Internal control over financial reporting – the effect of internal control material weaknesses on accrual quality

Evidence from the public listed companies in the United State of America

Abstract

This master's thesis examines the relation between accrual quality and the disclosure of internal control material weaknesses among the U.S. publicly listed firms. This master's thesis uses 241 firms that disclose at least one material weaknesses from January 2009 to December 2013. By measuring accrual quality (McNichols, 2002), the results suggest that internal control material weaknesses are generally associated with poor estimation of accruals that map from income to cash flows. Moreover, the results also show that the relation between poor accrual quality and internal control material weaknesses is driven by company-level material weaknesses rather than account-specific material weaknesses. Lastly, the results show that the association between accrual quality and internal control material weaknesses weakens and accrual quality improves if firms remediate their material weaknesses within one to three years after the disclosure of material weaknesses.

Keywords: earnings quality; accruals quality; internal control material weaknesses; remediation effect.

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Contents

1. INTRODUCTION

1.1 Background and objective

Known scandals of companies listed on the U.S. stock exchange in the beginning of this century (Enron & WorldCom) resulted in a lack of investors' confidence in the financial markets. In the cases of Enron and Worldcom, significant impact of deficiencies in internal control over financial reporting in internal control systems were present. Ineffective internal control environment can potentially create opportunistic behavior by managers that leads to earning mismanagement, misstatement of financial reporting and even accounting fraud.

Due to the scandals, the SEC (Securities Exchange Commission) established the Sarbanes-Oxley Act (SOX) in 2002. Passed by the U.S. federal law as a bill, SOX governs active public companies' financial reporting. Under SOX 302, management of large public firms is responsible for creating, maintaining, and reporting the effectiveness of the company's internal control system which reflects the level of quality of reported earnings. Additionally, under SOX 404, released in 2004, auditors are also required to attest the assertions made by management. There are many ways to measure the quality of reported earnings, one of them being accruals quality. Since the aim of SOX 302 and 404 is to provide reasonable assurance regarding the reliability and transparency of financial reporting, it is important to investigate the association between accrual quality and the disclosure of internal control material weaknesses.

The Committee of Sponsoring Organizations of the Treadway Commission (COSO) established a common internal control framework for firms to assess and standardize their internal control systems. Standard setters such as SEC expect firms to achieve effective and efficient operations, show the reliable financial reporting, and be compliant with applicable laws and regulations (COSO, 2013). By definition, internal control is a process that can provide reasonable assurance to achieve reliable financial reporting (PCAOB, 2004). Internal controls over financial reporting can improve the effectiveness and efficiency of the operational processes (Arens, Elder & Beasley, 2012). Meeting these expectations allows investors/shareholders to trust top management performance in safeguarding their assets.

Accruals are the difference between reported earnings and cash flow from operation. Accruals often occur from revenue and expenses which have been recorded in balance sheet accounts (e.g.,

accounts receivable and payable) but for which cash has not been received. According to Dechow et al. (1994), the accrual process can be used to mitigate problems such timing and matching that are inherited from the association between cash flows and reported earnings. However, "management might use their information advantage to opportunistically manipulate accruals" (Dechow et al., 1994). Therefore, accrual quality can also be defined as the degree to which earnings map with cash flows.

Prior literature finds that the internal control system is an important tool for efficient earnings quality (Kinney et al. 1990). Doyle et al. (2007) show that the disclosure of internal control material weaknesses is negatively associated with accrual quality. Doyle et al. (2007) posit that ineffective internal control environment allows misstatement such as "intentional biased accruals such as earnings management (e.g., lack of segregation of duties), and unintentional errors in accrual estimation (e.g., lack of experience in estimating bad-debt expense provision)" (Doyle et al., 2007, p. 1142). Furthermore, according to Ashbaugh-Skaife et al. (2008), remediation[1] of internal control problems has a positive impact on accrual quality. Therefore, the implementation of effective internal control systems can provide such reliable and transparent financial reporting.

This master's thesis aims to investigate the association between accrual quality and the disclosure of internal control material weaknesses under SOX 404 from listed U.S. public companies. The master's thesis attempts to answer the following research question:

"Does internal control material weakness affect accrual quality?"

Although this research question has been addressed in the papers by Doyle et al. (2007) and Ashbaugh-Skaife et al. (2008), this master's thesis analyzes additional factors that may also affect on accrual quality and the disclosure of internal control material weaknesses. Firstly, Doyle et al. (2007) consider "innate firm characteristics that affect accrual quality and additional material weaknesses determinants that could be related to accrual quality." Secondly, Ashbaugh-Skaife et al. (2007) investigate factors that affect the disclosure of material weaknesses and consider factors such as "internal control risk attributes and proxies for incentive to discover and disclose material weaknesses." Therefore, to obtain more accurate results, this thesis considers additional factors that are divided into three different streams: 1) innate firms' characteristics that affect accruals

[1] Remediation means that firms correct the occurrence of internal control material weaknesses and that internal control systems have become effective after the remediation actions.

quality, 2) internal control risk attributes, and 3) proxies for incentives to detect and disclose internal control material weaknesses. Additionally, to obtain more accurate results, this thesis uses more recent sample period between 2009 and 2013, right after the global recession.

Furthermore, this master's thesis will analyzes two different types of material weaknesses (e.g. company-level and account specific material weaknesses) and compare them to see whether the disclosure of company-level material weaknesses has a negatively stronger association with accrual quality. Lastly, this master's thesis examines the effect on accrual quality when firms remediate their internal control problems by applying the three different streams mentioned above.

1.2 Methodology

To answer the research question above, this master's thesis adopts the studies from Doyle et al. (2007); Ashbaugh-Skaife et al. (2008); and Ashbaugh-Skaife et al. (2007). The association between accrual quality and the disclosure of internal control material weaknesses is investigated using 241 firm-year observations that disclosed material weaknesses covering FY 2009 to FY 2013. The sample of this study focuses on publicly-active companies in the U.S. and mainly those firms that are obliged to submit an annual report on the internal control status under SOX 404. Internal control material weakness (MW) takes a value of 1 if a firm discloses at least 1 material weakness, and 0 otherwise. This study uses accrual quality measure (AQ) developed by Dechow and Dichev (2002), as modified by McNichols (2002) and Francis et al. (2005). The accrual quality measurement measures the error terms that capture the accrual estimation error made by selected firms. I believe this accrual model is appealing as it proves to be the most powerful model to capture earnings management (Jones et al., 2008). Furthermore, this master's thesis considers factors such as innate firms' characteristics that might affect accrual quality, internal control risk attributes and proxies for incentive to discover and disclose material weaknesses.

Secondly, based on Doyle et al. (2007), this study examines whether the relation between the disclosure of internal control material weaknesses and accrual quality is stronger for the disclosure of company-level material weaknesses than the disclosure of account-specific material weaknesses. In case of company-level material weaknesses there is a fundamental problem that produces such material weaknesses. The occurrence of company-level material weakness is mainly due to management override and weak internal control environment. Company level material weakness (MW_Company_Level) takes a value of 1 if a firm discloses at least 1 material weakness

related to company-wide problems (e.g., management override over financial reporting or ineffective control environment). Account-Specific material weakness is "more auditable" (Doyle et al., 2007) and caused by transactional issues. Account-Specific material weakness (MW_Account_Specific) takes a value of 1 if a firm discloses at least 1 material weakness related to account-specific problems or transactional issues.

Lastly, this study investigates the relation between firms that remediate their material weakness problems and accrual quality. Based on the definition of internal control by PCAOB (2004), internal control will produce more reliable financial reporting. Remediation of material weaknesses (MW_FIXED) takes a value of 1 if a firms' internal control opinion is effective within three subsequent years prior the disclosure of material weaknesses. Therefore, this study hypothesizes that remediation of internal control problems is positively associated with accrual quality.

1.3 Findings, limitations and implications

The results of this master's thesis suggest that after controlling various factors that affect both accrual quality and the disclosure of internal control material weaknesses, the disclosure of material weaknesses under SOX 404 is negatively associated with accrual quality. This association is consistent with innate firms' characteristics including difficulty to estimate accruals (e.g. length of operating cycle and cash flow volatility) (Dechow and Dichev, 2002; Doyle et al., 2007) and proxies to detect MWs that are likely to correlate with accrual quality (e.g. profitability and complexity) (Ge and McVay, 2005; Ashbaugh-Skaife et al., 2007; Doyle et al., 2007). Moreover, this study finds that the relation between the disclosure of internal control material weaknesses and accrual quality is associated with internal control risk attributes such as firms that bear more losses, have higher financial distress, are involved with restructuring activities and face insignificant growth rate and lower inventory turnover. This master's thesis also finds that only firms that change auditors more frequently and are partly owned by institutional shareholders are associated with accrual quality and material weaknesses.

Secondly, this master's thesis finds the association between the disclosure of internal control material weaknesses and accrual quality is stronger negatively associated under the disclosure of company-level material weaknesses than the disclosure of account-specific material weakness. As predicted, the disclosure of company-level material weaknesses has a negatively stronger

association with accrual quality than the disclosure of account-specific material weaknesses. Lastly, I find that the association between weak internal control material weaknesses and poor accrual quality is negatively associated with firms that remediate their internal control problems within three subsequent years after the disclosure of material weaknesses. When firms remediate their material weaknesses, firms' accrual quality improves.

This study has several limitations. The limitations include the small sample selection for MWs, the impact on dummy variables use for MWs, the classification of the control variable for auditor change and the sample period used for remediation effect. However, these limitations can be used for future studies.

This master's thesis provides evidence on the importance of internal controls, such that firms should invest to strengthen and maintain effectiveness internal control environments. The results are confirmed and consistent with prior research (Doyle et al., 2007; Ashbaugh-Skaife et al., 2008) that the implementation of effective internal control will improve the level of earnings quality. The findings are generally important for providing insight for standard setters and companies to maintain earnings quality and implement effective and efficient corporate governance mechanisms. This master's thesis suggests and confirms that firms will benefit from implementing and maintaining effective internal controls as it improves accrual quality.

2. THEORETICAL BACKGROUND

This section discusses further the main theoretical constructs of accrual quality (earnings quality), internal control and internal control remediation actions. I elaborate on earnings quality based on definition and measurements. Then, I discuss agency theory and stewardship theory to link how earnings quality (accrual quality) can be achieved in the best interest of stakeholders. In the second subsection of this chapter, institutional background about SOX 302 and SOX 404 explains the important role of internal controls. Next, I explain the internal control's concepts including its definition, classification, and causes that lead to internal control material weaknesses. Lastly, in relation to remediation actions, I discuss further how material weaknesses are remediated.

2.1 Earnings quality

2.1.1 Definition

Many researchers examine the empirical measures used in the academic research to assess earnings quality. There are many different interpretations of earnings quality because of the multidimensional character of this concept (Schipper & Vincent, 2003). To avoid unclear definition of earnings quality from different aspects, I derive the definition of earnings quality from Dechow et al. (2010), who define earnings quality as follows:

"Higher quality of earnings provides more information about the features of a firm's financial performance that are relevant to a specific decision made by a specific decision maker."

Based on Dechow et al. 2010), this definition is derived from the Statement of Financial Accounting Concepts No. 1 of the Financial Accounting Standard Board (FASB) that "financial reporting should provide information about the financial performance of a firm during a period" (FASB, 1978).

Several considerations can be made on the definition of earnings quality according to Dechow et al. (2010). First, earnings quality is used under the perspective of decision-relevance of information; therefore, Dechow et al. (2010) consider the above definition as meaningless since earnings quality is defined only in the context of a specific decision model. Secondly, reported earnings quality depends on how financial performance is informative to a firm, many features of earnings quality tend to be unobservable due to its level of informativeness to a firm. Lastly, the

relevancy of financial performance towards earnings quality must be associated with decision making and the ability of accounting system to measure performance. Overall, the definition of earnings quality suggests that quality must be in line with decision making depending on an informative representation of financial performance.

2.1.2 Measurement of earnings quality

Since earnings quality itself is unobservable due to its informativeness towards financial performance; therefore, earnings quality is not directly measurable. Earnings quality requires proxies to examine its level. Dechow et al. (2010) suggest that several proxies could be used to capture and measure the construct of earnings quality. Dechow et al. (2010) argue that this might cause larger differences in interpreting earnings quality applying from the widespread of potential proxies. Therefore, Dechow et al. (2010) use meta-analysis concerning earnings quality including three types of proxies to define earnings quality: 1) properties of earnings, 2) investor responsiveness to earnings and 3) external indicators of earnings misstatements.

The first proxy of properties of earnings interprets the degree of firm's accounting system and captures the underlying business reality. Properties of earnings consist of earnings persistence, earnings smoothness, asymmetric timeliness and timely loss recognition, target beating, and accruals. Dechow et al. (2010) specifically use abnormal accruals and accruals models. Dechow et al. (2010) posit that accruals models are the most common methodology used in many research to capture discretion. The use of discretion to manage earnings by manipulating the use of accruals. However, manipulation of accruals could distort the true and fair values of firm's condition and performance. Also, Dechow et al. (2010) argue that manipulation of accruals could lower the informational content and reliability of financial reporting. Therefore, the level of earnings quality reduces (Bernstein & Siegel, 1979). Since the main study of this thesis investigates about accrual quality, this study applies the main specific detail measurement of accruals that will be discussed in the next section (section 2.1.3).

The second proxies defined by Dechow et al. (2010) is investor responsiveness to earnings which includes earnings response coefficient (ERC). This proxy captures earnings quality by outside stakeholders including investors or banks. Many researches study the relation between unexpected earnings and abnormal (unexpected) stock returns, which is known as ERC. ERC indicates earnings informativeness or value relevance of unexpected earnings (Teoh & Wong, 1993; Liu &

Thomas, 2000; Ghosh & Moon, 2005). These studies posit that when unexpected earnings are perceived as creating a higher value relevance, this could lead to a stronger association between unexpected earnings and stock returns. A higher value relevance could then be achieved if the announced information better reflects the underlying firms' current performance and condition.

The last proxy of earnings quality discussed by Dechow et al. (2010) is the external indicator of earnings misstatements including firms subject to Accounting and Auditing Enforcement Releases (AAERs), restatement, and internal control material weaknesses reported under the regulation of the Sarbanes-Oxley Act. Internal control material weaknesses can be negatively associated with earnings quality because material weaknesses such as misstatements create unreliable financial reporting which might signify restatement of financial reporting. The main independent variable in this thesis uses internal control material weakness, and the detail theoretical concepts will be elaborated in the next section (Section 2.3).

2.1.3 Measurement of accrual quality

To measure earnings quality in relation to internal control material weaknesses, I choose accrual models. Accrual models are the most commonly used models in the related area (e.g., Doyle et al., 2007; Ashbaugh-Skaife et al., 2008). The operationalization of dependent variable in this study is the McNichols (2002) model to measure accrual quality.

Based on the estimation of management, accruals are the difference between reported income and cash flows from operations. Thus, the degree to which reported income capture cash flows (which shows the certainty of reported income) can also be known as accrual quality. Accruals are frequently used as proxy for earnings quality. Accruals are defined based on the association between earnings and cash flows from operations. Therefore, accrual quality is strongly associated to earnings smoothness and can be placed in the same group of proxies, namely the group of proxies based on accounting numbers. From the investors' perspectives, the degree of certainty of current earnings helps to predict future earnings. Accrual quality is then of a great importance to investors.

Jones et al. (2008) show evidence on several models in studying earnings management as well determining the ability to detect extreme cases of earnings management. There are several models used to detect earnings management; the most popular are fraudulent earnings and non-fraudulent restatement cases of earnings management. This section presents the accruals quality measurement

developed by Dechow and Dichev (2002), as modified by McNichols (2002) and Francis et al. (2005). This model seems to be more appealing compared to other models. Jones et al. (2008) find that the accruals quality measurement model tends to have stronger elements to detect management manipulation. Therefore, the accruals quality model is applied in this thesis. The next two paragraphs show the detailed explanation of McNichols (2002).

