtain financial and general firm data from the the Compustat database as well as auditor related data from Audit Analytics. I drop all observations with missing values for the control variables.

Firms are not likely to be randomly allocated to the treatment group (ICD firms) and the control group (non-ICD firms). Reporting an ICD rather depends on certain firm characteristics. Thus, it is impossible to derive causal inference in this case. Following Lawrence et al. (2011) I use propensity-score matching models to match on specific firm characteristics to examine whether the existence of an internal control deficiency can be attributed to the presence of a Chief Risk Officer or a Risk Committee. Propensity-score matching models match observations based on the probability of being treated. I matched observations based on the probability of undergoing the treatment which in this case is the probability of reporting an internal control deficiency. The starting point of the propensity-score matching the paper of Lawrence et al. is the independent variable in their main analysis (*BIG4*). I didn't match based on the independent variable (CRO, risk committee) due to unavailability of the outcome values for CRO and risk committee before conducting propensity-score matching. A setting in which propensity scores are used to select subjects for comparison when there is an unavailability of the outcome can be described as matching methods for selection of subjects to follow-up (Stuart and Ialongo (2011)). Propensity scores can be used to select the group for which the outcome variable will be collected which is especially helpful in this setting.

I use a logit regression model to estimate the probability of reporting an internal control deficiency including total assets, Tobin's Q, return on assets and leverage.

$$Adverse404b_{i,t} = \beta_0 + \beta_1 TotalAssets_{i,t} + \beta_3 TobinQ_{i,t} + \beta_4 ROA_{i,t} + \beta_5 Lev_{i,t} + year_FE + industry_FE + \varepsilon_{i,t}, \quad (1)$$

with firm i and fiscal year t . Table 1 describes the variables.

Table 1

Variable	Description
<i>Adverse404b</i>	Dummy: takes value 1, if firm has an adverse auditor opinion according to SOX 404 (b); 0 otherwise
<i>TotalAssets</i>	The amount of total assets at the end of the fiscal year
<i>TobinQ</i>	Tobin's Q (Market capitalization/Total assets)
<i>ROA</i>	Return on Assets (Net income/Total assets)
<i>Lev</i>	Leverage/Total assets
<i>CRO</i>	Dummy: takes value 1, if firm has hired a Chief Risk Officer; 0 otherwise
<i>RConBoard</i>	Dummy: takes value 1, if firm has a stand-alone risk committee which is part of BOD; 0 otherwise
<i>RCnotonBoard</i>	Dummy: takes value 1, if firm has a stand-alone risk committee which is not part of BOD; 0 otherwise
<i>MktCap</i>	Market Capitalization at the end of the fiscal year
<i>FirmAge</i>	Number of years firm has accessible data on Compustat
<i>BIG4</i>	Dummy: takes value 1, if external auditor is part of the Big 4; 0 otherwise

Then I matched, without replacement, an internal control deficiency firm (ICD firm) with a non-ICD firm that has the closest predicted value from equation (1) with a maximum distance of 3 percent. As a result, I can improve causal inference by creating a pseudo random sample in which the ICD is randomly allocated to the treatment and the control group. The treatment group consists of firms which have reported internal control deficiencies according to SOX section 404b. The control group incorporates firms with no internal control deficiencies for a given year. At this point of time the number of observations in the two groups were both equal to 511 with 1022 firm-year observations in total. In the next step I hand-collected information about CRO employment and risk committee existence based on the proxy statements available on the Security and Exchange

Commission website. A firm is defined to have a risk committee on the board if the risk committee is listed as a board committee in the proxy statement and consists of members of the board of directors. It is defined to have a risk committee not on the board if the risk committee is not mentioned to be part of the board and consists of either independent members or members of other committees or both. Examples of actual names of risk committees in the sample include “*risk management committee*”, “*risk oversight committee*”, “*risk steering committee*”, and “*enterprise risk management committee*”. If there was a Chief Risk Officer employed in the given year, the company is defined to have a CRO. After starting to hand-collect the valued for CRO and risk committee it became clear that there is no information available for the year 2008. I dropped all observations for the fiscal year 2008 resulting in an unequal number of observations in the treatment and the control group.

The final sample consists of 695 firm-year observations whereby 338 firms have an adverse auditor opinion after SOX section 404b and 357 firms did not report any adverse auditor opinion. This inequality of the number of observations in the treatment versus the control group should not bias the results of this research significantly.