Measure of accrual quality (McNichols, 2002)

Dechow and Dichev's (2002) provide a model developed from time series cash flow to capture accrual estimation errors. Dechow and Dichev (2002) estimate firm-level time series regression to measure the changes in working capital. Dechow and Dichev (2002) model is illustrated in the equation (1) below:

$$\triangle WC_{it} = \beta_0 + \beta_1 CFO_{it-1} + \beta_2 CFO_{it} + \beta_3 CFO_{it+1} + \varepsilon_{it} \quad (1)$$

Where $\triangle WC$ is the change in working capital from year t – 1 to year t. All variables in the regression model are deflated by the beginning of total assets. Dechow and Dichev (2002) measure the standard deviation of the residuals (ε) from the regression to compute as a firm-specific measure of accrual quality. McNichols (2002) shows evidence that Dechow and Dichev's accrual model can be modified to provide strong ability to capture discretionary accrual by including $\triangle REV$ and Property, Plant, and Equipment (PPE). $\triangle REV$ is a proxy to determine short-term accruals and PPE is used as a proxy for long-term accruals. According to McNichols, when these two variables are added into the regression, the adjusted R^2 increases. Therefore, I use McNichols (2002) model as the main dependent variable in this master's thesis. Below McNichols (2002) model is presented in the equation (2) as follows:

$$\triangle WC_{it} = \beta_0 + \beta_1 CFO_{it-1} + \beta_2 CFO_{it} + \beta_3 CFO_{it+1} + \beta_4 \triangle REV_{it} + \beta_5 PPE_{it} + \varepsilon_{it} \quad (2)$$

2.1.4 Agency and stewardship theories

To relate discretionary actions conducted by managers, agency theory discusses and describes the relation between groups as principals and agents in a firm. The setting of the agency theory can be assumed as the role of the agent (managers and board of directors), and the role of the principal (shareholders). The main idea of this theory is the assumption that interests of principals and agents are misaligned. Agency theory concerns about resolving conflicts that exist in agency relationship due to different (misaligned) goals in meeting goal congruence. In fact, agreement between

shareholders and management is whereby management should follow the company's best interest towards shareholders. However, there is the risk of management to focus solely on its interest despite this agreement. To reduce this risk, shareholders should invest in controlling and monitoring activities. Management runs the company as they are more closely involved with the business operations as compared to shareholders. In effect, management might have more knowledge about the company (inside information), and information asymmetry may exist. Information asymmetry can evolve and supports management to deviate from achieving goal congruence by hiding their true interest and actions. Thus, conflict of interests between management and shareholders may exist. There are two main types of problems that arise from information asymmetry, which are moral hazard and adverse selection. Moral hazard arises when external investors are not able to see and observe the true actions that management (managers and/or board of directors) create (Walker, 2013). Moral hazard is mainly about hidden actions. Adverse selection problem exists when management has access to important and superior information. Shareholders do not have access to this information and therefore are not able to evaluate with the same judgment as management does. Adverse selection problem is mainly related to hidden information between two parties (Eisenhardt, 1989).

Stewardship theory is seen as an alternative view of agency theory (Donaldson, 1990; Barney, 1990). Stewardship theory is built based on the assumption that management is intrinsically motivated to achieve their task in a pro-organizational manner (Donaldson and Davis, 1991). Management is assumed to act in the best interest of shareholders. The main objective is for managers to create and maintain a successful organization. Moreover, firms that practice stewardship theory place the CEO and Chairman responsibility under one responsibility (Donaldson et al., 2016). Therefore, it allows the board members to understand the knowledge of organizational operation including problems, strength, and opportunities to obtain deep commitment to success.

The agency theory describes the setting that possibly gives rise to accruals quality. Managers can manipulate earnings by signaling their firm's private information with the used of this discretion. In fact, managers can use information asymmetry such as discretion to manipulate earnings through discretionary accruals. The discretionary accruals are often used to improve the ability of earnings to measure firm's overall performance. Management obtains more information in regard to their firm's private information such as the ability to produce cash (Holthausen and Leftwich,

1983; Watts and Zimmerman, 1986; Holthausen, 1990; and Healy and Palepu, 1993). Stewardship theory has been discussed widely in corporate governance literature. Internal control is seen as one of the corporate governance tools used to identify risks and safeguard the company's assets. The role of internal control is discussed in the next section. Internal control is perceived as a process or set of guidelines affected by stakeholders to safeguard company's asset. Thus, this shows the role of internal control reflecting from stewardship theory.

2.2 Institutional Background

2.2.1 SOX (302 and 404) establishment

The Sarbanes-Oxley Act of 2002 (SOX) was introduced by Securities Exchange Commission (SEC) concerning the management and financial reporting of publicly active companies including public accounting firms.

In the late 90's and early 2000's, many large firms collapsed due to involvement in bookkeeping scandals; one of the biggest scandals is the bankruptcy of Enron (a global energy, commodities, and services company). Enron had over-estimated revenue (fictitious revenue) with manipulation on accounting choices while the company was in great debt. Meanwhile, Arthur Anderson (Enron's external auditor at that current time) was involved in the fraud by providing false audit opinions (provided unqualified opinions instead of adverse opinion). Both Enron and Arthur Anderson were found guilty and went bankrupt after the scandal.

Due to the scandal, investors had lost their trust towards corporate accounting and reporting practices. The Securities Exchange Commission (SEC) established Sarbanes-Oxley Act (SOX) (established in 25th of July, 2002) aiming to restore the confidence of the capital markets to the public. SOX 302 was introduced that included changes in the reporting practices of the firms and redefined the firms' responsibilities concerning their internal controls. Further later, the extended version of SOX 302 called SOX 404 was established for "accelerated filers" (companies meeting certain size and other criteria). The details of SOX 302 and 404 and its main difference are elaborated in the next section.

2.2.2 The section of SOX 302 and SOX 404

The section of 302 was effective on 29th of August 2002 and it became obligatory for all public firms to evaluate the effectiveness of their internal controls systems including policy and

procedures. Under the section of SOX 302, management is compulsory to disclose in the quarter and annual reports of any changes and any significant deficiencies regarding their firm's internal control systems and financial reports (SEC, 2002). Furthermore, management is required to inform the firm's external auditors and audit committee about their internal control status (SEC, 2003).

The extended version of the section of SOX 302 that is called SOX 404 which is effective on 15th November 2004. In addition to SOX 302, the section of 404 also known as "Management Assessment of Internal Control" requires management and other parties including external accountants and auditors. The evaluation and attestation by external auditors to examine the level of reliability of financial statement by reporting any changes (remediate MW) or new material weaknesses in the annual financial report (SEC, 2003). The intention of Section 404 is to induce strict internal controls; thus, reducing the discretionary/ opportunistic behavior. By disclosing internal control weaknesses over financial reporting, this might show a relation with liability risks for companies, which provide incentives to remediate internal control weaknesses and to invest more resources on establishing and maintaining adequate internal control systems (Coates et al. 2007). Therefore, it is an obligation to affirm the effectiveness of internal control not only by management but also by independent auditors.

There are significant differences in comparing both sections. For example, Under SOX 302, it remains vague whether internal control deficiencies should be disclosed to shareholders (Ashbaugh-Skaife et al., 2007). On the other hand, according to the answer of the SEC staff in a relevant question (SEC, 2004, Question 9), the detection and changes in material weaknesses should take full consideration and need to be disclosed in the financial reporting. However, in SOX 404, it is mandatory to disclose the detection and changes in material weaknesses by the executive of a company and its auditors.

Another important remark regarding the difference between SOX 302 and 404 is that under SOX 302, firms have limited guidance regarding the definitions of the material weaknesses disclosure and the classification of the severity of internal control deficiencies (Ton, 2009). There is still a vague understanding of what defines "material weaknesses" under SOX 302. When Auditing Standard No. 2 was released in 2004 that defined clearly the different levels of control deficiencies (as mentioned in the section 2.3.2). The clarity of the definition of different levels of control deficiencies is set to be mandatory under SOX 404.

In this thesis, I examine material weaknesses from the disclosure under SOX 404. In comparison with SOX 302, SOX 404 provides clearer guidelines (e.g. regarding the interpretation of the type of internal control deficiencies (Ashbaugh-Skaife et al., 2007)). Also, under SOX 404, the assessment of internal control is more comprehensive to managers and auditors which makes the assessment of internal control more objective, accurate and reliable.

2.3 Internal Controls

2.3.1 Definition from COSO Framework

Implementing and maintaining effective internal control has been strong incentive for firms to produce such reliable and transparent financial reports. The Committee of Sponsoring Organizations of the Treadway Commission (COSO) has established a common internal control framework for companies and organizations to assess their internal control systems. The most recent framework (COSO, 2013) defines internal control as:

"*Internal control is a process, effected by an entity's board of directors, management, and other personnel, designed to provide reasonable assurance regarding the achievement of objectives relating to operations, reporting, and compliance."*

The element of COSO frameworks consists of three different categories of objectives, which focus on various aspects of internal controls. The three objectives of COSO framework includes operation, reporting, and compliance. Operation objectives pertain to obtain effectiveness and efficiency of the entity's operations including operational and financial performance goals and safeguarding entity's assets against losses (including theft). Reporting objectives pertain to obtain reasonable assurance to shareholders and regulators of the financial and non-financial reporting. Also, it aims to provide the reliability, timeliness, and transparency of financial reporting. Lastly, compliance objectives pertain to comply with existing law and regulations. The establishment of this framework was a response to the financial scandals that incurred in the early 90's. It aims to provide guidance on how to evaluate and improve its internal control systems.

2.3.2 The classification of the internal control deficiencies

In 2004, Public Company Accounting Oversight Board (PCAOB) issued regulatory guidelines to provide a definition of different types of internal control deficiencies in Auditing Standard (AS)

No. 2. The classifications of internal control deficiencies are material weaknesses, significant deficiencies, and control deficiencies (PCAOB, 2004).

> A "control deficiency" 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 (AS No. 2, paragraph 8).
>
> *A "significant deficiency"* is a control deficiency, or combination of control deficiencies, that adversely affects the company's ability to initiate, authorize, record, process, or report external financial data reliably in accordance with generally accepted accounting principles such that there is more than a remote likelihood that a misstatement of the company's annual or interim financial statement that is more than inconsequential will not be prevented or detected *(AS No. 2, paragraph 9).*
>
> *A "material weakness"* is a significant deficiency, or combination of significant deficiencies, that results in more than a remote likelihood that a material misstatement of the annual or interim financial statements will not be prevented or detected *(AS No. 2, paragraph 10).*

In the classification above, "material weaknesses" are the most severe type which follows by the "significant deficiencies" and the "control deficiencies." Furthermore, the likelihood of occurrence of each category differs from one to another. The likelihood of the occurance of material weaknesses of the periodic financial statements will be discovered. The existence of internal control deficiencies occurs when the existing controls in business operations do not allow management or its employees to capture (prevention and detection) misstatements on a timely basis, in performing their current activities (AS No. 2, paragraph 8). Therefore, internal control over financial reporting focuses on prevention and detection of financial misstatement promptly (in a case of unintentional or intentional). Doyle et al. (2007) discuss about type of internal control material weaknesses, according to Moody's (the bond-rating company), they suggest that material weaknesses can be divided into two different categories. Company-level material weaknesses relate to more essential problems such as the ineffective control environment or the overall financial reporting processes, which auditor are less likely detect such material weaknesses. The examples of company-level material weaknesses are override by senior management and ineffective control environment. Moody's finds that the detection of company-level material weaknesses is caused not only by management's competency to prepare accurate financial

statements, but also its competency to control the business (Doss and Jonas, 2004). Account-specific material weaknesses relate to inadequate controls over accounts specific balances or transactional issues. According to Doyle et al. (2007), the examples of account-specific MWs are "lack of internal controls for accounting for loss contingencies including bad debts, deficiencies in the documentation of a receivables securitization program and lack of policy and procedure regarding the application of new accounting principles or the application of existing accounting principles to new transactions". Moody's suggests that "these types of material weaknesses are auditable, and thus do not represent as serious a concern regarding the reliability of the financial statements" (Doyle et al., 2007, p. 1145).

This thesis measures internal control deficiencies using "material weaknesses" (MWs) that are disclosed by firms or auditors in their financial reports. A dummy variable is used as MW is equal to 1 if a firm disclosed at least 1 MW, 0 otherwise. The reason why I choose MW as the operationalization of independent variable is that, as explained under the definition of PCAOB, MW is considered as the most severe type that likelihood of occurrence of material misstatement of financial reporting will not be prevented or detected (AS No. 2, paragraph 10).

2.3.3 Causes that lead to internal control deficiencies

Ashbaugh-Skaife et al. (2008) assume that internal control deficiencies (ICDs) affects the potential misstatement in financial reporting regarding noise and magnitude of abnormal accruals. One way is through unintentional misstatement. An unintentional misstatement is mainly due to poor policies and procedures, training, or alertness by employees. For instance, inadequate revenue policy and procedures that create omission in recording (or employee discretion) for revenue recognition, lack of experience for managers to estimate bad debts expense, incorrect recording of inventory that differ with the result of inventory counting (stock-take), and lack of basis for estimating allowance for inventory obsolescence. These examples of misstatement may create an increase or a decrease in accruals and resulting changes in net income.

The other way that ICDs can be affected through intentional misstatement by management or employees to upward earnings for the current period. For instance, when accounting choices are manipulated through accruals for recording important accounting estimates such as warranty liabilities, reserves for sales return, and allowance for uncollectible receivables. Such intentional misinterpretation may cause accounting scandals such as fraud which mainly to due to lack of

segregation of duties in the internal control systems. Lack of segregation of duties allows the misappropriation of transactions/ assets and misstatement of recorded amounts that are not detected due to lack of monitoring by responsible employees or by top management (the loose control environment).

2.3.4 Remediation actions

Internal control material weaknesses have frequently been linked with fraud, earnings management and business failure (e.g. Cohen Commission, 1978; COSO, 1992). Section of 404 aims to improve financial reporting which requires large public firms and external accountants/ auditors to test and report the effectiveness of internal control financial reporting. The report includes any remedial actions in any remediated material weaknesses (remediated and un-remediated MWs) at fiscal year-end. Under section SOX 404, it is important to study remediation actions regarding the improvement of earnings quality.

The section of SOX 404 does not clearly mention about the remediation of material weaknesses. However, SOX 404 requires management and other parties (e.g. auditors) to evaluate and attest the effectiveness of the internal control systems. Also, both management and external auditors require reporting any changes or additional material weaknesses detected in the financial statement. The disclosure of internal control report provides an incentive to management to remediate material weaknesses and monitor closely in maintaining adequate internal control systems (Coates et al., 2007).

An ineffective internal control system leads to internal control deficiencies and adverse auditors' opinions. Under SOX 404, there are four types of auditors' opinions which are unqualified opinion, qualified opinion, adverse opinion and disclaimer of opinion (these opinions follow from the strongest to the most severe opinion). An unqualified opinion is the strongest opinion that shows financial statements provide a true and fair view in accordance with financial reporting framework. An unqualified opinion gives assurance that financial statement does not have any significant deficiencies in respect to matters contained in the report. A qualified opinion is presented by the auditor when a company's financial statements have not been presented fully in accordance with accounting standards (e.g. GAAP & IFRS). Under qualified opinion, auditors may have additional remarks why such report is not unqualified. An adverse opinion is the most unfavorable opinion. An adverse opinion indicates that company's financial report has not been presented in accordance

with accounting standards and are grossly misstated. Also, an adverse opinion might indicate the existence of fraud. When a company receives adverse opinion by the auditor, the company is required to conduct restatement. Lastly, disclaimer of opinion is an opinion that auditor is not able to complete the audit report due to the absence of financial data/records or poor corporation and commitment from management. Thus, this opinion indicates that there is no opinion given over financial statement. The remediation of material weaknesses can be seen from the changes of auditors' SOX 404 opinions on the effectiveness of internal controls. Ashbaugh-Skaife et al. (2008) show that remediation can be examined from firms that disclose material weaknesses at the previous year/s under SOX 302 and receive an unqualified SOX 404 audit opinion from their external auditor at the following year/s.

2.4 Summary

After having elaborated on the aim of earnings quality including measurements, COSO and SOX (differences of SOX 302 and 404), and components of internal control, including definition, classifications, causes and remediation actions. As mentioned above, my study will be based on SOX 404 type of material weaknesses, for the reasons that I mentioned above. Furthermore, the accruals measurement will also be the main investigation to link the association with internal controls. Next follows the related empirical studies in association with accrual quality and internal control deficiencies.

3. LITERATURE REVIEW

This chapter contains a review of literature related to the association between accrual quality, internal control material weaknesses, and internal control remediation effect. I discuss three different streams of literature. The first stream of literature illustrates the association between accrual quality and material weaknesses (MWs) (Section 3.1), i.e. do firms that disclose MWs have a lower accrual quality than firms that do not disclose MWs? The second stream of literature (section 3.2) focuses on the association between firms' characteristics, internal control risk factors, and factors that are likely to affect the detection and disclosure of firms' MWs. The last stream of literature (section 3.3) illustrates the remediation effect after the disclosure of MWs, i.e. does remediation improve the association between accrual quality and internal control MWs?

3.1 Accrual quality and internal control

According to Doyle et al. (2007), firms that disclose material weaknesses (MWs) tend to have lower accrual quality. The study examines a sample of 705 firms with at least one MW reported between 2002 and 2005. This research identifies MWs under the section of SOX 302 or 404. The authors focus on material weaknesses that classify as being the most severe internal control problems and use a measure of accrual quality (AQ) developed by Dechow and Dichev (2002), as modified by McNichols (2002) and Francis et al. (2005). The regression model measures the association between accrual quality (AQ) and the existence of material weaknesses (MW), (broken down into account-specific and company level material weakness). The classification of account-specific material weakness relates to control problems over specific account balances or transaction-level processes. For instance, lack of internal controls for accounting for loss contingencies, including bad debts, and insufficient guidelines of internal control over the new application of accounting principles. Company-level material weaknesses relate to macro-level controls including override by senior management and weak control environment or ineffective of the overall financial reporting processes (Doyle et al., 2007, p. 1145).

This leads to the following equation (3) (Doyle et al., 2007, p. 1157):

"$AQM = \beta_0 + \beta_1 MW + \beta_2 MW\_ACCOUNT\_SPECIFIC + \beta_3 MW\_COMPANY\_LEVEL + \gamma Controls + \varepsilon$". (3)

Doyle et al. (2007) find that firms that report MWs have lower accrual quality. Furthermore, the authors find that the existence of MWs (dummy variable) correlates with relatively low accrual

quality. Low accrual quality is mainly due to lack of an effective internal control system (e.g. no segregation of duties) that leads to weak measurement of accruals that map into cash flows and lack of experience in estimating the bad debt expense provision. Also, the relation between weak internal control and poor accrual quality is associated with innate firms' characteristics including difficulty to estimate accruals (e.g. length of operating cycle and cash flow volatility) (Dechow and Dichev, 2002; Doyle et al., 2007) and proxies to detect MWs that are likely to correlate with accrual quality (e.g. profitability and complexity) (Ge and McVay, 2005; Ashbaugh-Skaife et al., 2007; Doyle et al., 2007). Doyle et al. (2007) find that the relation between weak internal controls and lower quality of accrual is stronger under firms that disclose MWs. The authors find that firms with company-level MWs disclosure under the section SOX 302 are significantly correlated with lower accrual quality. However, there is no significant correlation between company-level MWs disclosure under the section of SOX 404 and low accrual quality. In deeper analysis under this study, when company-level MWs are broken down into account-specific MWs under SOX 404, there is a significant correlation between account-specific MWs and low accrual quality. In this research, Doyle et al., (2007) imply that the internal control environment including firm-specific characteristics and sales volatility is a fundamental element in creating a high level of accrual quality. Company-level MWs and account-specific MWs play an important role in detecting the poor quality of accruals. Firm-specific characteristics will be elaborated more in detail in the next section (section 3.2.).

Ashbaugh-Skaife et al. (2008) investigate different aspects of "the effect of internal control deficiencies (ICD) and their remediation on accrual quality." The study uses a sample of 1,281 ICD sample firms and 6,497 non-ICD sample firms covering 2003 to 2005. The authors identify ICD under SOX 302 or 404 disclosure and detect changes in accrual quality by reviewing auditors' SOX 404 opinions on the effectiveness of internal controls. The regression model relates a measure of accrual quality (AQM) to material weaknesses (ICD).

This leads to the following equation (4) (Ashbaugh-Skaife et al., 2008, p. 234):

$$"AQM = \beta_0 + \beta_1 ICD + \gamma\ Controls + \varepsilon". \quad (4)$$

Ashbaugh-Skaife et al. (2008) use three measures to capture accrual quality;
"(1) the degree to which accruals fail to map into the past, current, or future cash flows (*WCA_NOISE)* is measured by taking the standard deviation of the residual estimated from the

regression (Dechow and Dichev, 2002)" (Ashbaugh-Skaife et al., 2008, p. 223);
"(2) absolute and signed total abnormal accruals (*AB_ACC*)" (Ashbaugh-Skaife et al., 2008, p. 223; and
"(3) absolute and signed abnormal working capital accruals (*AB_WACC*) (Ashbaugh-Skaife et al., 2008, p.224)".
The authors use innate firms' characteristics to control their research including segments, foreign sales, growth, inventory, M&A, restructuring, size, loss proportion, Zscore, book value of equity, engagement with big6 auditors and write-off (conservatism). Ashbaugh-Skaife et al. (2008) find that ICD firms illustrate larger abnormal (both signed and absolute) total and abnormal (both signed and absolute) working capital accruals relative to non-ICD firms. ICDs are likely to occur due to unintentional errors that add noise accruals (e.g., accruals of ICDs map less reliably to the past, current and future cash flows). Overall, ICD firms tend to be more conservative, complex, and have certain innate characteristics that lead to poorer accrual quality. ICDs are mainly due to lack of policies and procedures and inadequate monitoring instead of intentional misstatements by management) to present better earnings.

3.2 Internal control risk factors

Prior literature investigates several factors that influence the quality of internal control over financial reporting. Ashbaugh-Skaife et al. (2007), examine factors that affect the disclosure of material weaknesses (MWs) by using 4,484 firm-years from November 2004 to December 2005. This study focuses on the period after SOX 302 implementation and before the implementation of SOX 404. The authors posit that the disclosure of an ICD is a "function of firm-specific economic attributes that expose firms to internal control risks and the incentives of a firm's management and external auditors to discover and disclose internal control problems" (Ashbaugh-Skaife et al., 2007, p.175, 176). In a logistic regression equation firms that disclose internal control deficiencies are associated with firm-specific economic attributes:

- more complex operations (SEGMENTS, FOREIGN_SALES),
- recent organizational changes (M&A, RESTRUCTURE),
- operating characteristics that exposeto greater accounting measurement application risks (GROWTH and INVENTORY),
- impact of low investments in internal control systems (SIZE, LOSS, RZSCORE (Altman)),

and factors for incentives to discover and disclose:

- auditor-related risk factors (AUDITOR_RESIGN, AUDITOR (dominant auditor)),
- factors related to greater monitoring by stakeholders (RESTATEMENT, INST_CON and LITIGATION).

This leads to the following equation (5) (Ashbaugh-Skaife et al., 2007, p. 178):

"$ICD\_DISCLOSURE = \beta_0 + \beta_1 SEGMENTS + \beta_2 FOREIGN\ SALES + \beta_3 M\&A + \beta_4 RESTRUCTURING + \beta_5 GROWTH + \beta_6 INVENTORY + \beta_7 SIZE + \beta_8 \%LOSS + \beta_9 RZSCORE + \beta_{10} AUDITOR\ RESIGN + \beta_{11} AUDITOR + \beta_{12} RESTATEMENT + \beta_{13} INST\_CON + \beta_{14} LITIGATION + \varepsilon$". (5)

Firstly, the results are consistent with Ge & McVay (2005). Ashbaugh-Skaife et al. (2007) find that firms that disclose internal control deficiencies (ICDs) tend to be more complex in operation such as multiple numbers of segments and also involving foreign sales transactions. Ashbaugh-Skaife et al. (2007) find a positive correlation between firms that disclose ICDs with firms' complexity. Secondly, firms with ICDs often engage in organizational reforms such as merger & acquisition and restructuring. Ashbaugh-Skaife et al. (2007) show a consistent result with Balsam et al. (2014) that current internal control systems must be altered to fit the restructured organization. Moreover, the change in internal control systems might not fit with the change in organizational reforms which increases the risk of incurring internal control deficiencies. Thirdly, Ashbaugh-Skaife et al. (2007) find a negative association between firm size and firm profitability with firms that disclose ICDs. Fourthly, Ashbaugh-Skaife et al. (2007) show that firms that frequently change the auditor, in particular, due to auditor resignation, have a positive association with firms that disclose ICDs. Auditor resignation is partially due to auditors not willing to engage with high-risk firms (e.g. the potential client performance and weak internal control systems which could be difficult to audit). Lastly, Ashbaugh-Skaife et al. (2007) find that factors that are more likely to affect the detection and disclosure of ICDs are auditors' engagement with Big 6 auditors, firms that disclose a restatement, firms that have institutional shareholders and firms that expose a greater risks of lawsuit have a greater chance to disclose ICDs to minimize potential stock declines that can cause shareholders litigation. Furthermore, these factors have a positive association with firms that disclose ICDs. Overall, Firms with ICDs are associated with firm-specific characteristics such as complex operational organization, engagement in organizational reforms, and the

availability of resources for internal control implementation. Factors that lead to detect and disclose internal control problems are mainly engagement with large audit firms (Big6), firms that disclose a restatement and firms that have a higher percentage of institutional ownership.

Doyle et al. (2007) also investigate the relation of firm-specific characteristics in regards to firms that report MWs. The authors argue that several determinants affect the disclosure of MW and the level of accrual quality. In the regression model equation, firms that disclose material weaknesses are associated with the following firm-specific attributes:

- have incurred loss (LOSS_PROPORTION),
- smaller in size (TOTAL_ASSET),
- younger establishment (FIRM_AGE),
- more complex in operation (number of operating and geographic SEGMENTS),
- rapid growth (EXTREME_SALES_GROWTH),
- undergoing organizational changes (RESTRUCTURING_CHARGE)

This leads to the following equation (6) (Doyle et al., 2007, p. 223):

"$AQ = \beta_0 + \beta_1 MW + \beta_2 MW\_ACCOUNT\_SPECIFIC + \beta_3 MW\_COMPANY\_LEVEL + \beta_4 LOSS\_PROPORTION + \beta_5 SALES\_VOLATILITY + \beta_6 CFO\_VOLATILITY + \beta_7 TOTAL\_ASSETS + \beta_8 OPERATING\_CYCLE + \beta_9 FIRM\_AGE + \beta_{10} SEGMENTS + \beta_{11} EXTREME\_SALES\_GROWTH + \beta_{12} RESTRUCTURING\_CHARGE + \varepsilon$". (6)

They find that MWs are likely found in firms that are smaller in size, weaker in profitability, have more complex operations, high sales growth and involve in organizational reform (e.g. merger and acquisition and restructuring).

3.3 Remediation effect

Ashbaugh-Skaife et al. (2008) investigate intertemporal changes from remediation effect. As mentioned above in section 3.1, AQM is equal to AB_ACC or AB_WCACC. The authors' measure remediation as *WEAKCONTROLS* is equal to 1 for firms that disclose material weaknesses under SOX 302 or receive an adverse SOX 404, 0 otherwise. Also, *ICD_FIXED* measures firms that receive unqualified SOX 404 opinion and *ICD_FIXED* is equal to 1 if firms that remediate their material weaknesses. *ICD_FIXED* is essentially the measurement of remediation from the interaction from *WEAKCONTROL*. In the regression model, the coefficient

on *WEAKCONTROLS* represents the incremental (relative to non-ICD control firms) average abnormal accruals of firms that previously disclosed ICDs but failed to remediate these problems by the end of fiscal year. The coefficient on *ICD_FIXED* represents the incremental (relative to WEAKCONTROLS firms) average abnormal accruals of *ICD_FIXED* firms. The authors argue that firms that remediate their internal control MWs disclose their material weaknesses under SOX 302 or obtain an adverse SOX 404 opinion from their external auditors and receive unqualified SOX 404 opinion in the following years.

This leads to the following equation (7) (Ashbaugh-Skaife et al., 2008, p. 238):

"$AQM = \beta_0 + \beta_1 WEAK\_CONTROLS + \beta_2 ICD\_FIXED + \gamma Controls + \varepsilon$". (7)

Firstly, Ashbaugh-Skaife et al. (2008) find that ICD firms that receive unqualified SOX 404 opinion on a specific year have relatively lower absolute abnormal accruals compared to the previous years when ICDs are first reported. However, the authors find no evidence if this decrease is affected by firms being more conservative in accounting choices. Secondly, ICD firms that subsequently obtain adverse SOX 404 opinion reveal no significant changes in the magnitude of abnormal accruals. Lastly, Ashbaugh-Skaife et al. (2008) find a modest increase in accruals quality among firms with improved internal control effectiveness that obtain adverse SOX 404 opinion in the year when ICD are first reported followed by the achievement for unqualified SOX 404 opinion in the subsequent year. Conversely, firms that obtain worse SOX 404 opinion by the external auditor (e.g. from unqualified SOX 404 to adverse SOX 404 opinions) tend to have no change in the level of accrual quality. However, firms that receive the same SOX 404 opinions (e.g. unqualified or adverse in both years) indicate no significant changes in the level of accrual quality. Overall, this study implies that remediation action affects the level of accrual quality that shows in the changes of all SOX 404 audit opinions.

Bedard et al. (2012) examine the likelihood of remediation actions towards material weaknesses (MWs) required by SOX 404 and the association between remediation of material weaknesses and earnings quality. Bedard et al. (2012) conduct a study on full remediation of all specific types of MWs with accrual quality including entity level or COSO categories and account specific levels. To aggregate several problem issues, MWs are divided into two types which are resource type and corporate governance type. Resource type MWs includes IT, segregation of duties (SoD) and training. Corporate governance type MWs may include all types of problems issues. However,

corporate governance type MWs may not capture the problem issues in resource type MWs (such as revenue recognition problems). That is why Bedard et al. (2012) classify three different constructs by distinguishing complexity type MWs next to resource and corporate governance MWs. Bedard et al. (2012) use 404 firms-years observations that disclose MWs covering 2004 to 2006. The authors posit that the internal control remediation problem varies from different areas. In the logistic regression, firms that remediate their internal control MWs often:

- have problems in entity-level type (YE_ADJUSTMENT, TRAINING, RECONCILIATIONS, IT, and SEG_DUTIES),
- have problems in account-specific type (TAX, REVENUE, INVENTORY, LIAB_ACCRUAL, RECEIVABLE, AND FIXED_INTANGIBLE),
- more complex operations (COMPLEXITY (market cap, foreign currency translation, and number of segments, restructuring)),
- impact of low investment in control improvement (RESOURCES (free cash flow, ROA, loss, and liquidity)),
- impact from corporate governance activities (CORPGOV (CEO is the chairman of the board, percentage of audit committee, change in audit committee size, percentage of insider of board, and percentage of institutional ownership)),
- incur multiple MWs (MULTIPLE), and
- auditor-related risk factors (CHANGE_SAME_TIER (change auditor within same tier), CHANGE_DOWN (change auditor from a lower tier), CHANGE_UP (change auditor from a higher tier)).

This leads to the following equation (8) (Bedard et al., 2012, p. 65):

$$"PROBLEM\_REMEDIATION = \beta_0 + \beta_1 YE\ ADJUSTMENT + \beta_2 TRAININGS + \beta_3 RECONCILIATIONS + \beta_4 IT + \beta_5 SEG\ DUTIES + \beta_6 NONROUTINE + \beta_7 TAX + \beta_8 REVENUE + \beta_9 LIAB\ ACCRUAL + \beta_{10} INVENTORY + \beta_{11} RECEIVABLE + \beta_{12} FIXED\ INTANGIBLE + \beta_{13} COMPLEXITY + \beta_{14} RESOURCES + \beta_{15} CORPGOV + \beta_{16} MULTIPLE + \beta_{17} INSTITOWN + \beta_{18} REGULATED + \beta_{19} BIG6 + \beta_{20} CHANGE\ SAME\ TIER + \beta_{21} CHANGE\ DOWN + \beta_{22} CHANGE\ UP + \beta_{23} FY\ 2006 + \varepsilon". \quad (8)$$

The second model that Bedard et al. (2012) investigate is the relation of individual MW types with change in earnings quality. The authors use abnormal accruals from the Modified Jones Model (1995). By using the data sample of 467 firm-year observation between 2004 and 2006. To measure remediation of specific MW types, the authors create a series of indicators of remediation of specific MW types. In the logistic regression model, the authors elaborate that the association between change in remediation MW type and earnings quality often incur in firms that:

- have series of problems such as entity-level and account-specific problems (year-end adjustment, training, reconciliations, IT, and segregation of duties, control deficiencies, tax, revenue, inventory, liabilities accrual, receivable, and fixed intangible),
- have large growth in sizes ($\Delta LNASSETS$),
- incur losses in profitability (LOSS),
- have more leverage (ΔLEVERAGE),
- have more cash flow operation (ΔCFO),
- obtain more revenue including extreme growth in revenue ($\Delta EXTREME - GROWTH$),
- expose in auditor-related risk factors (change auditor within the same tier, change auditor from a higher tier, and change auditor from a lower tier), and
- classify as litigation industry (LIT).

This leads to the following equation (9) (Bedard et al., 2012, p. 68):

$$"\Delta ABSDACC = \beta_0 + \beta_{1-13}[R\_type] + \beta_{14}\,\Delta LNASSETS + \beta_{15}\,LOSS + \beta_{16}\,\Delta LEVERAGE + \beta_{17}\,\Delta CFO + \beta_{18}\,STD - OPCASH + \beta_{19}STD - REV + \beta_{20}\,\Delta MTB + \beta_{21}\,\Delta EXTREME - GROWTH + \beta_{22}\,CHANGE\ SAME\ TIER + \beta_{23}\,CHANGE\ DOWN + \beta_{24}\,CHANGE\ UP + \beta_{25}\,LIT + \beta_{26}\,FY\ 2006 + \varepsilon". \quad (9)$$

The main results of Bedard et al. (2012) show three different findings. Firstly, the remediation rates of specific MWs types differ. The availability of company resources and corporate governance quality inhibits remediation of the entity-level problem (e.g., information technology, inadequate segregation of duty, and training) is differently associated with remediation of specific types (e.g., tax, revenue, inventory, and receivables). Secondly, the remediation actions of some MWs types show a significant association with changes in abnormal accruals (negatively signed) (e.g., entity-level problems in reconciliation and IT, along with account-specific problems in revenue and tax). Lastly, Bedard et al. (2012) show that firms that do not remediate the MWs within two years are significantly associated with increased abnormal accruals, regardless of type. From the following study, it implies a positive association with changes in abnormal accruals when firms conduct remediation actions after the disclosure of MWs.