4.2 Method

To test whether the existence of an ICD can be attributed to the implementation of an ERM indicator, I use the following logistic models:

$$Adverse404b_{i,t} = \beta_0 + \beta_1 CRO_{i,t} + \beta_3 MktCap_{i,t} + \beta_4 TobinQ_{i,t} + \beta_5 ROA_{i,t} + \beta_6 FirmAge_{i,t} + \beta_7 BIG4_{i,t} + year_{FE} + industry_{FE} + \varepsilon_{i,t}, \quad (2)$$

$$Adverse404b_{i,t} = \beta_0 + \beta_1 RConBoard_{i,t} + \beta_3 MktCap_{i,t} + \beta_4 TobinQ_{i,t} + \beta_5 ROA_{i,t} + \beta_6 FirmAge_{i,t} + \beta_7 BIG4_{i,t} + year_{FE} + industry_{FE} + \varepsilon_{i,t}, \quad (3)$$

$$Adverse404b_{i,t} = \beta_0 + \beta_1 RCnotonBoard_{i,t} + \beta_3 MktCap_{i,t} + \beta_4 TobinQ_{i,t} + \beta_5 ROA_{i,t} + \beta_6 FirmAge_{i,t} + \beta_7 BIG4_{i,t} + year_{FE} + industry_{FE} + \varepsilon_{i,t}, \quad (4)$$

$$Adverse404b_{i,t} = \beta_0 + \beta_1 CRO + \beta_2 RConBoard + \beta_3 RCnotonBoard + \beta_4 MktCap_{i,t} + \beta_5 TobinQ_{i,t} + \beta_6 ROA_{i,t} + \beta_7 FirmAge_{i,t} + \beta_8 BIG4_{i,t} + year_{FE} + industry_{FE} + \varepsilon_{i,t}, \quad (5)$$

with firm i and fiscal year t .

I first test for ERM indicators separately in equation (1), (2) and (3). The main variable of interest is *CRO* in equation (2), *RConBoard* in equation (3) and *RCnotonBoard* in equation (4). In equation (5) I include all independent variables. Referring to Ge and MacVay (2007), I control for firm size (*MktCap*, *TotalAssets*), firm age, a company's financial health (Tobin's Q, ROA), and auditor type. In line with their expectations they found that larger firms tend to have less internal control deficiencies due to more financial reporting processes and procedures in place, economies of scale when developing and implementing internal controls and greater resources to spend on internal auditors or consulting fees. They also found that firm age is related to internal control deficiencies. Older firms are less affected by internal control deficiencies than younger firms. Also a firm's profitability seems to affect whether a company has to deal with internal control deficiencies so that poorly performing firms may not be able to adequately invest time and/or money in proper internal controls as supported by past research (DeFond and Jiambalvo (1991), Ge and MacVay (2007)). I control for auditor type (*BIG4*) as Doyle et al. (2007) find that smaller and less profitable firms are more likely to have internal control deficiencies than bigger more profitable firms. Those firms are less likely to hire a Big 4 auditor as they simply can not afford it. As a consequence, firms that have hired a Big 4 auditor are less likely to report internal control deficiencies. Another reason might be that Big 4 auditors avoid those firms with internal control deficiencies because they are perceived to be too risky. Moreover, I include year-fixed effects to capture the influence of aggregate time-series trends especially the influence of the financial crisis. Industry fixed-effects help me to rule out that the outcome of the analysis is due to differences in industries. I include industry-fixed effects using two digits SIC code. This is important because some industries tend to put more weight on their risk oversight than other industries as for instance banks focus more on risk management than other industries to meet special regulatory expectations. Therefore, it is highly common to hire a CRO or create a risk committee in the financial industry.

A logit regression model is useful for the purpose of this research because it allows for the estimation of predictors where the predicted variable is binary. In comparison to linear models like OLS, it doesn't assume a linear relationship but allows for prediction of non-linear models with a logarithmic distribution. Furthermore, it does not assume a homogeneity of variances. Apart from

its advantages, logit models require larger samples to achieve stable, meaningful results. The sample size of 695 observations could be a possible limitation in this study.