Another perspective involves the association between internal controls remediation actions and audit fees. Keane et al. (2012) investigate the relation between internal control weaknesses and audit fee. Also, to strengthen the research, Keane et al. (2012) use remediation actions as moderating effect whether remediation actions of internal control weaknesses will decrease the level of audit fee. The research uses 9,122 firms-year observations covering the years 2004 to 2007. In this research, remediation is identified as REMEDYYR1, REMEDYYR2, and REMEDYYR3. REMEDYYR1 is identified as an indicator of variable equal to 1 if a firm that previously disclosed MWs and remediated during the first year after disclosure; and 0 otherwise. REMEDYYR2 is identified as an indicator of variable equal to 1 if a firm that previously disclosed MWs and remediated during the second year after disclosure; and 0 otherwise. Lastly, REMEDYYR3 is an indicator of variable equal to 1 if a firm that previously disclosed MWs and remediated during the third year after disclosure; and 0 otherwise.

Keane et al. (2012) argue that the determinants of audit fees are associated with firms' internal control weaknesses and to what extend firms are exposed to client business risks. In the ordinary least squares (OLS) regression the determinants of audit fees are associated with several attributes including:

- Firms that disclosed internal control weaknesses (ICW)
- Firms with higher discretionary accruals tend to produce lower financial reporting quality (Discretionary Total Accruals – DTACC (Kothari et al., 2005)
- Firms that engage with Big4 auditors
- Firms that make a loss (*LOSS)*
- Firms with higher leverage (*LEVERAGE*)
- Firms that have high return on assets (ROA)
- Other control factors are related to firm-specific characteristics, like size, sales growth, number of segments and others.

This leads to the following equation (10) (Keane et al., 2012, p. 382):

$$"LNAUDITFEES_{it} = \beta_0 + \beta_1 ICW_{it} + \beta_2 BIG4_{it} + \beta_3 ICW_{it} * BIG4_{it} + \beta_4 CONSECUTIVE_{it} + \beta_5 REMEDYYR1_{it} + \beta_6 REMEDYYR2_{it} + \beta_7 REMEDYYR3_{it} + \beta_8 DTACC_{it} + \beta_9 LEVERAGE_{it} + \beta_{10} ROA_{it} + \beta_{11} LOSS_{it} + \beta_{12} LNASSETS_{it} + \beta_{13} SALESGR_{it} + \beta_{14} LNSEGS_{it} + \beta_{15} FY2004_{it} + \beta_{16} FY2005_{it} + \beta_{17} FY2006_{it} + \Sigma INDUSTRY + \varepsilon" \quad (10)$$

Keane et al. (2012) find that there is a positive correlation and interaction between ICW and Big4 which implies that disclosed MWs tend to be detected by the large auditors. Keane et al. (2012) find that there is an increase in audit fees if firms have additional MWs disclosure. However, firms that have the same report of MWs in the subsequent years pay higher fees than firms reporting different MWs in consecutive years. Audit fees remain high if firms remediate their MWs problems in year one, two or three. Overall, there is no significant correlation between ICW and the increase in audit fees. Auditors obtain high audit fees although firms have performed remediation on their MWs as they are still considered high-risk firms.

3.4 Conclusion and summary of related literature

Prior literature provides strong evidence on the specific effects of accrual quality, internal control problems (MW and ICD) and internal control remediation actions. Factors such as firm-specific characteristics and risk attributes play an important role in the association between accrual quality and internal control problems. Firm-specific characteristics such as organizational complexity, organizational restructuring, accounting risks, auditor resignation, availability of resources for internal controls (Doyle et al., 2007; Ashbaugh-Skaife et al., 2008) and sales volatility are fundamental elements in creating a high accrual quality. Internal control deficiencies and MWs

among entity-level and account-specific level are associated with accrual quality. The results show that remediation effect that produces better accrual quality depends on the specific types or level; remediation on entity level (e.g., information technology, inadequate segregation of duty, and training) and remediation on specific types (e.g., tax, revenue, inventory, and receivables). The remediation on entity levels is differently associated with remediation on specific types. Moreover, remediation effect provides better audit opinions from external auditors (e.g. from adverse SOX 404 opinions to unqualified SOX 404 opinions); thus gives a higher level of accrual quality. However, remediation actions conducted by ICD firms do not correlate with the level of audit fees as auditors would still consider these firms as high-risk firms. High-risk firms can affect the level of quality of financial reporting. Table 1 provides a summary of the relevant research literature discussed in this chapter.

Table 1: Summary of the relevant literature

Authors	Research questions	Samples	Methodology	Findings
Panel A: Accrual quality and internal control				
Doyle, Ge & McVay (2007)	Do internal control material weaknesses affect accrual quality?	705 firm-years observations covering 2002 – 2005	Regression	• MWs are associated with poorly estimated accruals that are not realized as cash flows. • The relationship between internal control material weaknesses and poor accruals quality is driven by overall company-level controls. • There is no relation between weak internal control and poor accruals quality for more auditable and account-specific weaknesses.
Ashbaugh-Skaife, Collins, Kinney & LaFond (2008)	Do internal control deficiencies affect accrual quality?	1,281 ICD sample firms and 6,497 non-ICD sample firms covering 2003 to 2005	Regression	ICD firms have higher noise of accruals (both signed & absolute) and higher negative abnormal accruals.
Panel B: Internal control risk factors				
Doyle, Ge & McVay (2007)	Do internal control material weaknesses affect accrual quality?	705 firm-years observations covering 2002 – 2005	Regression	MWs are more likely found in firms that are smaller in size, weaker in profitability, have more complex operations, high sales growth and involve in organizational reform (e.g. merger and acquisition and restructuring).

Ashbaugh-Skaife, Collins & Kinney (2007)	What factors affect control failures and managements' incentive to discover and report internal control problems?	4,484 firm-years observation from November 2004 to December 2005	Logistic regression	• ICD firms have more complex operations, organizational changes/reform, greater accounting risk, more auditor resignations, and have less resources to invest in internal control systems. • ICD firms have more prior SEC enforcement actions and financial restatements, which are more likely to use large audit firms, and have more concentrated institutional ownership.

Panel C: Remediation effect				
Ashbaugh -Skaife, Collins, Kinney & LaFond (2008)	Do internal control deficiencies affect accrual quality?	1,281 ICD sample firms and 6,497 non-ICD sample firms covering 2003 to 2005	Regression	• Intertemporal changes in effective internal control show that ICD firms that remediated ICDs and obtain unqualified SOX 404 opinions tend to have higher quality of accruals. Conversely, ICD firms that receive adverse SOX 404 opinions tend to have no increase in the quality of accruals. • Firms that improve the effectiveness of internal control and that receive unqualified SOX 404 opinions from external auditor tend to have a modest increase in accrual quality. Whereas firms with a worse effectiveness of internal control and that receive adverse SOX 404 opinions from unqualified SOX 404 indicate a significant decrease in accrual quality, and lastly firms that receive the same SOX opinions (e.g., unqualified or adverse in both years) tend to have no significant changes in the level of accrual quality.

Bedard, Hoitash,, Hoitash & Westermann (2012)	What factors affect remediation of SOX 404 material weaknesses (MWs)?	404 firm-years observation covering 2004 – 2006	Logistic regression	• The remediation rates of specific MWs types and the availability of company resources and corporate governance quality is differently associated with remediation of specific types. • The remediation of some MWs types is significantly associated with changes in abnormal accruals (e.g., entity-level problems in reconciliation and IT, and also account-specific problems in revenue and tax). • Firms that do not remediate MWs within two years are significantly associated with increased abnormal accruals (negative signed), regardless of type.
Keane, Elder & Albring (2012)	• Do internal control material weaknesses have impact on audit fees? • Do firms that remediate internal control weaknesses immediately incur an increase in audit fees as compared to firms that do not?	9,122 firm-years covering 2004 – 2007	Regression	Firms that report the same MWs pay higher fees than firms reporting different MWs in consecutive years and audit fees to remain high if firms remediate their MWs problems in year one, two or three.

4. HYPOTHESIS DEVELOPMENT

4.1 Background of the hypothesis development

This section gathers the insights from the prior literature in chapter three that will provide valuable and important direction in setting up the hypothesis. Three hypotheses are formed to answer the main research question. To look back on the main investigation on this thesis, the research question of this thesis is:

RQ: ***Does internal control material weakness affect accrual quality?***

The investigation on the association between accrual quality and internal control material weaknesses in this thesis uses an approach based on Doyle et al. (2007) and Ashbaugh-Skaife et al. (2007).

4.2 Association between accrual quality and internal control material weaknesses

The theoretical concept of internal control defines as "*a process, effected by an entity's board of directors, management, and other personnel, designed to provide reasonable assurance regarding the achievement of objectives relating to operations, reporting, and compliance"* (COSO, 2013). Based on the definition of internal control, effective internal control will lead to more reliable financial reporting. On the other hand, internal control aims to prevent and detect misstatement of the financial statement that are caused by error or fraud. The focus of this thesis is accrual quality. Poor accrual quality can be caused mainly due to management intention to increase accruals through earnings management and unintentional errors in accrual estimation (e.g., difficulty to predict future uncertainty or lack of control to detect errors) (Dechow and Schrand, 2004). When looking at the findings of the prior literature regarding the association between accrual quality and internal control, Doyle et al. (2007) and Ashbaugh-Skaife et al. (2008) provide evidence that accrual quality and disclosure of internal control material weaknesses (MWs) are negatively associated. Doyle et al. (2007) find that "accruals is poorer for firms with certain characteristics, such as a high proportion of losses, more volatile sales and cash flows, lower total assets, and longer operating cycle" (Doyle et al., 2007, p. 1145). Ashbaugh-Skaife et al. (2008) find that ICD firms show a high negative sign of accruals and large absolute abnormal accruals. Ashbaugh-Skaife et al. (2008) also argue that ICD are more likely to occur due to unintentional errors that

add noise to accruals (e.g., accruals of ICDs map less reliably to the past, current and future cash flows).

Based on the theoretical concept on internal control and prior literature, I expect that the occurrence and disclosure of internal control material weaknesses is associated with poorer accrual quality. Therefore the first hypothesis for this master's thesis is:

H1: ***Disclosure of internal control material weaknesses under SOX 404 is negatively associated with accrual quality.***

4.3 Types of material weaknesses

The first hypothesis defines that disclosure of internal control material weaknesses is associated with low accrual quality. Doyle et al. (2007) find that the disclosure of internal control material weaknesses is associated with poor accrual quality. In their further examination regarding the types of material weaknesses, Doyle et al. (2007) hypothesize the association of the "auditability or potential severity of internal control weaknesses with low accrual quality" (Doyle et al., 2007, p. 1145). According to Doyle et al. (2007), Moody's (the bond-rating company) suggests that material weaknesses falls into two categories; account specific material weaknesses related to insufficient controls over account specific or transactional level, and company specific material weaknesses related to problems such as ineffective control environment and management override in relation to financial reporting. Doyle et al. (2007) do not find a significant association on the disclosure under SOX 404 of the act when investigating the association between accrual quality and MWs. However, there is a significant association between MWs and poorer accrual quality when the disclosure of section SOX 404 are broken down into account-specific MWs against company-level MWs. Doyle et al. (2007) find that company-level MWs has a stronger negative relation with accrual quality than account specific MWs.

Therefore, based on the assumptions above, the second hypothesis for this thesis is:

H2: ***Company level material weaknesses have a stronger negative association with accrual quality than account specific material weaknesses.***

4.4 Remediation effect on internal control material weaknesses and accrual quality

Section SOX 302 requires management to disclose significant deficiencies in internal control in their financial statements. However, section of SOX 404 extended the version of SOX 302 which requires all publicly active companies to assert the effectiveness of the internal controls and, besides SOX 404 requires external auditors to express their opinion on the effectiveness of internal control over financial reporting. Due to this regulation, regulators and top management emphasize that remediation of internal control weaknesses is fundamental because it provides and improves financial statement reliability.

Ashbaugh-Skaife et al. (2008) find that ICD firms that improve their internal control system effectiveness in the subsequent years and achieve a better SOX 404 opinion (e.g., from adverse SOX 404 opinion to unqualified SOX 404 opinion) tend to have a modest increase in accrual quality. Also, according to Bédard et al. (2012), remediation of different types of MWs are positively associated with changes in abnormal accruals (negative signed) (e.g., entity-level types such as problems in reconciliation accounts and IT system, along with account-specific types such as problems in revenue and tax accounts). Bédard et al. (2012) find that firms that do not remediate their internal control deficiencies are significantly associated with the increase in abnormal accruals, regardless of type.

I expect firms that remediated the occurrence of MWs within 3 subsequent years' improves their accrual quality. From these assumptions, the third hypothesis is:

H3: ***Remediation of internal control material weaknesses under SOX 404 within 3 years of the disclosure of material weaknesses is positively associated with accrual quality.***

4.5 Summary

To sum up, this thesis predicts that disclosure of internal control MWs under SOX 404 is negatively associated with accrual quality. The company level material weaknesses have stronger negative association with accrual quality than account specific material weaknesses. Lastly, firms that remediated within three subsequent years from the occurrence of internal control MWs is predicted to be positively associated with accrual quality.

5. RESEARCH DESIGN

This master's thesis uses three regression models to test the formulated hypotheses. More specifically, this chapter explains the methodology to test all hypothesis including the elaboration of dependent, independent and control variables in all regressions. At the end of this chapter, an analysis of the sample selection is provided. This study adopts the studies based on Doyle et al. (2007); Ashbaugh-Skaife et al. (2007); and Ashbaugh-Skaife et al. (2008). Taking into consideration "innate firms characteristics that effect accrual quality" (Doyle et al., 2007), and "internal risk attributes" and "proxies for incentives to discover and disclose material weaknesses" (Ashbaugh-Skaife et al., 2007) to identify the association between accrual quality and the disclosure of internal control material weaknesses. The relation between remediation action and accrual quality adopts the study based on Ashbaugh-Skaife et al. (2008). The predictive validity framework ("Libby boxes"), presented in Appendix 1, shows how the conceptual relation examined in this thesis will be operationalized in the research design.

5.1 Dependent variables

In the theoretical background section, I emphasize the measurement of earnings quality by using accrual quality measurement. In that section, I state the main dependent variables being used are accrual quality measurements through the calculation of the error term.

5.1.1 Accrual quality measurement

Accrual quality measurement (AQ) developed by McNichols (2002) based on Dechow and Dichev (2002) includes cash flows from the past, current and the future which will then be used to find the standard deviation of the residuals (ε) from the following firm-specific regressions in equation (11):

$$\triangle WC_{it} = \beta_0 + \beta_1 CFO_{it-1} + \beta_2 CFO_{it} + \beta_3 CFO_{it+1} + \beta_4 \triangle REV_{it} + \beta_5 PPE_{it} + \varepsilon_{it} \quad (11)$$

Where,

$\Delta \mathrm{WC}_{i,t}$ = Working capital of firm i in year t;

$CFO_{i,t-1}$ = Cash flow from operations of firm i in year $t-1$;

$CFO_{i,t}$ = Cash flow from operations of firm i in year t;

$CFO_{i,t+1}$ = Cash flow from operations of firm i in year $t + 1$;

$\Delta \text{REV}_{i,t}$ = Revenue (sales) for firm i in year t less revenue for firm i in year t - 1;

$PPE_{i,t}$ = Gross property, plant, and equipment for firm i in year t;

$\varepsilon_{i,t}$ = Error term in year t for firm i;

All variables above are scaled by the average of total assets between year *t*-1 and *t*.

As mentioned in section 2.1.3 under theoretical background, accrual quality measurement developed by McNichols (2002) is chosen as the main dependent variable because this model measures the standard deviation of the residuals (ε) from the regression to compute firm-specific characteristics of accrual quality. Accrual quality can also be known as the beneficial role of accruals that is how well the amount of accruals captures the amount of cash flow to mitigate timing and matching problems inherited from the association between earnings and cash flow. Accruals are made based on assumptions and predictions; thus can be inaccurate and corrected in the future. Inaccurate and subsequent corrections of accruals are assumed as "accrual estimation errors" (Dechow and Dichev, 2002). Based these assumptions, the regression above shows change in working capital is explained by cash flow, change in revenues and PPE. The error term of the model reflects the degree of accruals that cannot be captured by the explanatory variables.

Dechow and Dichev (2002) and McNichols (2002) argue that accrual quality can be further measured by using the standard deviation of the residual to capture the degree of volatility in accruals. Due to the greater underlying accrual volatility, accrual estimation errors creates noise that can reduce the level of accrual quality. Therefore, the above statements indicate that the higher the amount of standard deviation of the residual of accrual estimation errors indicates the weaker accrual quality is.

Accrual quality measurement developed by McNichols (2002) provides evidence that adding $\triangle REV$ and Property, Plant, and Equipment (PPE) provides strong ability to capture discretionary accruals. Specifically, in this model $\triangle REV$ is used as proxy for short-term accruals. Meanwhile, PPE is used as a proxy for long-term accrual. Accrual quality measurement developed by McNichols (2002) suggests that the adjusted R^2increases when these two variables are added into the regression. Also, Jones et al. (2008) find that "only the accrual estimation errors estimated from cross-sectional models of working capital changes on past, present, and future cash flows

(Dechow and Dichev, 2002) and the McNichols 2002 modification of Dechow and Dichev have predictive power for both fraud and non-fraudulent restatements of earnings" (Jones et al., 2008, p. 529).

The calculation of the standard deviation of the residual of accrual estimation error is followed with the steps that are provided by Veenman (2013) (Appendix 2). All variables mentioned above are winsorized at the 1% and 99%. Veenman (2013) describes "the expected level of accruals given firm fundamentals". This guideline estimates for every firm in a given year in the sample of industry group with at least 20 firms. Firm year observation is used to identify the amount of the standard deviation of the residuals (ε) for every firm *i* in year *t* between 2009 and 2013. The total observation is 5,358 firm-year observations. The detail of the sample selection procedure is explained in section 5.9.

5.2 Independent variable

The independent variable in this study is material weaknesses (MW) that represents the likelihood of the occurrence of material weaknesses in a firm's internal controls. MW equals to 1 if the auditor or management of a firm disclosed material weaknesses according to SOX section 404 in the annual financial report in year *t*, and 0 otherwise. The sample period is measured between FY 2009 and FY 2013. The data is obtained from AuditAnalytics database and described as "count_weaknesses" that refers to the number of disclosed material weaknesses of its internal controls over financial reporting by auditor or management.

This study uses SOX 404 audit opinions instead of SOX 302 audit opinions. As mentioned in the theoretical background (section 2.2.2,) under SOX 302, material weaknesses are fully disclosed by management but not by auditors. On the other hand, under SOX 404, both management and auditor are obligated to provide assurance on the internal control systems. Balsam et al. (2014) and Jha et al. (2013) consider one point that differentiates SOX 302 from SOX 404 which is that management and auditor are obliged to provide an independent report about the quality of internal control system of a company. The auditor is responsible to be transparent in producing such report as it is assumed that they have no discretion to manipulate numbers just like what management sometimes does. Auditor's opinion is considered as reliable by researchers in conducting such studies and may help them to draw a safe interference about their hypothesis testing.

5.3 Control variables

Given some findings on prior literature and the association between internal control and earnings quality, this master's thesis includes other independent variables to control for potential determinants on earnings quality. In this section, control variables are divided into three different streams: 1) innate firms' characteristics that affect accruals quality, 2) internal control risk attributes, and 3) proxies for incentives to detect and disclose internal control material weaknesses.

5.3.1 Innate firms characteristics

Prior literature suggest that accrual quality can be categorized as poor for firms with certain "innate characteristics", such as greater frequency of losses, longer operating cycle, smaller in sizes, and larger magnitude of sales and cash flow volatility (Dechow and Dichev, 2002). Furthermore, Doyle et al. (2007) include these characteristics to strengthen the association between accruals quality and MW. In my study, I follow Doyle et al. (2007) by including factors such as *Loss Proportion, Sales Volatility, Cash flow (CFO) volatility, Total assets,* and *Operating Cycle.* However, loss proportion and total assets (SIZE) are also considered as internal control risk factors (Ashbaugh-Skaife et al., 2007). Thus, these two factors will be explained in the section of internal control risk attributes (Section 5.3.2).

Sales volatility

Sales volatility is measured by the standard deviation of sales, scaled by total assets for the year between 2009 and 2013 (Compustat) (Doyle et al., 2007). Dechow and Dichev (2002) indicate sales volatility as an innate firms' characteristics that affects accrual quality. Also, sales volatility is the indicator of a "volatile operating environment and the likelihood of greater use of approximations and estimation, with corresponding large errors of estimation and low accrual quality" (Dechow and Dichev, 2002, p. 47). Dechow and Dichev (2002) argue that lower accrual quality can be caused by larger magnitude of sales volatility. Based on the arguments above, I predict a positive coefficient for sales volatility (SALES_VOLATILITY).

CFO volatility

Cash flows volatility (CFO_VOLATILITY) is measured by the standard deviation of cash from operations, scaled by total assets for the year between 2009 and 2013 (Compustat) (Doyle et al., 2007). Dechow and Dichev (2002) posit that "high standard deviation of cash flow is another

measure of high uncertainty in the operating environment" (Dechow and Dichev, 2002, p. 47). Also, Dechow and Dichev (2002) argue that accrual quality is theoretically negatively associated with cash flow volatility. High volatility of cash flow indicates a low level of accrual quality due to "large forecast errors in volatile environments" (Dechow and Dichev, 2002, p. 45). Based on the arguments above, I predict a positive coefficient for CFO_VOLATILITY.

Operating cycle

Operating cycle (OPERATING_CYCLE) is measured by the log of the average of (sales/360) / (Total Account Receivable) + (Cost of Goods Sold/360)/ Total Inventory) (between 2009 and 2013) (Compustat) (Doyle et al., 2007) between 2009 and 2013. Dechow and Dichev (2002) indicate the longer operating cycle, the lower the accrual quality. Longer operating cycle creates uncertainty that requires more estimation and leads to errors of estimation. Thus, within these reasons the level of accrual quality tends to be low. Based on the arguments above, I predict a positive coefficient for OPERATING_CYCLE.

5.3.2 Internal control risk attributes

Ashbaugh-Skaife et al. (2007) conclude that the internal risk factors may correlate with firm's complexity and scope of firms' operations, changes in organizational structure, accounting measurement application risk, and firm resource in investing for internal control systems. They find that firms that disclose internal control deficiencies (ICDs) are associated with firm-specific economic attributes including firms with more complex operations (number of segments (SEGMENTS), foreign sales (FOREIGN_SALES)), firms that incur recent organizational changes (mergers and acquisition (MERGER_ACQ), restructurings (RESTRUCTURINGS)), firms that have operating characteristics that expose to greater accounting measurement application risks (GROWTH, and INVENTORY), and firms that are impacted by low investments in internal control systems (SIZE, LOSS, Altman ZSCORE).

Loss proportion & ZSCORE

Loss proportion (LOSS_PROPORTION) is measured by the ratio of the number of years of losses relative to the total number of years of data (2009 – 2013) (Compustat), and ZScore[2] (ZSCORE) is measured by 1.2A + 1.4B + 3.3C + 0.6D +1.0E. Where A is *Working Capital* divided by *Total*

[2] http://www.investopedia.com/articles/fundamental/04/021104.asp

Assets, B is *Retained Earnings* divided by *Total Assets*, C is *EBIT* divided by *Total Assets*, D is *Market Value of Equity* divided by *Total Liabilities*, and E is *Sales* divided by *Total Assets* (2009 – 2013) (Compustat). LOSS_PROPORTION captures the impact of low investment on internal control systems. The number of year where firms report a negative net income captures the possibility of firm's financial distress. Meanwhile, firms that report losses in their financial performances have a greater likelihood not to invest in their internal control systems (Krishnan, 2005; Ashbaugh-Skaife et al., 2007). ZScore captures distress risk with higher z-score indicates less distress risk (Altman, 1968). Based on the statements above, I predict a positive coefficient for LOSS_PROPORTION and a negative coefficient for ZSCORE on the association between low accrual quality and internal control weaknesses.

Total assets

Total assets is measured by the log of total assets between 2009 and 2013 (Compustat) to indicate the size of a firm. Dechow and Dichev (2002) argue that larger firms are more stable and have more predictable operations. Therefore, this could create fewer estimation errors in estimating accruals. Additionally, large firms tend to be "more diversified and various portfolio effects across divisions and business activities reduce the relative effect of estimation errors" (Dechow and Dichev, 2002, p. 47). Moreover, Ashbaugh-Skaife et al. (2007) posit that smaller firms tend to have less investment in high technological information systems (e.g., ERP systems such as SAP) that can strengthen internal control systems. Based on the statements above, I predict a negative coefficient for SIZE.

Segments and foreign sales

Segments (LnSEGMENT) is measured by the log of the number of business and geographic segments reported between 2009 and 2013 (Compustats Segment file), and FOREIGN_SALES takes a value of 1 if a firm reported a foreign transactions between 2009 and 2013 (Compustats Segment file), 0 otherwise. Segments and foreign sales indicate that firms are complex. Firms that have greater complexity and scope of operations are likely to face internal control problems (Ashbaugh-Skaife et al., 2007). The complexity of firms may create complex transactions as firm operates in diverse industries and/or in international markets. The more complex of a firm is, the more difficult structure of its internal control system. Furthermore, multi-segment firms potentially face greater internal control problems in consolidating financial reports (e.g., complexity of intra-

group transactions). Based on the statements above, I predict a positive coefficients for both SEGMENTS and FOREIGN_SALES.

Merger and acquisition and restructurings

MERGER_ACQ and RESTRUCTURINGS take a value of 1 if firms engage in M&A and restructuring activities between 2009 and 2013, 0 otherwise. Firms that are more likely to disclose ICDs are firms that have recently change organizational structure including merger and acquisition (MERGER_ACQ) or restructuring (RESTRUCTURINGS) (Ashbaugh-Skaife et al., 2007; Doyle et al., 2007). Firms that perform MERGER_ACQ are likely to face greater internal control challenges when integrating such operations, systems and cultures into one business unit. Also, firms that face changes in organization such as down-sizing organizational structures may face greater internal control challenges especially in human resource. Human-resource-related problems include lack of segregation of duties due to lack of staffing and supervision problems. Based on the arguments above, I predict a positive coefficients for both MERGER_ACQ and RESTRUCTURINGS.

Growth

Growth is measured by the average growth rate in sales from 2009 to 2013 (Compustat). Firms who are growing tend to fail in keeping up the pace in customer demand or entry into new markets. Furthermore, growing firms tend to encounter staffing problems as the scope and complexity of their operations expand (Ashbaugh-Skaife et al., 2007). Based on the statements above, I predict a positive coefficient for growth.

Inventory

INVENTORY measures the percentage of total assets between 2009 and 2013 (Compustat). Inventory captures "firms operating characteristics that are likely to expose them to greater accounting measurement application risks (Kinney and McDaniel, 1989)" (Ashbaugh-Skaife et al., 2007, p. 172). Firms that are exposed to large inventory face a greater deal of internal control risks such as improper measurement and recording of inventory risks, misreporting of inventory due to theft, and lack of timely recognition of inventory obsolescence. Based on the statement above, I predict a positive coefficient for INVENTORY.

5.3.3 Proxies for incentives to discover and disclose material weaknesses

Auditor (BIG4)

BIG4 takes a value of 1 if a firm engage with the dominant auditors between 2009 and 2013 (AuditAnalytics), and 0 otherwise. Prior literature uses Auditor BIG6 as a control variable that can detect and disclose material weaknesses and/or internal control deficiencies (Doyle et al., 2007; Ashbaugh-Skaife et al., 2007). However, this study uses more dominant auditors such as BIG4. I include PricewaterhouseCoopers, KPMG, Deloitte and Touche, and Ernst and Young as the most dominant public auditors. Having the most qualified auditors might determine how material weaknesses are detected and disclosed as well as improved in earnings quality. Therefore, based on the arguments above, I predict a negative coefficient for BIG4.

Change of auditor

Change of auditor (AUDITOR_CHANGE) is measured by taking the value of 1 if a firm change auditor within the period of 2009-2013. Change of auditor can be caused due to auditor resignation. This might occur when auditor believes that the client's is considered as high risk firm. High risk firms are more likely facing an excessive weak internal controls and might have inadequate resources to remediate the problems. Ashbaugh et al. (2007) find that auditor changes are positively associated with the disclosure of internal control deficiencies. Based on the statement above, I predict a positive coefficient for AUDITOR_CHANGE.

Restatement

RESTATEMENT takes a value of 1 if a firm previous financial statement are restated has no restatement at the current period between 2009 and 2013 (AuditAnalytics) and 0 otherwise. I include restatement because according to prior research, restatement is viewed as a proxy for managers' incentives to discover and report internal control deficiencies because firms are more likely to restate their financial statements when the quality of financial statements have been questioned by market regulators or auditors in the past (Ashbaugh-Skaife et al., 2007). Therefore, based on the statements above, I predict a negative coefficient for RESTATEMENT on the association between accrual quality and internal control weaknesses.

Institutional ownership

Institutional ownership (INST_OWN) is measured by taking the average of cumulative number of shares owned by institutions divided by the average total outstanding number of shares of a firm's percentage of shares held by institutional investors relative to the number of institutional investors that own the stock between 2009 and 2013 (Thomson Reuters, 13f). Prior research argues that having more institutional ownerships would provide an incentive to monitor management and would provide greater litigation threats as institutional investors have voting rights to bring pressure if internal control problems occur (Ashbaugh-Skaife et al., 2007; Jensen, 2003; Shleifer and Vishny, 1997). Moreover, Han (2004) reports that a large proportion of ownership concentration provides better monitoring capacity to minimize agency problems. Therefore, corporate governance monitoring by institution may decrease the accrual estimation error in a firm. Overall, I predict a negative coefficient for INST_OWN.

Litigation

LITIGATION takes a value of 1 if a firm is in a litigious industry – SIC codes (Compustat) 2833-2836; 3570-3577; 3600-3674; 5200-5961; and 7370, and 0 otherwise. Period between 2009 and 2013. The last control variable of this study to detect and disclose material weaknesses is LITIGATION. Management or managers in litigious firms face greater risk of lawsuits and have a greater incentive to detect and disclose an internal control problem (Ashbaugh-Skaife et al., 2007). Also, firms who are exposed in litigious industry tend to have lower accrual estimation errors. Based on the above statements, I predict a negative coefficient for LITIGATION.

5.4 Regression 1

The error terms from the accrual quality as mentioned above is used to test the relation with internal controls material weaknesses and the chosen control variables. Therefore, to determine the coefficient of the first regression, it can be modelled as follows in equation (14):

$$AQ = \beta_0 + \beta_1 MW_{it} + \beta_2 SALES\_VOLATILITY_{it} + \beta_3 CFO\_VOLATILITY_{it} + \beta_4 OPERATING\_CYLCE_{it} + \beta_5 LOSS\_PROPORTION_{it} + \beta_6 TOTAL\_ASSETS_{it} + \beta_7 LnSEGMENTS_{it} + \beta_8 FOREIGN\_SALES_{it} + \beta_9 MERGER\_ACQ_{it} + \beta_{10} RESTRUCTURINGS_{it} + \beta_{11} GROWTH_{it} + \beta_{12} INVENTORY_{it} + \beta_{13} BIG4_{it} + \beta_{14} AUDITOR\_CHANGE_{it} + \beta_{15} RESTATEMENT_{it} + \beta_{16} INST_{it} + \beta_{17} LITIGATION_{it} + \varepsilon_{it} \quad (14)$$

5.5 Type of material weaknesses

In-line with Doyle et al. (2007), the second hypothesis tests whether company-level material weaknesses has a stronger negative association with accrual quality than account-specific material weaknesses among all firm year observations. Company level material weaknesses takes a value of 1 if the opinion for ineffective internal control is related to management issues and ineffective control environment, 0 otherwise. Account specific material weaknesses takes a value of 1 if the opinion for ineffective internal control is related to accounts specific balances or transaction-level processes issues, 0 otherwise. Due to limited data from AuditAnalytics, I perform a hand collect data collection by identifying the reasons of internal control opinion issues. More specifically, opinions that are related to company level material weaknesses are senior management competencies, issues with internal audit committee, financial statement disclosure problems including footnotes, compliance issues, and merger and hedging issues. Account specific material weaknesses are related to issues including journal entries problem, reconciliation issues, revenue recognition issues and tax expense issues.