5. Results

5.1 Difference in means and correlational analysis

Table 2
Descriptive Statistics Propensity-Score Matched Sample

	ICD Mean Std. Dev.	Non-ICD Mean Std. Dev.	Difference in Means (t-statistic)
<i>CRO</i>	0.05 0.22	0.06 0.24	0.6348 (0.5258)
<i>RConBoard</i>	0.03 0.16	0.04 0.20	1.1166 (0.2646)
<i>RCnotonBoard</i>	0.03 0.16	0.08 0.27	3.2257*** (0.0013)
<i>TotalAssets</i>	2351.51 9310.43	22152.74 131460.1	2.8127*** (0.0052)
<i>Log (TotalAssets)</i>	6.23 1.67	7.20 2.05	6.8594*** (0.0000)
<i>Lev</i>	0.61 0.80	0.57 0.30	-1.0523 (0.2933)
<i>TobinQ</i>	2.03 2.76	1.87 1.68	-0.8744 (0.3823)
<i>MktCap</i>	903.77 2650.07	8057.57 29675.97	4.5357*** (0.0000)
<i>Log (MktCap)</i>	5.65 1.43	6.85 1.90	9.4293*** (0.000)
<i>ROA</i>	-0.04 1.19	-0.003 0.22	0.0678 (0.5437)
<i>FirmAge</i>	18.42 12.89	23.21 17.14	4.1772*** (0.0000)
<i>BIG4</i>	0.61 0.49	0.80 0.40	5.5484*** (0.0000)
<i>No. Obs.</i>	338	357	
<i>% of Total</i>	48,63%	51,37%	

*, **, *** Indicate significance at 10%, 5% and 1% levels, respectively, using two-tailed t-tests of differences in means assuming unequal variances.

Table 2 presents the descriptive statistics for the propensity-score matched sample. The full sample consists of 695 observations, where 338 firms reported an internal control deficiency (*ICD*) and 357 firms were free of any internal control deficiencies (*non-ICD*) after using equation (1) to calculate the propensity scores and matching firms with a caliber distance of 3 percent. Conducting a difference in means test is helpful in this setting because it gives an assessment of whether the propensity-score matching appears to be effective in terms of forming a balanced sample of ICD and non-ICD firms. The variables used to match the two samples are *TotalAssets*, *Lev*, *TobinQ* and *ROA*. The results indicate that the two groups are insignificantly different at a 10 percent significance level regarding all variables used in the matching process except *TotalAssets* which is significantly different between the two group at a significance level of 1 percent. A 99 percent winsorizing of *TotalAssets* doesn't change the outcome of the t-test. The outcome also doesn't change if I create the natural logarithm of *TotalAssets* and *MktCap* ($\log(\textit{TotalAssets})$, $\log(\textit{MktCap})$), which ensures a normal distribution of the two indicators and controls for outliers. *TotalAssets* and *MktCap* are both proxies for firm size, which indicates the the two groups differ in firm size regarding their means. However, the difference in firm size can be ignored as the two groups are insignificantly different regarding all other characteristics. In line with my expectations that firms with a Big 4 auditor are less likely to report internal control deficiencies, I find a difference in means of 5.5484 for *BIG4* which is significant at a 1 percent level.

Finally, the result of the t-test gives a first indication that having a stand-alone risk committee which is not part of the board of directors affects the reporting of an internal control deficiencies as I find a positive and significant difference in means of 3.2257 at a 1 percent significance level for *RCnotonBoard*.

Table 3 summarizes the correlations between the dependent variable, the independent variables and all control variables in the form of a Spearman Correlation Matrix. *Lev* does not appear in this matrix as it is not used in the main analysis and therefore not of interest in this test.

First, the results show that there is a negative, although no significant relation between the dependent variable (*Adverse404b*) and *CRO* or *RConBoard* (p-values 0.5270 and 0.2645, respectively) suggesting that hiring a CRO or creating a stand-alone risk-committee as part of the board of directors might have no effect on whether a firm discloses internal control deficiencies not controlling for other firm characteristics. However, the relation between *Adverse404b* and *RCnotonBoard* is negative and significant at a 1 percent level with a correlation coefficient of -0.1206 and a p-value of 0.0015. This suggests that there is a possible causal relation between stand-