5.6 Regression 2

To answer the second hypothesis, company-level and account specific level material weaknesses are tested if company-level material has stronger association with accrual quality. The following regression in the equation (15) is tested below:

$$AQ = \beta_0 + \beta_1 MW\_Company\_Level_{it} + \beta_2 MW\_Account\_Specific_{it} + \beta_3 SALES\_VOLATILITY_{it} + \beta_4 CFO\_VOLATILITY_{it} + \beta_5 OPERATING\_CYLCE_{it} + \beta_6 LOSS\_PROPORTION_{it} + \beta_7 TOTAL\_ASSETS_{it} + \beta_8 LnSEGMENTS_{it} + \beta_9 FOREIGN\_SALES_{it} + \beta_{10} MERGER\_ACQ_{it} + \beta_{11} RESTRUCTURINGS_{it} + \beta_{12} GROWTH_{it} + \beta_{13} INVENTORY_{it} + \beta_{14} BIG4_{it} + \beta_{15} AUDITOR\_CHANGE_{it} + \beta_{16} AUDITOR\_CHANGE_{it} + \beta_{17} RESTATEMENT_{it} + \beta_{18} INST\_OWN_{it} + \beta_{19} LITIGATION_{it} + \varepsilon_{it} \quad (15)$$

5.7 Remediation effect

In this study, remediation action is used to test if the association between accrual quality and remediation of internal control material weaknesses is negatively stronger. As mentioned in section 2.3.4 under remediation action, SOX 404 does not clearly mention about the remediation of material weaknesses. However, SOX 404 requires management and other parties (e.g. auditors) to evaluate and attest the effectiveness of the internal control systems. MW_FIXED is equal to 1 if

the firm's internal control opinion is effective under SOX 404 within three subsequent years between 2009 and 2015 after the disclosure of MW, 0 otherwise.

5.8 Regression 3

To test whether remediation action weakens the association between accrual quality and internal control material weaknesses; therefore, improves accrual quality. The following regression in the equation (16) is tested:

$$AQ = \beta_0 + \beta_1 MW\_FIXED_{it} + \beta_2 SALES\_VOLATILITY_{it} + \beta_3 CFO\_VOLATILITY_{it} + \beta_4 OPERATING\_CYLCE_{it} + \beta_5 LOSS\_PROPORTION_{it} + \beta_6 TOTAL\_ASSETS_{it} + \beta_7 LnSEGMENTS_{it} + \beta_8 FOREIGN\_SALES_{it} + \beta_9 MERGER\_ACQ_{it} + \beta_{10} RESTRUCTURINGS_{it} + \beta_{11} GROWTH_{it} + \beta_{12} INVENTORY_{it} + \beta_{13} BIG4_{it} + \beta_{14} AUDITOR\_CHANGE_{it} + \beta_{15} RESTATEMENT_{it} + \beta_{16} INST_{it} + \beta_{17} LITIGATION_{it} + \varepsilon_{it} \quad (16)$$

5.9 Sample selection

To test my hypotheses and answer the research question in this study, I collect and obtain data from Wharton Research Data Services (WRDS) and divide into different sub-databases. This study focuses on publicly active companies in the U.S.A. and mainly those firms that are obliged to submit an annual report about the internal control status under SOX 404. More specifically, internal control material weaknesses are obtained from AuditAnalytics, and related to financial data that is obtained from Compustat; corporate governance data related to institutional ownership is obtained from Thomson Reuters (13f), respectively.

Before merging the data set, the sample period for the dependent variable (AQ) uses the sample period of 2006 to 2016 to avoid missing values and capture the association between accrual quality, MW, and MW_FIXED. Specifically, the computation of AQ requires future and lag variables. Once the values of AQ are obtained for the chosen years, the unrelated years will be dropped. In this study, the sample period covers from Fiscal-Year 2009 to 2013. The sample selection procedure consists of two groups, namely internal control material weaknesses (ICMW) sample and non-internal control material weakness (NICMW) sample. The sample selection process starts with the deduction of firm-year observations that are not provided by Compustat and Thomson Reuters (13f). Moreover, consistent with Doyle et al. (2007) and Ashbaugh-Skaife et al. (2007), this study excludes financial services and utilities industries due to the unique regulation system.

Therefore, these type of industry are eliminated by using the SIC code of 49 and 6000-6799. Lastly, firms with missing and insufficient data on accrual quality and controls variables are eliminated. The total sample firm-year observation for ICMW and NICMW consists of 241 and 5,117 firm-year observations. Table 2 provides an overview and a detailed sample selection process.

The last set of analyses examines the relation between firms that remediate their internal control problems. The sample selection procedure consists of two groups, remediated ICMW (MW_Remediated) sample and non-remediated ICMW (MW_Non_Remediated) sample. The remediation tests are restricted only for firms who disclosed material weaknesses under SOX 404. Remediation of material weaknesses are tested within three subsequent years after the disclosure of MW (2009-2013). To capture the remediation effect in the year of 2011, 2012 and 2013, I extend the sample period from FY 2009 to 2015. Due to the availability of data, data from 2016 is not included. The main reason is that accrual quality measurement requires to calculate CFO_{it+1}. However, the financial data for FY 2017 is no yet to be available. Therefore, in FY 2013 only captures remediation effect with maximum of two years prior to the disclosure of material weaknesses. The total sample firm-year observation for MW_Remediated and MW_Non_Remediated consists of 235 and 393 firm-year observations.

Table 2: Sample selection and eliminations

Sample selection procedure	
ICMW Sample	
Number of firm-year observations with an non-effective internal control opinion under SOX 404 (FY 2009 through FY 2013) available in AuditAnalytics	1,160
Less: firm-year observations not provided by Compustat	(383)
Less: firm-year observations not provided by Thomson Reuters	(441)
Less: firm-year observations from financial services and utilities industries	(9)
Less: firms-year observations with unavailable and insufficient data on accrual quality	(34)
Less: firms-year observations with unavailable and insufficient data on control variables	(52)
Total ICMW sample used in regression	241
NICMW Sample	
Number of firm-year observations with an effective internal control opinion under SOX 404 (FY 2009 through FY 2013) available in AuditAnalytics	11,165
Less: firm-year observations not provided by Compustat	(1,269)
Less: firm-year observations not provided by Thomson Reuters	(3,195)
Less: firm-year observations from financial services and utilities industries	(392)
Less: firms-year observations with unavailable and insufficient data on accrual quality	(567)
Less: firms-year observations with unavailable and insufficient data on control variables	(625)
Total NICMW use in regression	5,117

5.10 Summary

This chapter provides the research methods to answer the research question based on theoretical constructs and prior literature. Different type of variables based on Doyle et al. (2007) and Ashbaugh-Skaife et al. (2007) are discussed. The Libby boxes that are illustrated on the appendix 1, gives a clearer view of the link between the dependent, independent and control variables. I adopt the measurement of accrual quality and internal material weaknesses the approach taken from Doyle et al. (2007); Ashbaugh-Skaife et al. (2007); Ashbaugh-Skaife et al. (2008) such that. This study can be considered as high construct validity and high internal validity because according to Doyle et al. (2007); Ashbaugh-Skaife et al. (2007); and Ashbaugh-Skaife et al. (2008), there is a significant association between internal control material weaknesses and accrual quality. However, due to the sample of ICMW is relatively small (241 firm-year observations), it can be considered that the sample might not be too representative and hard to implement in other

settings. Therefore, I suspect that this study has low external validity. Table 3 summarizes all variables including control variables that will be used in this thesis.

Table 3: Summary of variables

Variable	Predicted Sign	Description
Component of dependent variables		
$\Delta WC_{i,t}$	NA	Working capital of firm *i* in year *t* scaled by the total assets in year *t* between FY 2009 – FY 2013 (Compustat), measured as income before extraordinary items (taken from cash flow statement) minus cash flow from operations plus depreciation (taken from cash flow statement)
$CFO_{i,t-1}$	NA	Cash flow from operations of firm *i* in year *t* - 1 scaled by the total assets in year *t* between FY 2009 – FY 2013 (Compustat)
$CFO_{i,t}$	NA	Cash flow from operations of firm *i* in year *t* scaled by the total assets in year *t* between FY 2009 – FY 2013 (Compustat)
$CFO_{i,t+1}$	NA	Cash flow from operations of firm *i* in year *t* + 1, scaled by the total assets in year *t* between FY 2009 – FY 2013 (Compustat)
$\Delta REV_{i,t}$	NA	Revenue (sales) for firm *i* in year *t* less revenue for for firm *i* in year *t*-1 scaled by the total assets in year *t* between FY 2009 – FY 2013
$PPE_{i,t}$		Gross property, plant, and equipment for firm *i* in year *t* scaled by the total assets in year *t* FY 2009 – FY 2013
$\varepsilon_{i,t}$	NA	Error term in year *t* for firm *i* between FY 2009 – FY 2013 (Compustat)
Independent variables		
MW_{it}	+	MW is equal to 1 if the firm's "count weaknesses" are disclosed at least 1 material weakness in internal control report under SOX 404 from Jan, 2009 to Dec, 2013, and 0 otherwise (AuditAnalytics)

$MW\_Company\_Level_{it}$	+	MW_Company_Level is equal to 1 if the firm's "count weaknesses" are disclosed at least 1 material weakness in internal control under SOX 404 related to company-wide problems (e.g., management override FS or ineffective control environment) between FY 2009 and FY 2013, and 0 otherwise (AuditAnalytics)
$MW\_Account\_Specific_{it}$	+	MW_Account_Specific is equal to 1 if the firm's "count weaknesses" are disclosed at least 1 material weakness in internal control under SOX 404 related to account or transactional problems from FY 2009 to FY 2013, and 0 otherwise (AuditAnalytics)
MW_FIXED_{it}	-	MW_FIXED is equal to 1 if the firm's internal control opinion is effective under SOX 404 within three subsequent years after the disclosure of MW between FY 2009 and FY 2015, and 0 otherwise (AuditAnalytics)
Innate Firms Characteristics That Affect Accruals Quality (Control Variables)		
SALES_VOLATILITY	+	The standard deviation of sales, scaled by average assets between FY 2009 and FY 2013 (Compustat)
CFO_VOLATILITY	+	The standard deviation of cash from operations, scaled by average assets between FY 2009 and FY 2013 (Compustat)
OPERATING_CYCLE	+	The log of the average of (sales/360) / (Average Account Receivable) + (Cost of Goods Sold/360)/ Average Inventory) (between FY 2009 and FY 2013) (Compustat) from 2009 – 2013 (Compustat)
Internal Control Risk Attributes (Control Variables)		
LOSS_PROPORTION	+	The ratio of the number of years of losses relative to the total number of years of data (between FY 2009 and FY 2013)
ZSCORE	-	Decile rank of Altman (1980) z-score measure of distress risk between FY 2009 and FY 2013 (1.2A + 1.4B + 3.3C + 0.6D +1.0E. Where A is *Working Capital* divided by *Total Assets*, B is *Retained Earnings* divided by *Total Assets*, C is *EBIT* divided by *Total Assets*, D is *Market Value of Equity* divided by *Total Liabilities*, and E is *Sales* divided by *Total Assets*) (Compustat)

TOTAL_ASSETS	-	The log of average of total assets between FY 2009 and FY 2013 (Compustat)
LnSEGMENTS	+	The number of reported segments between FY 2009 and FY 2013 (Compustat segment file).
FOREIGN_SALES	+	An indicator variable is equal to 1 if a firm reports foreign sales between FY 2009 and FY 2013, and 0 otherwise (Compustat segment file).
MERGER_AQ	+	An indicator variable is equal to 1 if a firm report in involvement of M&A activities between FY 2009 and FY 2013, and 0 otherwise (Compustat).
RESTRUCTURINGS	+	An indicator variable is equal to 1 if a firm reports in involvement of restructuring activities between FY 2009 and FY 2013, and 0 otherwise (Compustat).
GROWTH	+	The average growth rate in sales between FY 2009 and FY 2013 (Compustat)
INVENTORY	+	The average inventory relative to total assets between FY 2009 and FY 2013 (Compustat).
Proxies for Incentives to Discover and Disclose Material Weaknesses (Control Variables)		
BIG4	-	An indicator variable is equal to 1 if firms engaged with the dominant auditors between FY 2009 and FY 2013, and 0 is otherwise (AuditAnalytics).
AUDITOR_CHANGE	+	An indicator variable is equal to 1 if a firm change auditor within the period of FY 2009 to FY 2013 and 0 otherwise (AuditAnalytics)
RESTATEMENT	-	An indicator variable is equal to 1 if a firm had a restatement or an SEC AARE between 2009 and 2013 and 0 otherwise (AuditAnalytics).
INST_OWN	-	The percentage of capital (outstanding stock) owned by the Institutional group between 2009 and 2013 (Thomson Reuters, 13f).
LITIGATION	-	An indicator is equal to 1 if a firm was in a litigation industry – SIC codes 2833-2836; 3570-3577; 3600-3674; 5200-5961; and 7370, and 0 otherwise. The sample period between FY 2009 and FY 2013 (Compustat).

6. RESULTS

This chapter consists of the descriptive analysis, the Pearson's correlation matrix, the variance inflation factor, and the results of the regression of the linear probability. Firstly, I will analyze the descriptive analysis based on three different hypotheses. Then I will describe the level of correlation of all variables in a form of Pearson correlation matrix. The last analysis of this study is the estimation of the regressions for all hypothesis which will present the rejection or the acceptance of all hypothesis and the answer to the research question.

6.1 Summarized descriptive analysis

Table 4 presents the descriptive statistics of the relation between accrual quality and internal control material weaknesses. Under this analysis, I specifically only analyze those variables that have the significance level of 1%, 5%, and 10% levels respectively. Panel A describes the descriptive statistics of internal control material weaknesses firms versus non-internal control material weaknesses firms. As the comparison groups, this study presents all firm-year observations from 2009 to 2013 between firms that disclose material weaknesses (241 firm-year observations) and firms who do not have any material weakness problems (5,117 firm-year observations). The total sample consists of 5,358 firm-year observations. Each of continuous variables including SALES_VOLATILTY, CFO_VOLATILITY, OPERATING_CYCLE, ZSCORE, GROWTH, INVENTORY and INST_OWN are winsorized at 1% and 99% to mitigate outliers.

Firstly, I expect accrual quality (AQ) to be lower in the standard deviation of residuals, thus indicates higher AQ. The mean of the standard deviation of the residual is 0.066 for ICMW firms, which in my opinion indicates a very low percentage for accrual quality. However, in comparison, the mean for accrual quality is higher for ICMW firms (0.066) than Non-ICMW firms (0.043) which provide initial support for H1; such is consistent with the study from Doyle et al. (2007) which indicates that ICMW firms have a higher mean of accrual quality than Non-ICMW. Moreover, the results for other variables in the descriptive statistics indicate that ICMW firms have a higher sales volatility, CFO volatility, loss proportion, financial distress, inventory turnovers, lower operating cycle, are smaller in size, lesser M&A and restructuring activities, are less likely to engage with Big 4 auditors and more likely to change auditors. It seems like the mean for sales volatility, CFO volatility, loss proportion, total assets are in-line with the study from Doyle et al.

(2007). However, some variables such as operating cycle, restructuring activities are facing different expectations.

Panel B shows the descriptive statistics of company-level versus account-specific material weaknesses. Panel B shows 241 total firm-year observations for firms that disclose material weaknesses. There are 143 firm-year observations for company-level material weaknesses and 93 firm-year observations for account-specific material weaknesses. Moreover, company-level material weaknesses have a higher mean (0.074) than account-specific material weaknesses (0.055). This result provides initial supports for H2. Also, consistent with the theoretical background, company-level material weaknesses are the fundamental problems such as management override and ineffective control environment than account-specific material weaknesses. This indication is in-line with the study from Doyle et al. (2007) that indicates higher mean for company-level material weaknesses than account-specific material weaknesses which provides initial support for H2.

Lastly, panel C shows the descriptive statistics of remediated ICMW firms (235 firm-year observations) versus non-remediated ICMW firms (393 firm-year observations). The descriptive statistics show that firms that remediated the internal control material weaknesses problems have a lower mean (0.052) than firms who do not remediate their internal control material weaknesses problem (0.061). This is in-line with the expectation that firms that remediate their material weaknesses problems tend to have a lower standard deviation of residuals (higher accrual quality) which provides initial support for H3.