alone risk committees as part of the board of directors and disclosing internal control deficiencies. If this is the case, the relation will be further tested in the main analysis of this research. Secondly, all control variables are significantly related to *Adverse404b* which proves the necessity to include them into the regression model for the main analysis. In addition, they are all negatively correlated which indicates that firm size, profitability, firm age and the existence of a Big 4 auditor have a negative effect on an adverse auditor opinion after SOX 404 (b). Third, the correlations between the independent variables suggest that companies tend to hire a CRO if there is already a stand-alone risk committee or vice versa. The coefficient of the relation between *CRO* and *RConBoard* implicates this by showing a positive and significant value (coefficient: 0.2201, p-value: 0.0000). The same is valid for the relation of *CRO* and *RCnotonBoard* (coefficient: 0.1267, p-value: 0.0008). One possible explanation for this phenomenon is that hiring a CRO often comes hand-in-hand with creating a stand-alone risk committee or vice versa. Finally, the table doesn't signal any multicollinearity issues.

Table 3
Spearman Correlation Matrix

	<i>Adverse404b</i>	<i>CRO</i>	<i>RConBoard</i>	<i>RCnotonBoard</i>	<i>TotalAssets</i>	<i>TobinQ</i>	<i>MktCap</i>	<i>ROA</i>	<i>FirmAge</i>	<i>BIG4</i>
<i>Adverse404b</i>	1									
<i>CRO</i>	-0.0241 (0.5270)	1								
<i>RConBoard</i>	-0.0425 (0.2645)	0.2201*** (0.0000)	1							
<i>RCnotonBoard</i>	-0.1206*** (0.0015)	0.1276*** (0.0008)	-0.0457 (0.2300)	1						
<i>TotalAssets</i>	-0.2417*** (0.0000)	0.2573*** (0.0000)	0.1805*** (0.0000)	0.2129*** (0.0000)	1					
<i>TobinQ</i>	-0.0752** (0.0481)	-0.1748*** (0.0000)	-0.1594*** (0.0000)	-0.0314 (0.4099)	-0.3523*** (0.0000)	1				
<i>MktCap</i>	-0.3287*** (0.0000)	0.0099 (0.7940)	0.0784** (0.0393)	0.1742*** (0.0000)	0.6667*** (0.0000)	0.2448*** (0.0000)	1			
<i>ROA</i>	-0.2081*** (0.0000)	-0.0561 (0.1401)	-0.0535 (0.1601)	0.0950** (0.0124)	0.1962*** (0.0000)	0.1333*** (0.0004)	0.3939*** (0.0000)	1		
<i>FirmAge</i>	-0.1158*** (0.0023)	0.0232 (0.5422)	0.0447 (0.2404)	0.1082*** (0.0044)	0.2930*** (0.0000)	-0.0655* (0.0853)	0.2876*** 0.0000	0.1721*** (0.0000)	1	
<i>BIG4</i>	-0.2041*** (0.0000)	-0.0265 (0.4861)	0.0354 (0.3525)	0.0717* (0.0594)	0.3632*** (0.0000)	-0.0026 (0.9456)	0.4693*** (0.0000)	0.0914** (0.0162)	0.1596*** (0.0000)	1

*, **, *** Indicate significance at 10%, 5% and 1% levels, respectively.

5.2. Multivariate analysis

Table 4
Main multivariate analysis

	Expected sign	Dependent variable = <i>Adverse404b</i>			
		(1)	(2)	(3)	(4)
<i>CRO</i>	-	-0.0829 (0.851)			-0.0494 (0.912)
<i>RConBoard</i>	-		-0.0951 (0.862)		-0.1911 (0.729)
<i>RCnotonBoard</i>	+/-			-0.8482* (0.073)	-0.8782* (0.064)
<i>Log(TotalAssets)</i>	-	0.0470 (0.692)	0.0532 (0.651)	0.0566 (0.630)	0.0492 (0.679)
<i>TobinQ</i>	-	0.0745 (0.187)	0.0763 (0.177)	0.0761 (0.177)	0.0733 (0.192)
<i>Log(MktCap)</i>	-	-0.4863*** (0.000)	-0.4916*** (0.000)	-0.4851*** (0.000)	-0.4749*** (0.000)
<i>ROA</i>	-	0.0406 (0.724)	0.0412 (0.721)	0.0398 (0.730)	0.0382 (0.739)
<i>FirmAge</i>	-	-0.0089 (0.203)	-0.0090 (0.198)	-0.0087 (0.220)	-0.0084 (0.235)
<i>BIG4</i>	?	-0.3693* (0.090)	-0.3675* (0.092)	-0.3659* (0.093)	-0.3632* (0.096)
<i>Industry_FE</i>		Included	Included	Included	Included
<i>Year_FE</i>		Included	Included	Included	Included
Matching model R^2		0.1374	0.1377	0.1404	0.1404
No. Obs.		695	695	695	695

*, **, *** Indicate significance at 10%, 5% and 1% levels, respectively. All variables are described in Table 1. Dependent variable is *Adverse404b* in all models. Multivariate estimates in column (1), (2) and (3) are based on equation (2), (3) and (4), respectively. Column (4) includes all independent variables based on equation (5). The matching model R^2 is the pseudo R^2 for the propensity-score logistic regression.

I model the probability of disclosing a material weakness in internal control over financial reporting as a function of *CRO*, *RConBoard* and *RCnotonBoard* using a logistic regression model with the constructs stated in section 4.2. The logit estimates in column (1) are based on equation (2) with *CRO* as the variable of interest and controlling for firm size, firm profitability, firm age and auditor type.

I can only partially support the findings of Ge and McVay (2007) that disclosing material weaknesses is more likely for firms that are smaller, less profitable and younger. In contrast to their findings I observe positive and insignificant results for firm profitability (*TobinQ* and *ROA*). Also firm age is not negatively correlated with disclosing material weaknesses and is not significant. *TotalAssets* and *MktCap* which are both proxies for firm size in the paper of Ge and McVay (2007) as well as in this paper, show contradicting results. The coefficient of *TotalAssets* is positive and not significant while *MktCap* shows negative and significant results which is in accordance with the expectation that larger firms have more financial resources to implement appropriate internal controls. In contrast to Zhang et al. (2007) I observe a positive relation between hiring a Big 4 auditor and disclosing material weaknesses. *BIG4* reveals a negative and significant coefficient of -0.3693 with a p-value of 0.090. Doyle et al. (2006) gives two possible explanations for this phenomenon. The first one is those firms which report internal control deficiencies are smaller and less profitable firms are financially constraint and as a consequence can not afford a Big 4 auditor. This explanation however, can not hold in this research as the results don't show an association between internal control deficiencies, firm size and firm profitability. Another reason Doyle et al. (2006) suggest is that Big 4 auditors avoid those firms that report internal control deficiencies which could be a valid explanation for the negative and significant relation between *BIG4* and *Adverse404b*.

The coefficient of *CRO* is negative with a value of -0.0829, which is in line with the expectation, but not significant. Therefore, I can reject the first hypothesis that companies that have appointed a Chief Risk Officer are less likely to report material weaknesses in internal control over financial reporting. Column (2) shows the results of equation (3) which tests for the second hypothesis that companies that have a separate risk committee which is part of the board of directors are less likely to report material weaknesses in internal control over financial reporting. I am able to reject this hypothesis as the coefficient of *RConBoard* is negative, but not significant (coefficient: -0.0951, p-value: 0.862). The third hypothesis testing is conducted in column (3) using equation (4). *RCnotonBoard* has a negative coefficient (-0.8482) and is significant at a 10 percent

level (p-value: 0.073). This implicates that the probability of disclosing a material weakness in internal control over financial reporting is lower when a company has a stand-alone risk committee which is not part of the board of directors. Thus, I don't reject the hypothesis that firms with a stand-alone risk committee which is not part of the board of directors are less likely to disclose material weaknesses in internal control over financial reporting.

When including *CRO*, *RConBoard* and *RCnotonBoard* into one model (column (4)), I observe a slight increase in the strength of the relation between *Adverse404b* and *RCnotonBoard* (decrease in p-value from 0.073 to 0.064). This can be explained by the correlation of *CRO* and *RCnotonBoard* (see Table 3). However, the overall results don't change even when controlling for other the other indicators of ERM.

5.3 Robustness check

For robustness check purposes, I include only one indicator for firm size and firm profitability. So I use either *MktCap* or *TotalAssets* and *ROA* or *TobinQ* and different combinations of it. Furthermore, I compare the outcome of the analysis using *TotalAssets* and *MktCap* and their natural logarithm for all models. In addition, I also use the natural logarithm of *FirmAge* to acquire a normal distribution. The outcome of the analysis doesn't change.