Table 4: Descriptive Statistics

Panel A: Descriptive Statistics of Internal Control Material Weaknesses Firms versus Non-Internal Control Material Weaknesses Firms					
	Full sample mean	ICMW mean	Predicted Difference	Non-ICMW mean	p-value
AQ	0.044	0.066	>	0.043	0.000
SALES_VOLATILITY	0.260	0.295		0.259	0.022
CFO_VOLATILITY	0.059	0.072		0.058	0.000
OPERATING_CYCLE	-0.083	-0.326		-0.071	0.000
LOSS_PROPORTION	0.397	0.565		0.389	0.000
ZSCORE	4.219	3.592		4.248	0.005
TOTAL_ASSETS	6.795	5.321		6.865	0.000
LnSEGMENT	3.047	2.649		3.066	0.000
FOREIGN_SALES	0.020	0.029		0.019	0.245
MERGER_ACQ	0.281	0.224		0.284	0.044
RESTRUCTURINGS	0.387	0.237		0.394	0.000
GROWTH	49.828	48.739		49.879	0.534
INVENTORY	52.790	57.249		52.580	0.011
BIG4	0.746	0.444		0.760	0.000
AUDITOR_CHANGE	0.050	0.095		0.048	0.001
RESTATEMENT	0.062	0.058		0.063	0.780
INST_OWN	50.911	51.320		50.892	0.816
LITIGATION	0.262	0.286		0.261	0.385
N	5358	241		5117	
Panel B: Descriptive Statistics of Company-Level versus Company-Level Firms					
	Full sample MW Mean	MW_ Company _Level mean	Predicted Sign	MW_ Account_ Specific Mean	p-value
AQ	0.066	0.074	>	0.055	0.039
SALES_VOLATILITY	0.295	0.302		0.285	0.632
CFO_VOLATILITY	0.072	0.072		0.072	0.950
OPERATING_CYCLE	-0.326	-0.362		-0.274	0.320
LOSS_PROPORTION	0.565	0.552		0.584	0.619
ZSCORE	3.592	3.337		3.963	0.223
TOTAL_ASSETS	5.321	5.067		5.692	0.007
LnSEGMENT	2.649	2.580		2.749	0.258
FOREIGN_SALES	0.029	0.042		0.010	0.151
MERGER_ACQ	0.224	0.196		0.265	0.205
RESTRUCTURINGS	0.237	0.203		0.286	0.138
GROWTH	48.739	50.455		46.235	0.327
INVENTORY	57.249	59.154		54.469	0.188
BIG4	0.444	0.364		0.561	0.002
AUDITOR_CHANGE	0.095	0.084		0.112	0.464
RESTATEMENT	0.058	0.042		0.082	0.197
INST_OWN	51.320	51.420		51.173	0.943
LITIGATION	0.286	0.301		0.265	0.552
N	241	143		98	

Note: All variables are defined in table 3 under section 5.10.

Panel C: Descriptive Statistics of Remediated ICMW Firms versus Non-Remediated ICMW Firms

	Full sample Mean	MW_ Remediated Mean	Predicted Sign	MW_Non Remediated Mean	p-value
AQ	0.058	0.052	<	0.061	0.065
SALES_VOLATILITY	56.557	57.247		56.145	0.616
CFO_VOLATILITY	57.710	58.877		57.013	0.423
OPERATING_CYCLE	37.471	39.702		36.137	0.111
LOSS_PROPORTION	0.551	0.576		0.536	0.326
ZSCORE	45.132	48.689		43.005	0.020
TOTAL_ASSETS	5.649	5.804		5.557	0.092
LnSEGMENT	3.106	3.128		3.093	0.735
FOREIGN_SALES	0.025	0.021		0.028	0.606
MERGER_ACQ	0.274	0.255		0.285	0.421
RESTRUCTURINGS	0.330	0.366		0.308	0.135
GROWTH	50.177	51.247		49.537	0.517
INVENTORY	56.553	57.013		56.277	0.740
BIG4	0.513	0.562		0.483	0.058
AUDITOR_CHANGE	0.104	0.072		0.122	0.048
RESTATEMENT	0.067	0.072		0.064	0.672
INST_OWN	54.596	55.911		53.809	0.326
LITIGATION	0.269	0.247		0.282	0.331
N	628	235		393	

Note: All variables are defined in table 3 under section 5.10.

6.2 Pearson's correlation matrix

Table 6 presents the Pearson correlation matrix. Most of the variables are positively or negatively correlated with one another either at 1%, 5% or 10% significance level. The primary variables for this study are accrual quality (AQ) and internal control material weaknesses (MW). According to the results of the Pearson correlation matrix, accrual quality is positively associated with the disclosure of material weaknesses (0.090), higher sales (0.112) and cash flow volatility (0.273), higher proportion of losses (0.250), more frequent change of auditors (0.068), higher institutional ownership (0.053) and exposure to more litigious industry (0.034). On the other hand, accrual quality is negatively associated with firms that have shorter operating cycle (-0.125), facing greater financial distress (-0.115), smaller in size (-0.217) and segments (-0.077), conducting less merger and acquisition (-0.046) activities and less likely to engage with Big4 auditors (-0.145). Material weaknesses firms are positively associated with higher sales (0.031) and cash flow volatility (0.062), a higher proportion of loss (0.074), more inventory turnover (0.035) and tend to change auditors more frequently (0.045). Material weaknesses are negatively associated with shorter operating cycle (-0.144), facing greater distress (-0.039), smaller in size (-0.159) and lesser

business segments (-0.070), conducting less merger and acquisition (-0.028) and restructuring activities (-0.067), and less likely to engage with Big4 auditors (-0.151).

6.2.1 Multicollinearity test

It is also important to check for multicollinearity test that identifies the moderate or high degree of correlation between variables. If the correlation between variables finds a high degree of correlation, the analysis of a regression can be affected and ended up to misleading analysis due to the standard error, and the variance of the coefficient inflates. The VIF shows how increased the variance, and the square of the standard deviation are. If the value of variables exceeds 7, this shows that the problem of multicollinearity.

Table 5 represent VIF (variance inflation factors) for all hypothesis. Firstly, in Table 5 under H1, all variables show none of the VIF value exceeds above 7. The minimum and maximum are 3.22 (TOTAL_ASSETS) and 1.01 (RESTATEMENT). Moreover, the mean for H1 is 1.38. Since the VIF values for hypothesis are much lower than 7, I conclude that there is no multicollinearity issue. Secondly, Table 5 under H2 shows that none of the VIF value exceeds above 7. The minimum and maximum values are 3.22 (TOTAL_ASSETS) and 1.01 (MW_Account_Specific and RESTATEMENT). Furthermore, the mean for H2 is 1.36, slightly above the mean for H1. I conclude that for H2 variables, there is no multicollinearity issue. Lastly, H3 variables show no VIF value exceeds above 7. The minimum and maximum values for the variables are 3.24 (TOTAL_ASSETS) and 1.05 (MW_FIXED). Moreover, the mean for H3 is 1.41, slightly above the mean for H2. Therefore, I conclude that for H3 variables, there is no multicollinearity problem as well.

Table 5: VIF test for multicollinearity

Variables	Hypothesis 1		Variables	Hypothesis 2		Variables	Hypothesis 3	
	VIF	1/VIF		VIF	1/VIF		VIF	1/VIF
TOTAL_ ASSETS	3.22	0.311	TOTAL_ ASSETS	3.22	0.322	TOTAL_ ASSETS	3.24	0.308
BIG4	1.81	0.511	BIG4	1.81	0.551	BIG4	2.00	0.499
CFO_ VOLATILITY	1.58	0.632	CFO_ VOLATILITY	1.58	0.632	OPERATING _CYCLE	1.89	0.529
OPERATING _CYCLE	1.54	0.650	OPERATING _CYCLE	1.54	0.650	CFO_ VOLATILITY	1.46	0.686
SALES_ VOLATILITY	1.45	0.690	SALES_ VOLATILITY	1.45	0.690	RESTRUCTUR INGS	1.36	0.733
LOSS_ PROPORTION	1.40	0.716	LOSS_ PROPORTION	1.40	0.716	LOSS_ PROPORTION	1.35	0.738
INST_OWN	1.40	0.716	INST_OWN	1.40	0.716	SALES_ VOLATILITY	1.32	0.756
GROWTH	1.29	0.778	GROWTH	1.29	0.778	GROWTH	1.30	0.772
ZSCORE	1.24	0.806	ZSCORE	1.24	0.806	LnSEGMENT	1.27	0.788
INVENTORY	1.22	0.819	INVENTORY	1.22	0.819	MERGER_ACQ	1.25	0.799
LnSEGMENT	1.19	0.840	LnSEGMENT	1.19	0.840	ZSCORE	1.24	0.804
RESTRUCTUR INGS	1.19	0.842	RESTRUCTUR INGS	1.19	0.843	INST_OWN	1.19	0.837
MERGER_ ACQ	1.13	0.889	MERGER_ ACQ	1.13	0.889	INVENTORY	1.18	0.849
AUDITOR_ CHANGE	1.05	0.950	AUDITOR_ CHANGE	1.05	0.950	AUDITOR_ CHANGE	1.10	0.912
MW	1.05	0.957	MW_Company _Level	1.04	0.962	LITIGATION	1.10	0.912
LITIGATION	1.03	0.967	LITIGATION	1.03	0.967	RESTATEMENT	1.07	0.935
FOREIGN_ SALES	1.03	0.971	FOREIGN_ SALES	1.03	0.971	FOREIGN_ SALES	1.05	0.951
RESTATE MENT	1.01	0.994	MW_Account_ Specific	1.01	0.987	MW_FIXED	1.05	0.955
	-	-	RESTATE MENT	1.01	0.994		-	-
Mean VIF	1.38			1.36			1.41	

Note: All variables are defined in table 3 under section 5.10.

Table 6: Pearson Correlation Matrix

	AQ	MW	SALES_ VOLATILITY	CFO_VO LATILITY	OPERATI NG_CYCLE	LOSS_ PROPOR TION	ZSCORE	TOTAL_ ASSETS	LnSEG MENT	FOREIGN _SALES	MERGER _ACQ	RESTRUC TURINGS	GROWTH	INVEN TORY	BIG4	AUDIT OR _CHAN GE	RESTA TEME NT	INST _OWN	LITIGA TION
AQ	1.000																		
MW	0.090***	1.000																	
SALES_VO LATILITY	0.112***	0.031**	1.000																
CFO_VOLA TILITY	0.273***	0.062***	0.447***	1.000															
OPERATI NG_CYCLE	-0.125***	-0.144***	-0.033**	-0.278***	1.000														
LOSS_PRO PORTION	0.250***	0.074***	0.036***	0.257***	-0.274***	1.000													
ZSCORE	-0.115***	-0.039***	0.130***	0.080***	0.016	-0.289***	1.000												
TOTAL_ ASSETS	-0.217***	-0.159***	-0.224***	-0.414***	0.509***	-0.346***	-0.136***	1.000											
LnSEG MENT	-0.077***	-0.070***	-0.173***	-0.196***	0.126***	-0.048***	-0.078***	0.307***	1.000										
FOREIGN _SALES	0.015	0.016	0.022	0.072***	-0.079***	-0.030**	0.053***	-0.081***	-0.108***	1.000									
MERGER _ACQ	-0.046***	-0.028**	-0.086***	-0.177***	0.131***	-0.058***	-0.067***	0.195***	0.119***	-0.029**	1.000								
RESTRUC TURINGS	0.005	-0.067***	-0.139***	-0.149***	0.167***	-0.022	-0.160***	0.271***	0.214***	-0.043***	0.167***	1.000							
GROWTH	-0.017	-0.009	0.299***	0.196***	0.058***	-0.115***	0.192***	-0.040***	-0.131***	0.038***	0.138***	-0.184***	1.000						
INVENTO RY	0.004	0.035**	0.223***	0.080***	-0.081***	0.008	0.109***	-0.286***	-0.008	0.049***	-0.100***	-0.031**	-0.110***	1.000					
BIG4	-0.145***	-0.151***	-0.122***	-0.254***	0.421***	-0.202***	-0.043***	0.635***	0.139***	-0.085***	0.157***	0.239***	0.009	-0.207***	1.000				
AUDITOR _CHANGE	0.068***	0.045***	0.062***	0.090***	0.009	0.080***	0.022	-0.123***	-0.033**	0.012	-0.036***	-0.036***	0.024*	0.031**	-0.178***	1.000			
RESTATE MENT	0.008	-0.004	-0.031**	-0.030**	0.049***	-0.005	0.003	0.035**	0.014	0.004	0.005	0.030**	-0.004	-0.031**	0.051***	0.008	1.000		
INST_ OWN	0.053***	0.003	0.110***	0.120***	-0.073***	0.117***	0.069***	-0.478***	-0.131***	0.022	-0.044***	-0.097***	0.009	0.197***	-0.256***	0.079***	0.007	1.000	
LITIGA TION	0.034**	0.012	0.030**	0.118***	-0.059***	0.060***	0.065***	-0.076***	-0.101***	-0.030**	-0.025*	-0.040***	0.029**	0.039***	-0.014	0.004	-0.006	0.010	1.000

*p<0.10 **p<0.05 ***p<0.01

Note: All variables are defined in table 3 under section 5.10.

6.3 The main test results

6.3.1 Hypothesis 1

Table 7 represents the main results of the regression model for the sample period between 2009 and 2013 by adopting the studies from Doyle et al. (2007) and Ashbaugh-Skaife et al. (2007). The main study of this thesis is to examine the relation between accrual quality and internal control material weaknesses. As expected, the main variable of interest, MW has a significant positive correlation between AQ and MW at 1% significance level (0.012). The result describes that on average when a firm discloses 1 MW within a year, accrual quality tends to decrease by 1.2%. Consistent with Doyle et al. (2007) study and the predicted direction that coefficient of MW is positively significant. The results support the statement of H1 which suggests that firms that are affected by MW tend to have poorer accrual quality.

The innate firms' characteristics such as SALES_VOLATILITY, CFO_VOLATILITY, and OPERATING_CYCLE show a significantly positive correlation between AQ and MW (0.006, 0.239, and 0.006 respectively); this is consistent with Doyle et al. (2007) and the predicted direction. Material weakness firms tend to have higher sales and cash flow volatility and have longer operating cycle. The internal control risk attributes show that only LOSS_PROPORTION, ZScore, TOTAL_ASSETS and RESTRUCTURINGS that are in-line with the study of Doyle et al. (2007) and predicted signs (0.013, -0.001, -0.004, and 0.006 respectively). For firms with multiple segments, involvement with foreign transactions, and M&A activities do not have any correlation with AQ and MW. The occurrence of non-correlated variables is partly due to the sample of this study which captures that many firms affected by MW do not have many business segments, foreign transactions, and M&A activities. For GROWTH and INVENTORY, the results show negative coefficients. Although the negative coefficients for GROWTH and INVENTORY are relatively small (-0.0001 and -0.0001 respectively), this is partly due to high volatility in sales that might affect the percentage of growth and inventory turnover. Lastly, proxies for incentive to detect and disclose material weaknesses, only AUDITOR_CHANGE and INST_OWN are consistent with the predictions (0.006 and -0.0001 respectively). Firms that change auditors more frequently tend to be high risks firms and faced stronger internal control problems. Change of auditors might be due to disagreement between auditor and client over accounting rules, doubt over auditor's capabilities, or other reasons. Firms that have institutional ownership tend to produce

more transparent financial reporting which lead to effective internal control environment. BIG4 and RESTATEMENT do not show any significant relation with AQ and MW. Besides elaborating on the coefficient estimate, it is also important to analyze the fit of the model. The R-squared of 0.134 means only 13.4% of the variation of AQ can be explained by MW and all control variables. The R-squared is relatively low as compared to prior literature (Doyle et al., 2007). Low r-squared can be due to the size of the sample of ICMW that is relatively small, such that it does not capture small firms that are more prone to greater internal control problems. Thus, the sample might not be too representative.

Overall, the evidence from the results of the regression under hypothesis 1 indicates that there is a strong positive relation between poor accrual quality and internal control material weaknesses. Therefore, H1 is accepted.

6.3.2 Hypothesis 2

The (2) specification of Table 7 describes the main results regarding the second hypothesis. Next, I examine the relation between AQ and different types of internal control material weaknesses. In this study, I predict that company-level material weaknesses have a stronger relation with AQ than account-specific material weaknesses. As expected, company-level material weaknesses have a positive association with AQ, whereas account-specific material weaknesses do not have any association with AQ (0.020*** and 0.002 respectively). The result describes, on average when a firm discloses 1 MW related to company-level MW within a year, accrual quality tends to decrease by 2.0%. Consistent with prior literature (Doyle et al., 2007) and H2 prediction, the coefficient on account-specific material weaknesses is lower than company-specific material weaknesses. Therefore, H2 is accepted.

The results of the correlation between control variables from the innate firms' characteristics, internal control risk attributes, and proxies for incentive to detect and disclose material weaknesses are more or less the same with the results of control variables in H1. The innate firms' characteristics such as SALES_VOLATILITY, CFO_VOLATILITY, and OPERATING_CYCLE show a significantly positive correlation between AQ and MW (0.006, 0.240, and 0.006 respectively). The internal control risk attributes show that only LOSS_PROPORTION, ZScore, TOTAL_ASSETS and RESTRUCTURING that are in-line with the study of Doyle et al. (2007)

and predicted signs (0.014, -0.001, -0.004, and 0.006 respectively). For LnSEGMENT, FOREIGN_SALES, and MERGER_ACQ do not have any correlation with AQ and MW. For GROWTH and INVENTORY, the results show negative coefficients between 1%, 5% and 10% significance level (-0.0001 and -0.0001 respectively). For the last stream, proxies for incentive to detect and disclose material weaknesses, only AUDITOR_CHANGE and INST_OWN are consistent with the predictions (-0.0001 and 0.067 respectively). BIG4 and RESTATEMENT do not show any significant relation with AQ and MW. Under H2, the R-squared is slightly increased by 0.1%. This shows only 13.5% provides information on the proportion of AQ that is explained by company-level and account-specific material weaknesses.