Moreover, I generate two new variables from the previously used ERM indicators called *RC* and *ERM*. *RC* is an indicator variable, which takes value 1, if a company has a stand-alone risk committee which is either part of the board of directors or not. Hence, it is a combination of *RConBoard* and *RCnotonBoard* to test whether a stand-alone risk committee in general has an effect on the disclosing of material weaknesses in internal control over financial reporting. *ERM* is a combination of *CRO*, *RConBoard* and *RCnotonBoard*. It takes value 1, if a company has hired a CRO or/and has a stand-alone risk committee to test the overall effect of an implemented ERM system being characterized by one of those three indicators.

Table 5 presents the outcome in column (1) and (2). I expect the direction of the effect to be negative for both, *RC* and *ERM*. Even though the effect of *RC* and *ERM* is indeed negative, I can only identify significant results for *RC* at a 10 percent level in column (1) which is probably driven by risk committees which are not part of the board of directors. This implies that only the creation of a stand-alone risk committee has a significant effect on the quality of internal controls. The outcomes of the controls are similar to those as seen in Table 4. The outcome of *CRO* is not surprisingly insignificant as already suggested in the main analysis. I conclude that combining one or more of the three ERM indicators does not lead to a decrease in the probability of disclosing

internal control deficiencies in internal over financial reporting.

Table 5
Multivariate analysis with combined estimators

	Expected sign	Dependent variable = <i>Adverse404b</i>		
		(1)	(2)	(3)
<i>CRO</i>	-	-0.0202 (0.964)		-0.0652 (0.885)
<i>RC</i>	-	-0.5991* (0.099)		-0.5874 (0.106)
<i>ERM</i>	-		-0.3935 (0.204)	
<i>Log(TotalAssets)</i>	-	0.0499 (0.675)	0.0210 (0.795)	0.0462 (0.696)
<i>TobinQ</i>	-	0.0724 (0.197)	0.0696 (0.201)	0.0727 (0.194)
<i>Log(MktCap)</i>	-	-0.4756*** (0.000)	-0.4513*** (0.000)	-0.4774*** (0.000)
<i>ROA</i>	-	0.0368 (0.747)	0.0429 (0.701)	-0.0370 (0.745)
<i>FirmAge</i>	-	-0.0084 (0.231)	-0.0067 (0.333)	-0.1719 (0.226)
<i>BIG4</i>	?	-0.3659* (0.093)	0.3595* (0.096)	0.3590* (0.099)
<i>Industry_FE</i>		Included	Included	Included
<i>Year_FE</i>		Included	Included	Included
Matching model R ²		0.1404	0.1303	0.1405

*, **, *** Indicate significance at 10%, 5% and 1% levels, respectively. All variables are described in Table 1. Dependent variable is *Adverse404b* in all models. Multivariate estimates in column (1) include *CRO* and *RC* as independent variables of interest. Column (2) includes *ERM* as the independent variable of interest. Column (3) is equal to column (1) with *Log(FirmAge)* replacing *FirmAge* for robustness check. The matching model R² is the pseudo R² for the propensity-score logistic regression.

5.4 Further analysis

Despite the relation between the ERM indicators and internal control quality including the full sample it is possible that the relation varies for different sub groups of the sample. One consideration is that the relation might be different for smaller versus larger firms. The need for an ERM system increases with the size of a company as the scope of events threatening is likely to change in nature, timing and the extent. Furthermore, larger firms might have greater resources and are more likely to successfully implement ERM (Beasley et al. (2005)). Thus, I expect a greater effect of ERM indicators on internal control quality for accelerated filers⁶ than for non-accelerated filers. For this purpose, I create a new variable called *AccFiler*, which is equal to 1 if the company is an accelerated filer, and 0 otherwise. I create interaction terms for each ERM indicator (*CRO* x *AccFiler*, *RConBoard* x *AccFiler* and *RCnotonBoard* x *AccFiler*) which represent the effect of ERM indicators on internal control quality for accelerated filers only. Table 6 presents the results of the multivariate analysis with interaction terms. I can not observe any significant results for the interaction of ERM indicators and the variable for accelerated filers. Thus, I conclude that there are no differences in the effect of ERM on internal control quality for accelerated and non-accelerated filers.

⁶ The SEC defines an accelerated filer as issuers which have a market capitalization of at least \$75 million.

Table 6
Multivariate Analysis with Interaction terms

	Expected sign	Dependent variable = <i>Adverse404b</i>		
		(1)	(2)	(3)
<i>CRO</i>	-	0.4554 (0.567)		
<i>CRO x AccFiler</i>	-	-0.6891 (0.445)		
<i>RConBoard</i>	-		-15.2750 (0.989)	
<i>RConBoard x AccFiler</i>	-		15.3379 (0.989)	
<i>RCnotonBoard</i>	-			12.8652 (0.982)
<i>RCnotonBoard x AccFiler</i>	-			-13.7822 (0.980)
<i>AccFiler</i>	-	0.4802 (0.194)	0.3527 (0.330)	0.4714 (0.191)
<i>Log(TotalAssets)</i>	-	0.0656 (0.589)	0.0887 (0.464)	0.0835 (0.468)
<i>TobinQ</i>	-	0.0772 (0.179)	0.0848 (0.147)	0.0818 (0.157)
<i>Log(MktCap)</i>	-	-0.5359*** (0.000)	-0.5581*** (0.000)	-0.5431*** (0.000)
<i>ROA</i>	-	0.0377 (0.741)	0.0411 (0.725)	0.0383 (0.740)
<i>FirmAge</i>	-	-0.0086 (0.222)	-0.0093 (0.187)	-0.0088 (0.218)
<i>BIG4</i>	-	-0.3784* (0.082)	-0.3894* (0.075)	-0.3581 (0.101)
<i>Industry_FE</i>		Included	Included	Included
<i>Year_FE</i>		Included	Included	Included
Matching model R ²				
No. Obs.		695	695	695

*, **, *** Indicate significance at 10%, 5% and 1% levels, respectively. All variables are described in Table 1. Dependent variable is *Adverse404b* in all models.

6. Discussion and conclusion

This study tries to examine the causal inference between ERM and the reporting of material weaknesses in internal control over financial reporting in compliance with SOX 404 (b) of the Sarbanes-Oxley Act. I use the following three different indicators which signal the implementation of an ERM system: The existence of a Chief Risk Officer, a stand-alone risk committee as part of the board of directors, and a stand-alone committee which is not part of the board of directors. Using propensity-score matching to match firms that reported weaknesses in internal control over financial reporting with firms that did not report any material weaknesses and a logit regression model, I found only significant results for the indicator which represents the existence of a risk committee which is not part of the board of directors, controlling for firm size, firm profitability, firm age and auditor type. I expected no relation between material weakness reporting and risk committees which are not incorporated into the board of directors because there are arguments for and against the effectiveness of such committees regarding internal control over financial reporting. One main argument is that risk committees which consists of independent directors weaken the board's focus on risk oversight as practitioners agree that risk oversight should stay primarily the the board of directors' responsibility. This paper however shows that creating such a stand-alone risk committee could help to reduce the likelihood of reporting internal control deficiencies by allocating parts of the risk-oversight to a committee consisting of independent directors. Using the argument that this helps the audit committee to only focus on relevant risks related to financial reporting, I conclude that creating a stand-alone risk committee supports an entity wide risk management approach and reduces the likelihood of reporting material weaknesses. I also find that the appointment of a Chief Risk Officer comes most of the time hand-in-hand with the creation of a risk committee which consists of members of the board. This phenomenon is especially present in the financial industry. However, I don't find a significant relation between the presence of a Chief Risk Officer or a risk committee as part of the board of directors and the disclosing of material weaknesses. This implies that implementing a ERM system only in form of a stand-alone risk committee independent from the board of the directors could support the top-down and entity level risk approach suggested by the SEC. Thus, I contribute to the findings of previous literature dealing with advantages and disadvantages of ERM.

Furthermore, I give practitioners an indication of the best way to implement a ERM system. Another finding in this paper is that companies which hired a Big 4 auditors are less likely to report material weaknesses. Doyle et al. (2007) gives two main arguments that could explain this

outcome. One is that firms with disclose material weaknesses are financially weaker and less profitable und thus can't afford a Big 4 auditor. The other one states that Big 4 auditors avoid firms with material weaknesses as they are perceived to be riskier. Future research could further analyze this by including *BIG4* as the main variable of interest controlling firm characteristics that influences the decision of how Big 4 auditors chose their clients.

However, the findings of this paper must be interpreted by readers with caution as it is subject to certain limitations. First, the generalization of this research is restricted due to the relatively small sample size with a small percentage of firms that follow an ERM approach. Using a bigger sample might be useful in future research. Lastly, inclusion of different control variables and other relevant firm characteristics may improve the results of this research.

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