Overall, the evidence from the results of the regression under hypothesis 2 indicates that company-level material weaknesses have a stronger association with accrual quality than account-specific material weaknesses. Therefore, H2 is accepted.

Table 7: Regression analysis

Panel A: AQ and ICMW

Variables	Predicted Sign	(1)	(2)
		AQ	
MW	+	0.012***	
		(0.003)	
MW_Company_Level	+		0.020***
			(0.004)
MW_Account_Specific	+		0.002
			(0.005)
SALES_VOLATILITY	+	0.006*	0.006*
		(0.003)	(0.003)
CFO_VOLATILITY	+	0.239***	0.240***
		(0.019)	(0.019)
OPERATING_CYCLE	+	0.006***	0.006***
		(0.002)	(0.002)
LOSS_PROPORTION	+	0.013***	0.014***
		(0.002)	(0.002)
ZSCORE	-	-0.001***	-0.001***
		(0.0002)	(0.0002)
TOTAL_ASSETS	-	-0.004***	-0.004***
		(0.001)	(0.001)
LnSEGMENT	+	-0.0005	-0.0005
		(0.001)	(0.001)
FOREIGN_SALES	+	0.002	0.001
		(0.005)	(0.005)
MERGER_ACQ	+	0.001	0.002
		(0.002)	(0.002)
RESTRUCTURINGS	+	0.006***	0.006***
		(0.002)	(0.002)
GROWTH	+	-0.0001***	-0.0001***
		(0.00003)	(0.00003)
INVENTORY	+	-0.0001***	-0.0001***
		(0.00003)	(0.00003)
BIG4	-	-0.002	-0.002
		(0.002)	(0.002)
AUDITOR_CHANGE	+	0.006*	0.006*
		(0.003)	(0.003)
RESTATEMENT	-	0.004	0.004
		(0.003)	(0.003)
INST_OWN	-	-0.0001***	-0.0001***
		(0.00003)	(0.00003)
LITIGATION	-	0.0004	0.0004
		(0.002)	(0.002)
Intercept		0.067***	0.0668***
		(0.006)	(0.006)
N		5358	5358
R^2		13.4%	13.5%
adj. R^2		13.1%	13.2%

*p<0.10 **p<0.05 ***p<0.01

Note: All variables are defined in table 3 under section 5.10.

6.3.3 Hypothesis 3 – production of robust standard error

For the last hypothesis, I will analyze the relation between AQ and remediation of MW. Table 8 represents the result of the regression model of the relation between AQ and remediation of MW. In this study, I strictly focus on firms that disclosed material weaknesses. Also, as mentioned, the sample period is expanded to be covering from 2009 to 2015. The expansion of sample period will capture better remediation for the firm-year material weaknesses in 2011, 2012 and 2013. The total sample use is 628 firm-year observations.

For the third hypothesis, I predict that there is a positive association between AQ and remediation of MW. The interpretation of the results should be a negative coefficient as it decreases the amount of accrual estimation errors. The results of the regression in this study show a negative coefficient but not significant (-0.007). To support H3, I conduct a production of robust standard error by applying cluster (gvkey). After applying a production of robust standard error, the result of the variable interest, MW_FIXED shows a significantly negative association with AQ (-0.007) at 10% significance level. Consistent with Ashbaugh-Skaife et al. (2008) and H3 prediction, that ICD_FIXED is negatively associated with AQM. The interpretation of the results shows that on average when a firm remediate at least 1 material weakness, accrual quality tends to improve by 0.7%. Therefore, in this study H3 is accepted.

As far as innate firm characteristics, internal control risk attributes and proxies for incentive to discover and disclose material weaknesses, only CFO_VOLATILITY and ZSCORE hold significant association between AQ and MW_FIXED at 1% significant level (0.286 and -0.003 respectively). The rest of the control variables show insignificant results that are different compared to the previous hypothesis. Under H3, the R-squared is slightly increased by 0.4%. This shows only 13.9% provides information on the proportion of AQ that is explained by firms that remediated their internal control material weaknesses (MW_FIXED).

Overall, the evidence from the results of the regression under hypothesis 3 indicates that there is a strong negative relation between poor accrual quality and remediation of internal control material weaknesses. Therefore, H3 is accepted.

Table 8

Panel B: AQ and Remediated ICMW

Variables	Predicted Sign	AQ	
			Robust Std. Error
MW_FIXED	-	-0.007	-0.007*
		(0.005)	(0.004)
SALES_VOLATILITY	+	-0.007	-0.007
		(0.010)	(0.015)
CFO_VOLATILITY	+	0.286***	0.286***
		(0.054)	(0.110)
OPERATING_CYCLE	+	-0.004	-0.004
		(0.006)	(0.006)
LOSS_PROPORTION	+	0.011*	0.011*
		(0.006)	(0.006)
ZSCORE	-	-0.003***	-0.003***
		(0.001)	(0.001)
TOTAL_ASSETS	-	-0.0003	-0.0003
		(0.002)	(0.002)
LnSEGMENT	+	-0.003	-0.003
		(0.002)	(0.002)
FOREIGN_SALES	+	-0.002	-0.002
		(0.015)	(0.017)
MERGER_ACQ	+	0.001	0.001
		(0.006)	(0.005)
RESTRUCTURINGS	+	0.004	0.004
		(0.006)	(0.008)
GROWTH	+	0.0001	0.0001
		(0.0001)	(0.0001)
INVENTORY	+	-0.0002*	-0.0002
		(0.0001)	(0.0001)
BIG4	-	-0.003	-0.003
		(0.006)	(0.007)
AUDITOR_CHANGE	+	0.001	0.001
		(0.008)	(0.009)
RESTATEMENT	-	0.002	0.002
		(0.009)	(0.008)
INST_OWN	-	-0.00004	-0.00004
		(0.0001)	(0.0001)
LITIGATION	-	0.003	0.003
		(0.005)	(0.006)
Intercept		0.064***	0.064***
		(0.019)	(0.020)
N		628	628
R^2		13.9%	13.9%
adj. R^2		11.4%	11.4%

*p<0.10 **p<0.05 ***p<0.01

Note: All variables are defined in table 3 under section 5.10.

6.4 Summary

The descriptive statistics that were presented confirm what was predicted by prior literature. Moreover, the Pearson's matrix indicates that most of the variables in this study are correlated with each other. The main results of this study show consistent results with prior literature (Doyle et al., 2007; Ashbaugh-Skaife et al., 2007; Ashbaugh-Skaife et al., 2008) and the prediction. Therefore, based on the results above, this study accepts all hypothesis tested. In next section, I will conclude all the results of this study and elaborate the main answer to the research question along with contribution and limitation of this study.

7. CONCLUSION

7.1 Conclusion

The Securities Exchange Commission (SEC) introduced the implementation of SOX 302 and 404 in 2000s due to the number of scandals by U.S. listed companies (Enron & Worldcom). By definition, internal control is "*a process, effected by an entity's board of directors, management, and other personnel, designed to provide reasonable assurance regarding the achievement of objectives relating to operations, reporting, and compliance"* (COSO, 2013). Management of large public firms is responsible to create, maintain and report the effectiveness of the firm's internal control system which reflects the reliability of reported earnings. Under SOX 404, it is mandatory for auditors to attest the assertions of financial reporting published by management. Financial reporting can be measured in many ways. This study specifically measures financial reporting through accrual quality. Therefore, the first hypothesis in this thesis is:

H1: ***Disclosure of internal control material weaknesses under SOX 404 is negatively associated with accrual quality.***

Doyle et al. (2007) find that there is a positive significance between accrual quality and material weaknesses. The results of H1 indicate that firms that are affected by material weaknesses in their internal control systems tend to have lower accrual quality compared to firms with effective internal control. The regression model under H1 shows that a coefficient of *MW*, a dummy variable that takes value of 1 if a firm disclosed material weaknesses, is positive and significant. On average, firms that are affected by at least 1 MW in a particular year have the tendency of decrease in the level of accrual quality by 1.2%. Therefore, I accept the first hypothesis.

Doyle et al. (2007) argue that company-level material weaknesses have stronger negative association with accrual quality than account-specific material weaknesses. Moreover, the relation between weak internal control and poor accrual quality is determined by material weaknesses related to overall company-level controls, which may be "difficult to audit around" (Doyle et al., 2007). Therefore, based on prior literature, the second hypothesis is:

H2: ***Company level material weaknesses have a stronger negative association with accrual quality than account specific material weaknesses.***

The results of H2 indicate that company-level material weaknesses tend to produce lower accrual quality than account-specific material weaknesses. The regression model under H2 shows that the coefficient of MW_Company_Level is positive and significant, whereas the coefficient of MW_Account_Specific is positive but not significant. The results prove that company-level material weaknesses are related to accrual quality more than account-specific material weaknesses. On average, when a firm discloses 1 MW related to company-level MW within a year, accrual quality decreases by 2.0%. Therefore, I accept the second hypothesis.

Ashbaugh-Skaife et al. (2008) find that firms that receive different internal control audit opinions from auditors in successive years show changes in accrual quality. By definition, internal control is a process that will lead to produce reliable financial reporting. Therefore, based on the statements above, the last hypothesis is:

H3: ***Remediation of internal control material weaknesses under SOX 404 within 3 years of the disclosure of material weaknesses is positively associated with accrual quality.***

The results for H3 show that remediation provides better accrual quality. The regression model under H3 shows that the coefficient of MW_FIXED, that firms remediate their internal control problem within three years after the disclosure of MW is positive and significant. On average, when a firm remediates its internal control material weaknesses within three year, accrual quality improves by 0.7%. Therefore, I accept the third hypothesis.

Some of the results of all control variables are consistent with prior literature (Doyle et al., 2007; Ashbaugh-Skaife et al., 2007). In this study, variables that are not significant and consistent with the prediction include the number of segments that firms operate, foreign transactions, M&A activities, Big4 engagement, restatement and firms that are exposed in litigation industry show insignificant relation. Moreover, other factors such as sales growth and inventory turnover show the opposite direction compared to prior literate. Therefore, this study suggests that material weakness firms tend to:

- have higher sales and cash flow volatility;
- have longer operating cycles;
- have more losses;
- have higher financial distress;

- be smaller in size;
- be lower in sales growth and inventory turnover;
- be more likely to change auditors frequently; and
- have more institutional ownership

To conclude this thesis, the research question in this study states that:

RQ: "Does internal control material weakness affect accrual quality?"

Based on the results of this study and the acceptance to all hypothesis, the answer to the research question is a confirmation that internal control material weakness affects accrual quality.

7.2 Limitation

Although this study accepts all hypothesis, there are several limitations that can be used for future studies. The "ICMW" sample (241 firm-year observations) is relatively small. The sample size might not be too representative, and it is hard to generalize to other settings. Therefore, the percentage of R-squared is relatively low. Secondly, the measurement of material weaknesses is measured by using dummy variables equals to 1 if a firm discloses an ineffective internal control opinions, and 0 if otherwise. Thus, it is hard to see the impact on the magnitude of the disclosure of material weaknesses and also hard to see which material weaknesses are remediated in accordance with this study. Thirdly, in the control variable of auditor change, I did not specifically separate whether this is caused by the auditor resigning or being terminated by the client. The auditor's separation due to resignation or termination could lead to better results in relation to the disclosure of material weaknesses. Lastly, due to the availability of the data, the sample period used to test the remediation effect does not capture the third year of remediation after the disclosure of material weaknesses. Overall, these limitations can be assumed to be used for future research.

7.3 Contribution

This master's thesis aims to contribute to the existing literature on the impact of internal controls in relation to earnings quality by explaining the role of internal controls towards the environment of an organization that would impact the accruals quality. Investors may have more information in obtaining assurance of the reliability of the firm's financial reporting. This master's thesis suggests that the accruals quality becomes more reliable and material weaknesses of firms could be

minimized or mitigated when the implementation of internal controls over financial reporting are set properly in accordance to SOX 302 and 404. Moreover, this study contributes to the prior literature on the association between internal controls and accruals quality (Doyle et al., 2007) by focusing three different streams: 1) innate firms' characteristics that might affect earnings quality (Doyle et al., 2007); 2) internal control risk attributes (Doyle et al., 2007; Ashbaugh-Skaife et al., 2007) and 3) proxies for incentives to discover and disclose material weaknesses (Ashbaugh-Skaife et al., 2007). This master's thesis examines the effect on accrual quality for firms that remediate their internal control material weakness problems (Ashbaugh-Skaife et al., 2007) by applying those three different streams that are mentioned above. This master's thesis uses more refined set of proxies and recent sample period after the global recession, since the existing literature base their samples before the recession (2007) and right after the financial scandals (2002). What is important is that this master's thesis provides evidence of the important role of internal controls which firms should invest more on resources in strengthening and maintaining an effective internal control environment. Also, effective internal control can act as an effective corporate governance mechanism.

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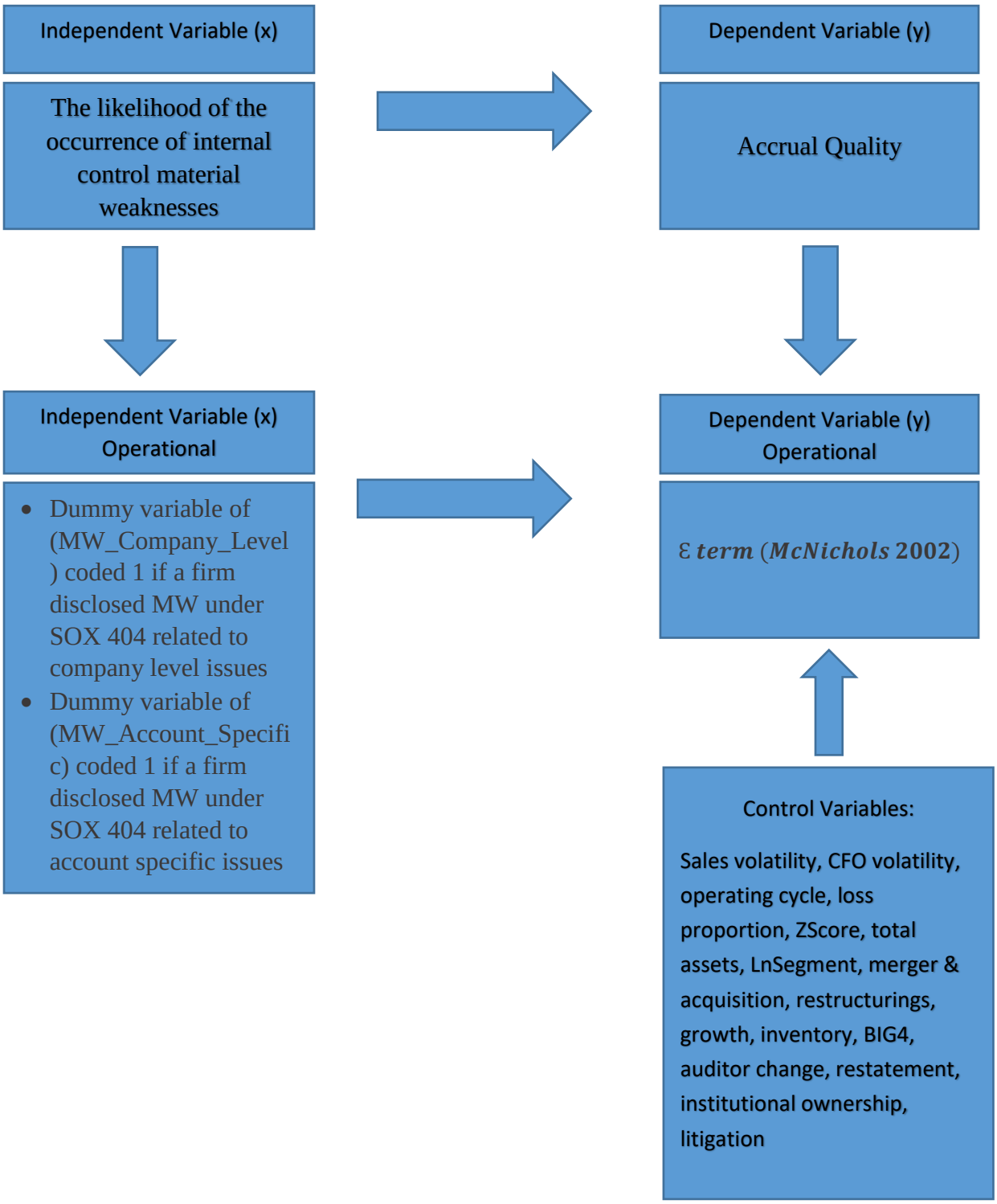
Appendix

Appendix 1: Libby Boxes

Hypothesis 1

Hypothesis 2:



Hypothesis 3: