Real earnings management:

The impact of audit quality and PCAOB

Evidence from NASDAQ and NYSE listed firms

ERASMUS UNIVERSITEIT ROTTERDAM
ERASMUS SCHOOL OF ECONOMICS

Author: Jason Tan

Student number: 376675

Supervisor: R. van der Wal RA

Date: 03-07-2013

Preface

This thesis is my final act as a master-student at the Erasmus University Rotterdam. This thesis began as a paper that I wrote with a co-student regarding audit quality and accrual earnings management. With this paper as a backbone of this thesis I added new ingredients such as real earnings management, SOx and a more thorough investigation of the PCAOB inspections.

I couldn't have write this thesis all by myself and therefore I would like to thank several people who have supported me during the writing process. First, my supervisor R. van der Wal RA. His knowledge and experience were very helpful during the writing process. His comments provided me with new insights how to tackle certain problems and how see certain things. Therefore, I would like to thank him for his helpful comments and support.

I would also like to thank my parents and sister who have helped me in various ways. Their support was essential for me to succeed and therefore I owe them my gratitude. Finally, I would like to thank Mr. Knoops who assisted me during the seminar and the paper that I wrote. His guidance during the seminar has helped me to understand the essence of writing a thesis and therefore I would like to thank him.

Jason Tan

Rotterdam, July 2013

Abstract

This study examines audit quality and the PCAOB in relation with real earnings management and accrual earnings management. In contrast with previous literature (Cohen et al. 2008; Chi et al. 2011; Zang 2012) this research will also discuss the influence of the PCAOB inspections on real earnings management. Due to the passage of the PCAOB inspections in 2004, real earnings management presumably increased. Similar to the PCAOB, the passage of SOx documents an increase in real earnings management (Cohen et al., 2008). The proxies for audit quality are Big N auditors and audit firm tenure. Previous literature such as Becker et al. 1998 reports that Big N auditors are better capable of constraining accrual earnings management. However, an unintended consequence of Big N auditors might be the increase of real earnings management (Chi et al. 2011). Additionally, regulators debate whether audit firm rotation would enhance audit quality. Previous researches focuses on the relation between audit firm tenure and accrual earnings management. In addition this research will provide new insights in the relation between audit firm tenure and real earnings management.

The results indicate that Big N auditors do stimulate real earnings management. Presumably the higher standard that they deliver has an unintended consequence resulting in more real earnings management. In contradiction of prior literature (Johnson et al. 2002; Myers et al. 2003) the results indicate that not short audit firm tenure is related with lower audit quality but long audit firm tenure. The results show that long audit firm tenure has a downward effect on real earnings management, while it has an upward effect on accrual earnings management. Moreover, the results of the PCAOB confirm prior literature (Carcello et al. 2011), as the passage of the PCAOB presumable leads to more real earnings management. The results also support the assumption that the passage of the PCAOB inspections leads to a decline in accrual earnings management. The purpose of the PCAOB was to improve audit quality but a side effect is the increase of real earnings management. It is also evident that the results of the PCAOB are marginal or low, so caution is needed with interpreting the results. This research finds that due to higher audit quality and constrain on accrual earnings management, firms resort to real earnings management.

Table of content

1. Introduction

1.1 Introduction

In recent years the world was shocked by several accounting scandals of among others Adelphia, Enron and WorldCom. This has lead to the establishment of the Sarbanes-Oxley Act in the United States in 2002. The purpose of the act was to restore confidence in the U.S. capital market and to increase the transparency of disclosure for the protection of investors. This increase of scrutiny by regulators should prevent similar accounting scandals in the future. The transparency of disclosure is an important aspect of SOx (section 302 & section 404[1]) as financial statements are the source of information for stakeholders. The information in the financial statements also reflects the inside knowledge of management. Based on their inside knowledge, management can decide on the reporting method, accruals and disclosures that would fit the business economics (Healy and Wahlen, 1999). However, this discretion granted to management provides the possibility to use earnings management by selecting the reporting method, accruals and disclosures that do not accurately and timely reflect the underlying economics of the business (Healy and Wahlen, 1999). With the establishment of SOx, regulators strove for a better quality of information.

A study by Cohen et al. (2008) revealed that accrual-based earnings management declined significantly since the passage of SOx. Suggesting that SOx succeeded in achieving their objective. However, firms continued to manage their earnings by adopting real earnings management. This form of earnings management deals with real activities manipulation, such as cutting in research and development expenditures and postponing investment projects. A reason that managers adopt real earnings management over accrual-based earnings management is the lower probability of drawing auditor or regulatory scrutiny. When it is properly disclosed in the financial statements, real earnings management cannot influence the auditors' opinion or regulators' action (Kim et al. 2010). A recent study by Zang (2012) revealed that both forms of earnings management act as substitutes of each other. Based on the costliness, management decides which method of earnings management to adopt. When the cost of adopting accrual-based earnings management is higher than the cost of real earnings management, it is most likely that management will resort to real earnings management and vice versa. The quality of the audit also influences the level of real earnings management (Chi et al. 2011). When higher quality auditors constrain the ability of the firm to manage accruals, firms will more likely resort to real earnings management.

[1] The purpose of Sections 302 and 404 is to ensure that necessary information is disclosed, initiated, processed, recorded, and reported, and furthermore management has assessed the effectiveness of internal controls regarding the reliability of financial reporting.

As audit quality is one factor that determines whether firms resort to real earnings management, this research will also focus on the Public Company Accounting Oversight Board (PCAOB). With the passage of SOx in 2002 also the PCAOB was established. Despite not being explicitly stated in SOx, the purpose of the PCAOB is to improve audit quality (Gradison and Boster, 2010). This notion is supported by the study of Carcello et al. (2011), stating that audit quality has improved with the establishment of the PCAOB inspections. Since the start of the PCAOB inspections a reduction of accruals have been observed for auditees of Big 4 firms. In light of this finding, this research will also investigate the influence of the PCAOB on real earnings management by looking at the period's pre and post PCAOB inspections.

1.2 Main research question and sub questions

The previous section describes the problem and based on this problem the following main research question is formulated:

"What is the impact of the adoption of the PCAOB inspections and the influence of audit quality on the switch in earnings management method by NASDAQ and NYSE quoted companies?"

The main research question will be supported by the following sub questions:

1. What is earnings management and what are the motives of earnings management?
2. What is the PCAOB?
3. What is the relation between the PCAOB inspections and earnings management?
4. What is audit quality and what are the distinct characteristics of audit quality?
5. How does these characteristics influence earnings management?
6. What is the reason to switch between the two strategies of earnings management?
7. How can the switch in earnings management method be measured?

1.3 Methodology

This research consists of two phases, starting with a literature review. The literature review includes the findings of previous researchers regarding accrual and real earnings management, factors that determine audit quality, and the influence of the PCAOB. The results of the literature review provide a basis for the second phase of this research, which is the empirical research.

The second phase consist of a quantitative analysis. The research period is 1998 till 2011, withholding a time period of 14 years. To test the influence of the establishment of the PCAOB, the sample is split into two parts through the use of dichotomous variables. The PCAOB is established in 2002 but effectively monitored public accounting companies in 2004. Therefore, this research use

control variables that indicate whether the PCAOB is active, which is the pre-PCAOB period starting from 1998 till 2004 and a post-PCAOB period from 2005 till 2011. Furthermore this research will use CRSP/COMPUSTAT merged to obtain the data necessary to come to a conclusion. Finally, the sample consists of 26.777 firm-year observations.

1.4 Relevance

The study by Zang (2012) focuses on the trade-off between real earnings management and accrual earnings management. While Chi et al. (2011) examines the relation between audit quality and real earnings management. Unlike these two studies this research will also discuss the importance of the PCAOB and proxies of audit quality. Starting with the PCAOB it is interesting to investigate the progress of the PCAOB inspections since its establishment in 2004. Unlike the study by Carcello et al. (2011) this research will focus on a broader timeframe starting from the year 2002 till 2012. The study by Carcello et al. is limited to the time period 2004 till 2006. By extending this time period, this research will investigate whether the influence of the PCAOB remained the same compared to that of Carcello et al. taking into account the events that have taken place after 2006 (crisis and etc.). In addition to the Carcello et al. (2011) study, this research will investigate whether there is structural improvement of audit quality or an accidental improvement. Furthermore, to the best of my knowledge the study of Carcello et al. (2011) is the only study that relates the establishment of the PCAOB inspections and audit quality. By relating real earnings management rather than accrual earnings management with PCAOB, this study is to the best of my knowledge the only study that relates the two elements. Finally it is over eight years now since the introduction of the PCAOB inspections. This provides a good moment to evaluate the process.

Additionally, this study provides relevance, in such way that it participates in the ongoing debate regarding mandatory audit firm rotation. It is an item in both the United States and in Europe. In the current situation it is required by the Sarbanes-Oxley Act, that the lead and concurring audit partner rotate off the audit engagement after five years (Arens et al. 2011). However, there are no rules for audit firm rotation. Regulators are debating about audit firm rotation and not solely rotation on audit partners. Proponents of mandatory audit firm rotation argue that longer audit firm tenure might harm the independence of the audit firm and therefore audit quality.

This research is from an academic perspective relevant as it contributes to the existing literature regarding earnings management and the PCAOB. This can be interesting for academics involved in earnings management research and for SEC regulators. For SEC regulators it is interesting as it discusses aspects such as audit firm tenure, which affects audit quality. Regulators could for instance increase regulations to limit the practice of earnings management and increase the level of

audit quality. Furthermore from a societal perspective this research is interesting for investors in such way that investors should be aware that firms might engage in earnings management.

Additionally it provides indicators of both real and accrual earnings management and recommends that investors to be sceptical before investing in firms, which can be achieved through an extensive analysis of the financial statements. Finally this research is interesting for auditors as this research provides indicators of firms applying earnings management and that it discusses indicators of audit quality. To conclude, this research can be interesting for academics, regulators, investors and auditors.

1.5 Limitations

This research has several limitations to cope with. First limitation is the various factors that may influence earnings management in general. This research cannot capture all of these factors, which makes the multivariate regression limited. Due to the inability of this research to capture all factors the multivariate regression cannot predict all of these factors, which is also the second limitation of this research. The third limitation is the sequential nature of accrual earnings management and real earnings management. This research cannot capture the actual switch between accrual and real earnings management. The fourth limitation regards the missing value of advertising expense and R&D expenses. To preserve the power of the sample all missing values of advertising expenses and R&D expenses were replaced with zero following Cohen et al. (2008). The final limitation is the modified Jones model (1991) modified by Dechow et al. (1995) to measure accrual earnings management. This model has been criticized as being weak, as it have difficulty measuring the magnitude of earnings management. To offset this weakness an additional sensitivity analysis performed with Kothari et al. 2005 model. The complete overview of the limitations can be found in section 6.2.

1.6 Structure

The remainder of this research is structured as follow:
Chapter 2 will provide the broad theoretical background of this research and will provide answers for the first four sub questions. This chapter will provide among others the definition of both accrual and real earnings management, audit quality, and the definitions of SOx and the PCAOB. Chapter 2 will act as the stepping-stone to understand the literature as described in chapter 3.

Chapter 2 provided the definitions to understand earnings management and the other topics of this research. Chapter 3 continues with the implementation of these definitions through the review of prior literature. Additionally, chapter 3 will provide a thorough analysis of any differences in findings

between the different studies. Ultimately, the goal of chapter 3 is to provide a theoretical background to formulate the hypotheses of this research, which is discussed in chapter 4.

Based on previous literature several hypotheses are developed in chapter 4. These hypotheses will test the relation regarding real earnings management and the audit quality components including the PCAOB. Moreover, chapter 4 will provide the research design as derived from previous literature. This research will provide answers how to measure real earnings management and accrual earnings management. Finally, chapter 4 will conclude with the sample selection.

Chapter 5 will provide the results of this research. The results are obtained through tests as formulated in chapter 4. The results are explained and elaborated with the use of various tables. Furthermore, results that do not correspond with prior literature are thoroughly analysed.

Chapter 5 delivered the results and the analyses. Based on these results chapter 6 will provide the final conclusion regarding real earnings management and audit quality. Additionally, the limitations of this research are discussed as well. Finally, chapter 6 will conclude with suggestions for the future.

2. Audit quality, earnings management, and PCAOB

2.1 Introduction

This chapter will provide the theoretical background of this research concerning the impact of the PCAOB and audit quality on the switch in earnings management. Furthermore, this chapter will provide answers to the following sub questions: What is earnings management and what are the motives of earnings management? What is the PCAOB? What is audit quality and what are the distinct characteristics of audit quality? First, the theoretical foundation consisting of three different theories will be briefly elaborated. Second, this chapter explains aspects of earnings management, such as motives and methods of earnings management. Third, audit quality and its proxies are discussed. Fourth the implementation of SOx and therewith the passage of the PCAOB are elaborated as well. Finally a brief summary of the sections will be provided at the end of the chapter.

2.2 Theoretical foundation

This section discusses the theoretical framework of this research. First the agency theory is explained. Furthermore the stakeholder theory is explained. Thirdly positive accounting theory of Watts and Zimmerman (1990) is elaborated. Finally, this section will conclude with an analysis.

2.2.1 Behind the theories

The agency theory, stakeholder theory, and the positive accounting theory all have in common that they are related to the main topics of this research, which are audit quality and earnings management. The essence of the agency theory is the divergence/ information asymmetry in the relationship between the principals (stakeholders) and agents (managers). Central in this relationship is the monitoring role of the auditor. The purpose of the auditor is to limit the divergence/information asymmetry between the two parties. However, the level of audit quality determines the capabilities of the auditor. Higher quality auditors are better capable of reducing the divergence/information asymmetry, which this research investigates. But before the influence of audit quality is investigated the origin of the relationship problem between the principal and the agent is explained through the agency theory.

The reason to discuss the stakeholder theory and the positive accounting theory is because of their conflicting relationship. The stakeholder theory describes how managers should act, which is in the best interest of the stakeholders. While the positive accounting theory describes the self-interest of managers and their quest for personal benefits. Subsequently, the positive accounting theory provides background information what possible motivations are to use earnings

management. This conflicting relation between what is good and wrong provides background information regarding the earnings management topic of this research.

2.2.2 Agency Theory

Management may not always be driven to act in the best interest of stakeholders, rather that they are driven by self-interest. However, stakeholders have difficulty of identifying management activities. The agency theory according to Jensen and Meckling (1976) is concerned with this relation between the principal(s) and the agent. The agent acts on the behalf of the principals as the principals delegate some decision-making authority to the agent. At the cornerstone of the agency theory two problems might occur. The first problem concerns the divergence of interest between the principals and the agent. The principals cannot verify whether the agent acts in the best interest of the principals or his own. There is an information asymmetry. This information asymmetry consists of two other problems, namely: moral hazard and adverse selection. Moral hazard describes the problem that an action undertaken by the agent is unobservable and that the moral value of the agent is different compared to that of the principal (Darrough and Stoughton, 1986). Adverse selection problem arises when the agent is not performing conform the expectations of the principal. The abilities necessary of an agent to perform his duty seems to be limited, as the principal has made a misrepresentation of the agent's abilities (Dahlstrom and Ingram, 2003). The second problem is the different attitude towards risk. Principals and agents might prefer different actions because of their different attitude towards risk tolerance.

To mitigate these problems, principals might establish appropriate incentives to limit the divergence and opportunistic actions by the agent. However, incentives might have an adverse effect on the behaviour of the manager. Compensation associated with the performance of the firm might lead to an incentive to manipulate earnings by the agent. To limit the divergence, principals can establish monitoring systems. Jensen and Meckling (1976) mentioned that audit is one type of monitoring activity that might increase the value of the firm and another type is the board of directors as the main monitoring system. In relation to this research it is the monitoring by external parties (auditors) that are important. The monitoring system provide an ex post control system (Jensen et al. 1976). When principals are able to obtain information more effectively about the activity of the agent, the more likely that the manager acts in the best interest of the stakeholders, thus fewer resources are needed to reduce the divergence through incentives (Eisenhardt 1989). Through an audit principals can effectively obtain information regarding the activity of management. The better the quality of the auditor the more likely that agency costs are reduced, as management have less accounting flexibility to benefit from opportunistic discretionary accruals. An audit can reduce the level of information asymmetry by providing reasonable assurance that the financial

statements are free from material misstatements and omissions (Arens et al. 2011). With an audit the interests of the stakeholders and potential stakeholders can be protected. However the monitoring system vary with the quality of the audit. The quality of the audit determines the extent to which the audit can detect material misstatements and omissions and therefore reduce the information asymmetry. A higher level of audit quality leads to a better detection of material misstatements and omissions.

2.2.3 Stakeholder theory

The stakeholder theory concerns the perception of both managers and stakeholders in how they view the purpose of the organization and how to they should act based on ethical principals (Friedman 2006). The relation between the managers and stakeholders should be more than just about maximising profit it would be more valuable when it is based on moral commitments. Stakeholders include stockholders, creditors, managers, employees, customers, suppliers, communities and the general public. There is the existence of an exchange relationship between the firm and the stakeholders. Stakeholders contribute with resources and in return they expect their interests to be compensated. Freeman (2004) defines stakeholders as "those groups who are vital to the survival and success of the corporation". For example creditors provide loans to the firm and in return they expect the firm to repay the loan in accordance to the arrangement. Managers and employees provide their knowledge and commitment and in exchange they expect fair income. Important in the stakeholder theory is the role of the manager. According to Evan and Freeman (1990) managers should act in the best interest of the firm and ensure the survival of the firm. Furthermore it is also the responsibility of the manager to align the goals and interest between the firm and the stakeholders to strengthen the business. The decisions the manager make for the firm are for the best interest of both the firm and the stakeholders, and are based on ethical grounds. However, it is important to consider that managers may not always act in the best interest of the stakeholder. They may act in their own interest like maximising the value of the firm because their compensation plan is tied to the value of the firm. This phenomenon will be explained by the positive accounting theory of Watts and Zimmerman (1990)

2.2.4 Positive accounting theory

The positive accounting theory by Watts and Zimmerman (1990) describes the behaviour and interest of managers under certain conditions. The purpose of the positive accounting theory is to explain and predict why managers choose to adopt a particular accounting method. Central in the positive accounting theory is the assumption of self-interest. It is assumed that managers are mainly interested in maximizing their own utility through the use of accounting rules. In order to maximize

their own utility management strive to report a positive view of the firm's performance. Showing a negative performance would lead to a disinterest by investors and stakeholders. It is in the interest of management to report positive profits. Watts and Zimmerman (1978) have developed three hypotheses that explain the behaviour of management and the use of reporting method under different circumstances.

Bonus plan hypothesis

According to the bonus plan hypothesis, managers of firms with bonus plans are more likely to adopt accounting methods that would increase the current reported income. By shifting the reported income to the current period management receives the bonus earlier than it originally should have. However when the bonus plan has reached its limit it is assumed that management have the incentive to shift the earnings of that year to the next year, which leads to a bonus increase in the subsequent year. But if the firm has made a loss or not reach its target, management might have the incentive to take a big bath. Taking a Big bath is a situation whereby firms take a one-time overstatement of charges to reduce their earnings when present earnings are lower than expected. Subsequently future earnings might increases and thus future compensation plans.

Debt/equity hypothesis

The debt/equity hypothesis predicts that management in all probability would adopt an accounting method that would increase the current reported income when the debt to equity ratio is high. The debt to equity ratio indicates the relative portion of debt to finance an entity's assets. It also presents the ability of a firm to borrow additional capital. Generally investors and lenders are less willing to finance firms with a high debt-to-equity ratio and thus management would prefer to adopt an accounting method that would maximize the reported income.

Political cost hypothesis

The political cost hypothesis explains that larger firms are more likely to adopt accounting methods that would reduce the reported income. The reason behind this choice is to prevent political attention and thus political costs. A general perception is that larger firms generate more political attention and high profits can possibly lead to adverse political actions by society. For this reason the political cost hypothesis explains that management will most likely adopt accounting methods that would reduce the reported income.

The tree hypotheses provide insight in how managers act under different circumstances. Management of larger firms act differently than management of smaller firms. Larger firms have the

tendency to reduce the reported income to prevent political costs. However bonus plans might be an incentive for management to choose for accounting methods that can increase the current reported income, which in turn would increase their bonus. These hypotheses explain the reason behind the choices of management and why they choose specific accounting methods.

2.2.5 Analysis of the theoretical foundation

Three theories have been elaborated, namely: the agency theory the stakeholder theory, and the positive accounting theory. Compared to the stakeholder theory of Evan and Freedman (1990) the positive accounting theory of Watts and Zimmerman (1990) describes that management is mainly interested in maximizing their own utility, pointing out the self-interest of management. While according to the stakeholder theory, management should act in the best interest of the firm and ensure the survival of the firm. The decisions that they take should be beneficial for the firm and for its stakeholders. Thus, the two theories differ from each other in the actions of management. At one side it describes how management *should* act (stakeholder theory) and *how* it is presumed to act (positive accounting theory). In addition, the agency theory explains the difficulty for stakeholders to monitor the actions of management. Stakeholders want management to act conform the stakeholder theory of Evan and Freedman, however it is possible that they practice earnings management to satisfy their own needs, which is conform the positive accounting theory. To mitigate the information asymmetry between stakeholders and management, audits can be performed to provide additional assurance that financial statements are free of misstatements and omissions.

2.3 Earnings management

This section will explain several aspects of earnings management. First the definition of earnings management is explained. Secondly, the motives for management to practice earnings management are elaborated. Finally the two forms of earnings management will be explained.

2.3.1 Definition of earnings management

As stated earlier from the perspective of the stakeholder theory, the main objective of the firm is to maximize stakeholder value. The value of the firm is determined through expected positive future firm performance, which is based on earnings. To enhance the value of the firm it is in the best interest of the firm to report positive earnings and positive (steady) growth. However, it is difficult for a firm to meet the expectations of positive growth. Fearing a decline in firm value, firms might engage in earnings management and manipulate the earnings to meet the expectations. In prior

literature earnings management is defined in various ways. According to Healy and Wahlen (1999) earnings management *"occurs when managers use judgement in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers."* Ronen and Yaari (2008) describe the definition of Healy and Wahlen as the practice of using tricks to misrepresent or reduce transparency of the financial reports. However, Ronen and Yaari (2008) argue that there are two weaknesses to the definition of Healy and Wahlen (1999). The first weakness of the definition is that there is no clear boundary between earnings management and normal activities with earnings as result. Second, earnings management is not always misleading. Firms do not always manage earnings to manipulate investors but perhaps to enhance the informational value of the earnings (Ronen and Yaari, 2008). Additionally, Ronen and Yaari (2008) categorized different definitions of earnings management in three different colours, namely: white, gray, and black. These colours represent different forms of earnings management. White (beneficial) earnings management serves the transparency of financial reports by enhancing transparency. The manipulation of reports within the boundaries is gray earnings management, which could be opportunistic or efficient. Finally, black (pernicious) earnings management represents fraud and intended misrepresentations with purpose to deceive stakeholders. Ronen and Yaari (2008) p.25 formulated the following definitions for each colour:

"White" earnings management
"Earnings management is taking advantage of the flexibility in the choice of accounting treatment to signal the manager's private information on future cash flows."

"Gray" earnings management
"Earnings management is choosing an accounting treatment that is either opportunistic (maximizing the utility of management only) or economically efficient."

"Black" earnings management
"Earnings management is the practice of using tricks to misrepresent or reduce transparency of the financial reports."

Based on these three categories of earnings management and the weaknesses in the definition of Healy and Wahlen (1999), Ronen and Yaari (2008) formulated a three-step definition/measure of earnings management. The first measures the short-term truth of earnings as known to management: *"earnings management is a collection of managerial decisions that result in not*

reporting the true short-term, value-maximizing earnings as known to management." The second measure of their definition describes the subjective value that is attached to earnings management, which is the following description: *"earnings management can be: beneficial (it signals long-term value), pernicious (it conceals short- or long-term value), and neutral (it reveals the short-true performance)."* Finally the last step of their definitions describes how earnings management is achieved. *"The managed earnings result from taking production/investment actions before earnings are realized, or making accounting choices that affect the earnings numbers and their interpretation after the true earnings are realized."* (Ronen and Yaari, 2008 p. 27)

2.3.2 Motives to engage in earnings management

The motivation of management to practice earnings management lies with the extensive use of financial reporting by both internal and external stakeholders. Furthermore, Xie et al. (2003) report that earnings management is primarily driven by self-interest. Compensation plans tied to the firm performance is a motive but also aspects such as prestige, future promotions, and job security are motives to enhance the presentation of firm's performance. In conformity with the study of Xie et al. (2003), Palepu et al. (2010) report that management most likely manipulates earnings upwards as their compensation and job security is tied to the reported profits. Additionally, Healy and Wahlen (1999) report three motives behind earnings management.

Capital Market Motivations

Capital market motivation is about achieving or surpassing the expectation of financial analyst and investors. This could motivate management to influence the value of the stock in their advantage by managing their earnings upwards. Healy and Wahlen (1999) report that prior to initial public offerings and stock-financed acquisitions, management practice earnings management using income-increasing unexpected accruals. This would increase the expectations of investors regarding future firm performance and therefore the attractiveness of the firm. Thus, the capital market motivation explains that management exploits information asymmetries between managers and external stakeholders to influence the stock prices of the firm.

Contracting motivations

Healy and Wahlen (1999) report that accounting information is used to monitor and regulate the contracts between the firms and the stakeholder. Through these contracts the incentives of management and the external stakeholder are aligned, however it also provides incentives for management to practice earnings management. Management strive towards achieving the goals set in the contracts. In conformity with the positive accounting theory of Watts and Zimmerman (1990),

management adopts accounting methods that would maximize their own interest. When the bonus plan is contractual and tied to the reported income, this is an incentive for management to manipulate the earnings. Similar to the bonus plan hypothesis as discussed earlier, this would be an incentive for management to either record the reported income earlier or later.

Regulatory motivations

Healy and Wahlen (1999) distinguish within regulatory motivations: the industry regulations and anti-trust or other regulations. According to Healy and Wahlen (1999) every industry has its own regulations, which are explicitly tied to accounting data. Banks regulations for instance require banks to have adequate capital. Insurance regulations require insurers to meet certain minimum financial health standard. According Healy and Wahlen (1999) these regulations are incentives for management to practice earnings management. Beside industry regulation the Anti-trust or other regulations provide incentives for management to manipulate earnings. In conformity with the political cost hypothesis, management might have the incentive to reduce the reported profit. According to Healy and Wahlen (1999) this can be the case with firms applying for government subsidy or protection.

Beside motivations provided by Healy and Wahlen (1999) other studies report other motivations for earnings management. Dechow et al. (2003) suggest that managers are motivated by small loss avoidance. Management will use their discretionary power to avoid a small loss and report a small profit instead. The study by Baralexis (2004) suggest that larger firms have a preference to manage their earnings upwards in order to gain better access on the capital market. Furthermore, Baralexis (2004) suggests that smaller firms have a preference to manage their earnings downwards to reduce their income tax. Thus, there are several motives for management to practice earnings management depending on the circumstances. The underlying problem of earnings management is the information asymmetry that exists between management and the external stakeholders. In combination with the discretionary capabilities that management has, this information asymmetry promotes the practice of earnings management.

2.3.3 Strategies of earnings management

To misrepresent or reduce the transparency of the financial reports managers might manipulate earnings. There are different methods for manipulating earnings. This research focuses on two particular strategies, namely: accrual earnings management and real earnings management.
First, since managers use their discretion to estimate the accruals, they have the possibility to alter the level of accruals. Healy and Wahlen referred this as the use of judgement in financial reporting,

which could lead to alterations and misrepresentations. This form of earnings management is called accrual-based earnings management. Second, managers can deviate from their regular business practices, like deviating from normal levels of discretionary expenditures. Through this deviation firms can manipulate reported income. This form of earnings management is defined as real earnings management. However there are several other methods for manipulating earnings, which Arthur Levitt (1998) described in its paper "the numbers game".

1. Big bath charges

Big bath charges is a situation whereby firms take a one-time overstatement of charges to reduce their earnings when earnings are lower than expected (Sevin and Schroeder, 2005). In a bad situation the stakeholders would not a see an extra loss as insurmountable, since the situation is already bad. Levitt (1998) referred this as 'cleaning-up' the balance sheet. With big bath charges, management intends to recognize all losses in the present period and the revenues that are realized in the present period are transferred to the subsequent year. This one-time loss will not be qualified as important by investors, as they focus on the future earnings (Sevin and Schroeder, 2005; Schepers et al. 2007).

2. Creative acquisition accounting

Levitt (1998) referred this method as "merger magic". As part of mergers and acquisitions, firms acquire other firms using stock as acquisition currency. Mergers can take place according two methods: pooling or purchase accounting. However, in most cases companies have no choice than to adopt purchase accounting, which consequently can result in a decline of future earnings. The magic that Levitt refers to is the classification of the acquisition price as in-process research and development. This enable firms to write it off in a one-time charge, which remove future obligations (Levitt, 1998).

3. Cookie jar reserves

With this method firms stashes the earnings during the good years in cookie jar reserves in order reach for them during the bad years. This consequently will level out the earnings, which is income smoothing. Management stashes the accruals, such as overstating sales returns or warranty costs in good times and use it to reduce similar charges in bad times (Levitt, 1998; Sevin and Schroeder, 2005).

4. Abusing the materiality concept

This method concerns either the deliberate recording of errors in the financial statements within a defined percentage ceiling or ignores mistakes in the financial statements (Levitt, 1998; Sevin and Schroeder, 2005). Materiality is a concept that concerns the flexibility of financial reporting, which according to Levitt (1998) is misused by firms under the assumption that the effect/impact of the mistakes in the financial statement is not significant. As the impact of the mistakes on the financial statements is not significant, managers argue that these errors are immaterial (Levitt, 1998).

5. Improper revenue recognition

This method concerns the boost of earnings through the recognition of revenues. For instance, companies can manipulate the timing of the revenue recognition. Ronen and Yaari (2008) describes several categories of revenue manipulation:

- *Recording contingent sales with right of return of sales*: according to the recognition principle, revenues are only recognized when all risks are passed on the buyer. This makes the recording of contingent sales a violation of this principle.
- *Channel stuffing*: to boost the revenues, firm offers exorbitant discounts to their customers in order to persuade them to make early purchases.
- *Bill-and-hold transactions*: are virtual transactions, whereby the bill of the sale is recorded but the actual product is still in the property of the seller, and the buyer is not expected to pay for it.
- *Violating quarter cut-offs*: concerns the recognition of earnings in advance, rather than the quarter where they are actually earned.

These are methods of earnings management but there are two overarching earnings management strategies, as was explained earlier: accrual earnings management and real earnings management. First, accrual earnings management is elaborated.

Accrual-based earnings management

Accruals are part of accrual accounting and are one of the features in corporate reporting. One important reason to adopt accrual accounting is to solve the information asymmetry. The firm possesses more information than the Stakeholders. Stakeholders demand for periodic information, while the economic transactions are continuous (Palepu et al. 2010). For this reason closing the books at the end of a reporting period is arbitrary and therefore using realized cash flows is not informative for the investors. To solve this problem, accrual accounting is adopted. Instead of using actual figures, accrual accounting uses expectations of management. For example the expected cash receipts and payments are used to calculate net profit rather than the actual cash receipts and

payments. Another example of accruals in accounting is revenue recognition. However this leads to another problem, as managers have discretion over these accruals. Management can use this discretion to either reflect inside information or exploit it for their personal benefit. Despite the use of accrual accounting, information asymmetry still exist. According to Dechow and Dichev (2002) stakeholders cannot distinguish whether management made honest estimation errors or opportunistic use of accruals.

Relation in methods

Methods like big bath charges, cookie jar reserves, and improper revenue recognition are influenced by accruals. It was discussed earlier that the purpose of accruals is for the timely recognition of both gains and losses. However, like the positive accounting theory pointed out, managers are mainly driven by self-interest. Within GAAP-based accrual accounting managers are given the responsibility to estimate and record obligations that are due in the future, which are the results of transactions that have taken place in the current fiscal year. However, estimations cannot be certain, as the future is unpredictable and therefore there is no right answer. This estimation process provides managers the opportunity to engage in earnings management.

With cookie jar reserves, management make higher estimates of possible expenses, which would increase the recorded expenses in the current year. By estimating and thus recording more expenses in the current year, future periods may face fewer expenses. This would create cookie jar reserves, which they can reach in later to boost their earnings. When future expenses are higher than expected the cookie jar reserves are empty, however when the future expenses are lower than estimated, the accrual of the previous period can boost the earnings.

Similar to the cookie jar reserves accruals play an important role in big bath charges. Central in big bath charges is the notion that it is better to report all bad news at once and get rid of it now, rather than later. Charges are mainly based on estimates, whereby managers prefer to estimate higher losses in the current period to prevent earnings surprises.

With the big impact that revenue has on the bottom-line, managers have incentives to manage revenues. Under accrual accounting, a firm recognize revenue when it has performed all, or a substantial portion of, the services to be provided (Roychowdhury, 2004). However, Levitt (1998) report that firms use improper revenue recognition to manage their earnings with the use of accruals. By recognizing them in advance for instance firms can boost their earnings prematurely. This means that firms borrow earnings from the future. This is the opposite of the cookie jar reserves, which postpone earnings to the future.

These methods of earnings management is tightly related to accrual earnings management, whereby managers can either borrow earnings from the future or postpone earnings to the future.

Real earnings management

In a survey of 400 U.S. corporate executives, Graham et al. (2005) found evidence that managers are willing to manipulate real business activities to manage reported earnings. According to this survey 80% of the surveyed executives are willing to cut discretionary expenditures on R&D and advertising to meet their earnings target. The definition of real activities manipulation according to Roychowdhury (2006) is the deviation from normal business practices. However a disadvantage of real activities manipulation is that it may negatively affect the economic performance of the firm on the long term. A study by Xu et al. (2007) elaborates that these deviations can be managed through various operating, investing and financing activities. Similar to this notion Zang (2012) formulates that *"real activities manipulation is a purposeful action to alter reported earnings in a particular direction, which is achieved by changing the timing or structuring of an operation, investment, or financing transaction, and which as suboptimal business consequences."*

Real activities manipulation by deviations from operating and investing activities are altering the levels of discretionary expenditures such as R&D and selling, general and administrative (SGA) expenses (Roychowdhury, 2006). Through the reduction of discretionary expenditures, firms can present an increase in earnings, as the reduction of discretionary expenditure decreases the expenses. Moreover, the reduction in expenses can affect the cash flow of the firm when the expenses are paid in cash. A reduction of expenses leads to a reduction in cash out flow, which subsequently have a positive effect on abnormal cash flow in the current period. Nevertheless, this might negatively affect the cash flows in the future (Roychowdhury, 2006).

Additionally, firms can meet analyst forecast through overproduction and prices discounts in order to reduce the costs of goods sold (Roychowdhury, 2006). Through overproduction firms can spread the fixed overhead costs to the large production per unit, which subsequently leads to lower per unit fixed production costs. This would lead to a lower cost of goods sold. However, due to the overproduction firms might incur additional holding costs and therefore cash flows from operations are lower than the normal sales levels (Roychowdhury, 2006).

Firms can also present excessive price discounts or lenient credit terms to persuade more customers, which in turn can boost the sales volumes. By introducing price discounts firms can accelerate their sales from the next year to the current year. However, it is expected that the increase in sales volume is incidental and will return to normal when the original prices are re-enacted (Roychowdhury, 2006). The price discounts will boost total earnings in the current period but it will also lead to lower margins. This would subsequently lead to a situation where production costs relatively to sales will be abnormally high (Roychowdhury, 2006).

Beside deviations in short-term assets, firms can manage earnings through the sale of long-term assets when they are sold with a gain. Finally by acquiring businesses and enter lease agreements the firm can increase reported earnings and improve leverage ratios (Xu et al. 2007).

Moreover the firm can engage real activities manipulation through financing activities. An example of a deviation in financing activities is stock repurchases. With stock repurchases the number of common shares outstanding are reduced, which would increase the earnings per share. Also financial instruments are used to hedge against fluctuations in interest rates and exchange rates, which would influence the volatility of the firms' operating cash flow. By hedging through the use of financial instruments the firm can protect themselves from earnings decreases. There are various forms of real activities manipulation that management can adopt and which will be explained through out this research.

2.4 Audit quality

This section provides the definition of audit quality and aspects such as independence and auditor size and audit firm tenure are elaborated.

Prior literature (Becker et al. 1998; Francis et al. 1999) often refers to the definition of DeAngelo (1981) to define audit quality. She defines audit quality as "the market-assessed joint probability that a given auditor will both (1) discover a breach in the client's accounting system, and (2) report the breach." Within the definition of DeAngelo two factors are important: auditor competence and auditor independence. Auditor competence is the ability of the auditor to discover the breach and auditor independence is the willingness to report the breach. In the course of years several definitions were added to define audit quality, like DeAngelo most of these definitions highlights the importance of competence and independence. However, Arens et al. (2011) made a remark that competence is of little value when the auditor is biased in the accumulation and evaluation of evidence. Suggesting that competence can only be of value when the auditor is independent. Auditor independence can be categorized in: independence in fact and independence in appearance (Arens et al. 2011). For the quality of the audit, independence in fact is crucial, as it is the state of mind of the auditor. When the auditor is not independent in mind, the quality of the audit cannot be guaranteed, as accumulated evidence might be compromised. Independent in appearance is how stakeholders judge and perceive the independence of the auditor is therefore essential for the credibility of the financial statements that were audited. Since audit quality is unobservable it is necessary to approximate it with a valid proxy. Often used in prior literature is auditor size. DeAngelo (1981) found a relationship between auditor size and audit quality. DeAngelo explains that a bigger audit firm has more to lose than a smaller firm, for that reason they are not willing to obey because

of client pressure. Many other studies (Becker et al. 1998; Francis et al. 1999) followed DeAngelo and use auditor size as a proxy for audit quality, however other proxies are also available to approximate audit quality. Proxies like auditor size, and audit firm tenure are examples of audit quality. Next, elaborations for these proxies are given.

Auditor size

For this research auditor size is used as a proxy because previous literature (DeAngelo, 1981; Becker et al. 1998; Chi et al. 2011) recognizes that Big N auditors provide higher quality auditing services and greater credibility over financial reporting than non-Big N auditors. The findings of these studies (Becker et al. 1998; Francis et al. 1999) suggest that Big N auditors constrain accrual earnings management. On the other side evidence is found that it also encourage greater levels of real earnings management (Chi et al. 2011). It would be interesting to investigate the influence of auditor size on real earnings management.

Audit firm tenure

Audit firm tenure is used to find evidence that might support the notion that mandatory audit firm rotation reduces real earnings management. There is ongoing debate regarding audit firm tenure and its influence on audit quality (PCAOB, 2011). Prior literature (Johnson et al. 2002; Myers et al. 2003; Davis et al. 2009) finds mixed evidence regarding audit firm tenure and its relation with accrual earnings management. This research attempts to find evidence regarding audit firm tenure and real earnings management.

2.5 Public Accounting Oversight Board

This section will explain the relation between the Sarbanes-Oxley Act and the Public Company Accounting Oversight Board. First the Sarbanes-Oxley Act is explained and finally the Public Company Oversight Board.

Introducing the Sarbanes-Oxley Act

The Public Accounting Oversight Board (PCAOB) is an essential part of the Sarbanes Oxley Act (SOx) and for this reason SOx is elaborated first. Before the establishment of SOx in 2002 the world was shocked by corporate scandals of among others Enron and WorldCom. In the case of Enron their auditors; Arthur Anderson was also involved in the scandal. Because of these scandals the U.S. business environment was viewed as unreliable and uncertain. Furthermore the scandals have lead to a lack of confidence in the financial disclosures (Wang et al. 2010). To counter the fallen confidence of stakeholders U.S. Congress passed the Sarbanes-Oxley act. The purpose of SOx was to

improve the quality and quantity of information provided to the public, with the intention to restore the confidence of the public in the financial markets (Chang et al. 2009). Additionally, SOx emphasizes corporate governance making board members more accountable, changing the relationships between the boards and CEOs. With the introduction of SOx, audit committees are required to be independent and the members' financial literate. Also certain non-audit services were prohibited to clients to prevent possible impairment of the independence. To monitor the quality of the audits provided by public accounting companies, SOx created the Public Company Accounting Oversight Board (Wang et al. 2010).

Public Accounting Oversight Board

SOx established the PCAOB based on concerns that self-regulation is not sufficient and adequate, as the accounting practice have failed to protect investors from poor quality audits (Hillary & Lennox, 2005). The mission of the PCAOB is: "to oversee the audit of public companies that are subject to the securities laws…in order to protect the interest in the preparation of informative, accurate, and independent audit reports for U.S. issuers" (SOx section 101a). Prior to the establishment of the PCAOB, accounting firms were subdue to the self-regulation programme of the American Institute of Certified Public Accountants, the AICPA peer review. Nonetheless, this peer review programme was criticized as having a lack of objectivity. "You scratch my back, I'll scratch yours" was the view of the peer review program (Lennox & Pittman, 2010), as accounting firms could select their own reviewer (firm). With the establishment of the PCAOB the reviewer became independent and thus objective. With respect to the peer review programme, the PCAOB select the inspectors to inspect the audit firms, instead of the audit firms selecting the inspectors. However, remarks were made regarding the competence of the inspectors. According to Palmrose (2005) a trade-off was made between expertise and independence and therefore raised questions whether the inspectors were capable of assessing the quality of the audit firms. The problem lies with the current knowledge of the inspectors. The inspectors are not tied to any accounting firm and therefore unaware of new developments on the market. Nevertheless it is expected that the establishment of the PCAOB have lead to an improvement of the monitoring of public accounting companies.

2.6 Summary

This chapter discusses the theoretical foundation of this research and will provide answers to several sub questions. First the chapter starts with discussing theories that related with the main topics of this research, which are audit quality and earnings management. The agency theory explains the divergence of interest between management (agents) and stakeholders (principals). This divergence of interest caused by an information asymmetry and different attitude towards risk are described in the agency theory. Furthermore two conflicting theories are elaborated. The stakeholder theory suggest that the relation between managers and stakeholders should be more than just about maximising profit it would be more valuable when it is based on moral commitments. According to Evan and Freeman (1990) managers should act in the best interest of the firm and ensure the survival of the firm. Furthermore it is also the responsibility of the manager to align the goals and interest between the firm and the stakeholders to strengthen the business. However the positive accounting theory of Watts and Zimmerman describes that managers are mainly interested in maximizing their own utility through the use of accounting rules. Managers would prefer to report positive information in order to benefit from it.

Second, this chapter provides the answer on the sub question: *what is earnings management and what are the motives of earnings management?* Healy and Wahlen (1999) formulated a generally accepted definition of earnings management. Earnings management *"occurs when managers use judgement in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers" (Healy and Wahlen, 1999).* There are a variety of motives to practice earnings management but it depends on the circumstances in which management operates. Healy and Wahlen (1999) report three motives behind earnings management, which are: capital market motivations, contracting motivations, and regulatory motivations. Furthermore there are two overarching strategies of earnings management: accrual earnings management and real earnings management.

Third, this chapter provide answer to the sub question: *what is audit quality and what are the distinct characteristics of audit quality?* The general definition of audit quality is "the market-assessed joint probability that a given auditor will both discover a breach in the client's accounting system, and report the breach" (DeAngelo, 1981). Derived from this definition are independence and competence, which are key components of audit quality. Examples of proxies for audit quality are also elaborated, for this research both auditor size and audit firm tenure are used as proxies for audit quality.

Finally, this chapter will answer the question regarding the purpose of the PCAOB. The mission of the PCAOB is: "to oversee the audit of public companies that are subject to the securities

laws…in order to protect the interest in the preparation of informative, accurate, and independent audit reports for U.S. issuers" (SOx section 101a).

The next chapter will discuss previous literature regarding the main topics of this research. It will report the findings of literature concerning audit quality subdivided in auditor size and audit firm tenure, the relation of the PCAOB inspection process and earnings management, and finally the literature regarding the switch between the two strategies.

3. Literature review

3.1 Introduction

This chapter will discuss the findings of prior empirical researches on the relation between audit quality and the switch between accrual earnings management and real earnings management. Also empirical research regarding the PCAOB will be discussed as well. This chapter will provide the foundation for the hypotheses formulated in the next chapter. This chapter will provide answers to the following sub questions: What is the relation between the PCAOB inspections and earnings management? And how does audit quality influence earnings management? First, the chapter discusses the proxies of audit quality and its relation with accrual earnings management, respectively auditor size and audit firm tenure. Second, the relation between the PCAOB and audit quality in prior research is discussed. Third, empirical researches regarding the switch between accrual earnings management and real earnings management are elaborated as well. Finally a brief summary of the sections is given.

3.2 Audit quality and Earnings management

This section will present the literature review of studies that investigated the relation between audit quality and earnings management. Audit quality is not directly observable and thus proxies are needed. For this research auditor size and audit firm tenure are used as a proxy to measure audit quality and its relation with earnings management. This section consists of several studies categorized in each proxy.

3.2.1 Auditor size

Becker et al. (1998) investigate the relation between audit quality and earnings management. To investigate this relation, the researchers use U.S. listed firms of the period 1989 -1992. They assume that Big Six auditors are of higher quality than non-Big Six auditors. The researchers assume that Big Six auditors are better capable of constraining earnings management. To measure audit quality Becker et al. (1998) uses the dichotomous variables: Big Six and non-Big Six auditors. Moreover, earnings management is measured by discretionary accruals. Becker et al. (1998) find that clients of non-Big Six auditors report 1.5% - 2.1% higher discretionary accruals (based on assets) compared to clients of Big Six auditors. This finding suggests that Big Six auditors are of higher quality than non-Big Six auditors and therefore are better capable of constraining earnings management.

Francis et al. (1999) investigate the relation between hiring Big Six auditors and the tendency to generate accruals. The researchers assume that firms with a greater propensity to generate

accruals are more likely to hire Big Six auditors. Subsequently, they also assume that clients of Big Six auditors have smaller discretionary accruals compared to clients of non-Big Six auditors. The researchers argue that firms with the tendency to generate accruals more likely hire Big Six auditors based on the assumption that Big Six auditor provide more credibility and reliability over financial reporting, which increases the confidence of the stakeholders and investors. The researchers use a sample of NASDAQ firms over the period 1975 -1994. Francis et al. (1999) find that firms audited by Big Six auditors have higher levels of total accruals nevertheless they also report lower amounts of estimated discretionary accruals than firms of non-Big 4 auditors. Likewise, Francis et al. (1999) find that firms audited by Big 4 auditors have lower amounts of estimated discretionary accruals than firms of non-Big 4 auditors. Suggesting that Big 4 auditors are better capable of constraining aggressive and opportunistic reporting of accruals.

The research by Leuz et al. (2003) finds that earnings management behaviour is different depending on the legal and institutional characteristics of a country. For this reason mainly U.S. sample studies are being reviewed for this research. Though it is interesting to capture earnings management behaviour of non-U.S. samples as well. The research of Chen et al. (2005) investigates the relation between audit quality and earnings management of firms prior to their initial public offering. The sample consists of Taiwanese firms over the period 1999 - 2002. To measure earnings management the researchers uses unexpected accruals. Furthermore, auditor size (Big Five vs. non-Big Five) and industry specialist are used to measure audit quality. They find that Big Five auditors are constraining the incentives of management to practice earnings management. Therefore, firms audited by Big Five auditors have lower unexpected accruals and provide more accurate information. Moreover, audit quality also reduces the information asymmetry between investors and management, which might be crucial prior to an initial public offering.

The research of Van Tendeloo and Vanstraelen (2008) indicate that firms audited by Big 4 auditors engage less in earnings management, though they underline the importance of a strong legal environment. For this research they use a sample consisting of private companies in European countries. The researchers hypothesize that Big Four auditors have an incentive to provide higher quality auditing services (which constrains earnings management), only in high tax alignment countries where financial statements are more scrutinized by tax authorities, which in turn increases the probability of audit failure being detected. The researchers find that private firms audited by Big Four auditors engage less in earnings management compared to firms audited by non-Big Four auditors. Nevertheless, they also find that this only occurs in high tax enforcements countries. Finally, Van Tendeloo and Vanstraelen (2008) find firms are less willing to engage in earnings management when they operate in countries with strong legal enforcements.

3.2.1.1 Explanation and analysis

These studies (Becker et al. 1998; Francis et al. 1999; Chen et al. 2005; Van Tendeloo and Vanstraelen 2008) all find that Big Four auditors provide higher quality auditing services and greater credibility over financial reporting than smaller audit firms. According to DeAngelo (1981) larger audit firms have more valuable reputations. Reputation loss has more adverse effects (fewer clients and lower fees) on larger audit firms than smaller audit firms. Also larger audit firms work with larger (high-profile) clients, which bring more audit risk in comparison with smaller clients. For these reasons DeAngelo (1981) argues that larger audit firms have more incentives to protect their valuable reputations. Also larger audit firms are more independent, as they have a larger client base. This will diminish the financial dependence on a single client and thus increases the independence (DeAngelo, 1981). Even in the event of having a large client, auditors prefer the protection of their reputation rather than being lenient and favourable (Reynolds and Francis, 2001). Another explanation is given by the deep pocket hypothesis of Dye (1993) that explains that larger audit firms are more accurate since they have more wealth at risk from litigation. While DeAngelo (1981) argue that reputation loss is an incentive, Dye (1993) argues that wealth at risk is the main incentive. Lennox (1999) investigated both the reputation hypothesis and the deep pocket hypothesis. Lennox (1999) finds that the threat of litigation is the main driver of accurate reports rather than the fear of reputation loss. Nonetheless, reputation as incentive to deliver quality auditing should not be neglected.

3.2.2 Audit firm tenure

Prior studies (Johnson et al., 2002; Carcello and Nagy, 2004) find that short audit tenure is related with lower audit quality. Johnson et al. (2002) investigate the relation between audit firm tenure and financial reporting quality, using the sample period 1986-1995 of U.S. listed firms. Johnson et al. (2002) classify tenure in three categories: SHORT (two to three years), MEDIUM (four to eight years), and LONG (nine years or more). They use discretionary accruals and the persistence of the accrual component of earnings as proxies to measure audit quality. The researchers find no relation between long audit tenure (nine years or more) and earnings management. Instead, their research reports that short audit firm tenure (two to three years) is related with low financial-reporting quality.

A study by Myers et al. (2003) investigates the relation between audit firm tenure and audit quality. They adopt the sample period 1988-2000 of U.S. listed firms. Furthermore, to measure audit quality they use absolute and signed discretionary accruals and current accruals as proxies. Unlike Johnson et al. (2002), they use an OLS-regression rather than a piece-wise regression. They find that longer audit firm tenure is related with less extreme income-increasing accruals and less extreme income-decreasing accruals. This suggests that longer audit tenure constrains the ability of

management to use accruals and the use of earnings management. Additionally, long audit tenure also constrains the ability of management to create reserves for future earnings.

The research of Carcello and Nagy (2004) find that short audit tenure is related with more fraudulent reporting. Using the sample period 1990-2001 of US listed firms they investigate the relation between audit tenure and fraudulent reporting. As a proxy to measure audit quality they use cited fraudulent reporting. Like the Johnson et al. (2002) research, tenure is classified in short (three year or less) and long (nine years or more). The researchers find a significant relation between short audit tenure and fraudulent reporting, which suggest that fraudulent reporting will most likely occur when audit tenure is short (three years or less). However, they fail to find a significant relation between long audit tenure (nine years or more) and fraudulent reporting.

In contrast, Davis et al. (2009) argue that both short audit firm tenure and long audit firm tenure are related with an increase in discretionary accruals. Using a sample period of 1988 till 2006 of U.S. listed firm and alternative cut-offs for SHORT (greater than one but less than four) and LONG (fifteen years or more), they find that long term auditor and client relationships are related with auditor tolerance of earnings management behaviour. Additionally, Davis et al. (2009) use alternative cut-offs to investigate audit firm tenure. For short audit firm tenure, Davis et al. (2009) use the cut-offs four and five years. Moreover, long audit firm tenure consists of eight, ten, twenty and twenty-five years. The alternative cut-offs do not influence the previous results. Davis et al. (2009) still find that both the alternative SHORT and LONG audit firm tenure are significantly related with positive discretionary accruals in the pre-SOx period. However, in the post-SOx period neither tenure variable is significant. Unlike the study of Myers et al. (2003), they find that the length of long audit tenure is limited to fifteen years before audit quality is reduced. Auditors are becoming too familiar when audit firm tenure reaches fifteen years or more and might therefore lose their objectiveness.

3.2.2.1 Explanation and analysis

These studies (Johnson et al. (2002); Myers et al. (2003); Carcello and Nagy (2004) find that short audit tenure is related with lower audit quality. There are several explanations for this outcome. One of these explanations is low balling (DeAngelo, 1981), which is a marketing strategy used by audit firms to attract new clients. DeAngelo (1981) underlines the importance of client retention, because audit firms capable of client retention have a competitive advantage over the competition and are assured of future economic benefits. With low balling, audit firms sets 'introduction prices' for the first audit, which results in an initial loss for the audit firm. Audit firms would see this as an investment year. In the following years, the costs of auditing will be lower due to the absence of start-up costs and higher audit fees (DeAngelo, 1981). For this reason client retention is important. However, client retention also increases the economic pressure on the audit firm to retain the client

to secure their initial investment. Losing the client can be costly for the audit firm. This pressure can lead to the impairment of independence in the first years of the engagement and therefore audit quality. This is might be an explanation while short audit tenure is related with lower audit quality.

Another explanation is the lack of experience and client specific knowledge in the early years of the audit. Because of the inexperience and lack of knowledge it is possible that material misstatements are not detected in the financial statements, which can explain the low quality of auditing services in the first years. According to these studies (Johnson et al. (2002); Myers et al. (2003); Carcello and Nagy (2004); Davis et al. (2009)) short tenure is related with low audit quality because of the lack of experience and client specific knowledge, while long audit tenure is related with low audit quality due to familiarity.

Both Johnson et al. (2002) and Carcello and Nagy (2004) adopt dichotomous variables to indicate the length of the tenure, whether it is SHORT (three years) or LONG (longer than nine years). However, these cut-offs can be considered to be arbitrary, as the researcher determines what SHORT and LONG is. Despite it is arbitrary; both studies find that short audit firm tenure is positively associated with audit quality, which confirms the expectations of the researchers. Nevertheless, long tenure is defined differently by the various studies (Johnson et al. 2002; Davis et al. 2009). Both Johnson et al. (2002) and Carcello and Nagy (2004) define LONG as longer than nine years, while Davis et al. (2009) define LONG as fifteen years or more. Moreover, the findings could yield difficulties when the observations mostly concern nine years or more rather than fifteen years or more, which probably lead to insignificant results regarding fifteen years or more. This would be problematic when the relation between long audit firm tenure and earnings management appear after the arbitrary cut-off of nine years. By adopting long as nine years or more the research might not capture the actual result. To offset the problem of long audit firm tenure Johnson et al. (2002) add an additional variable (alternative) of eight and ten years. Nonetheless, this would not affect the results, as the study by Davis et al. (2009) indicates hat audit quality is reduced when audit tenure is fifteen years or longer. The research by Davis et al. (2009) suggested that using a dichotomous variable LONG of nine years or more is inappropriate to capture the effect of long tenure on audit quality. Despite the suggestion by Davis et al. (2009) it is plausible that most researches will apply the same method as Johnson et al. (2002) to capture the effects of long audit firm tenure. The method of Davis et al. (2009) needs a very large sample that includes firms with audit firm tenure longer than fifteen years, which might be improbable for certain researches.

The study by Myers et al. (2003) applied a different approach. Myers et al. (2003) split their sample into tenure deciles in their univariate model. By doing this, the researchers attempt to mitigate the problem of few long audit firm tenure observations that might harm the precision of the model. In their multivariate model, ordinal variables for audit firm tenure are used. Unlike Johnson et

al. (2002) and Carcello and Nagy (2004) they do find significant results for long audit firm tenure. Both models indicate that long audit firm tenure is related with higher audit quality. The results of Myers et al. (2003) also differ from the results of Davis et al. (2009), which according to Davis et al. (2009) is caused by the difference between their sample I/B/E/S and COMPUSTAT. Davis et al. (2009) argue that I/B/E/S firms are under pressure to meet or beat analyst' forecasts, which might be an incentive to engage in earnings management. Johnson et al. (2002) and Myers et al. (2003) use COMPUSTAT for their sample, whose firms are not exposed to similar pressure as I/B/E/S firms.

3.3 Audit quality and the PCAOB

This section of the chapter discusses the influence of the PCAOB on audit quality. The first part of this section consists of the research by Carcello et al. (2011). They investigate the relation between the PCAOB inspection process and the improvement of audit quality of Big Four auditing firms. Second, this section elaborates the research by Gunny et al. (2012). Finally this section concludes with a short analysis of both studies.

With the passage of SOx the PCAOB was established. Before the passage of the SOx act audit firms were only subjected to self-regulation under the AICPA sponsored peer review. Since 2004 the PCAOB became responsible for performing independent inspections of audit firms with the purpose to promote high professional standards and improve the quality of auditing services of registered public accounting firms. Carcello et al. (2011) investigated the relation between the PCAOB inspection process and the improvement of audit quality of Big Four firms. The researchers expect that earnings management will decline in the first year following a PCAOB inspection. Subsequently they expect that audit quality will improve due to the PCAOB inspections. To measure audit quality the researchers used the absolute value of performance-adjusted discretionary accruals. The sample consists of Big 4 Firms of the years 2004 – 2006 in the United States. Carcello et al. (2011) find that . The absolute value of performance-adjusted discretionary accruals declines following each of the first and the second PCAOB inspection. Which suggest that earnings management declined. Furthermore the multivariate analysis indicates a significant decline in abnormal accruals both in the year following the first PCAOB inspection and the year following the second PCAOB inspection. These finding suggest that audit quality improved after the PCAOB inspections with the decline in earnings management.

The study by Gunny et al. (2012) investigates whether PCAOB inspection reports are related with audit quality. The researchers expect that audit quality be related to the PCAOB inspections. This expectation is based on the amount of resources that the PCAOB can dedicate in combination with the unprecedented access that they have to confidential documents and clients. The study of

Carcello et al. (2011) investigates general audit quality after the implementation of SOx and the PCAOB (Gunny et al., 2012). While this research focuses on the relation between the PCAOB inspection report results and underlying audit quality of an auditor's portfolio of clients. Gunny et al. (2012) measures audit quality by tree client-specific measures: abnormal current accruals, the propensity to restate, and the auditor's propensity to issue a going concern opinion. Additionally the researchers have split the PCAOB inspection results into three categories: clean, deficient (an audit deficiency is discovered), and seriously deficient (audit deficiency and a failure to prevent a GAAP departure). To investigate the difference between annually inspected auditors and triennially inspected auditors Gunny et al. (2012) split their sample into these two groups. Gunny et al. (2012) find no concrete results for the annually inspected auditors rather that they find conflicting results. However, they find that triennially inspected auditors are related with lower audit quality. More specifically they find that triennially inspected auditors receiving deficient or seriously deficient reports are related with higher abnormal accruals. Nevertheless, they have not found that PCAOB inspection reports are related with the propensity to issue a going concern opinion.

3.3.1 Explanation and analysis

The study by Carcello et al. (2012) finds evidence that audit quality improved after the passage of the PCAOB inspection process, which according to Gunny et al. (2012) is the result of the resources of the PCAOB and the unprecedented access that they have. In relation to the previous chapter this finding should constrain accrual earnings management. Nevertheless, Carcello et al. (2011) also give an alternative explanation for the decline of earnings management. The PCAOB is one explanation the other explanation is the greater vigilance and caution by participants in the financial reporting process due to heightened scrutiny. They are less willing to support on accrual earnings management to hit the targets. Cohen et al. (2008) also refer to the establishment of SOx as a possible explanation of a decline in accrual earnings management. Other researchers such as Zang (2012) give the switch to real earnings management as a feasible explanation for the decline in accrual earnings management. It may be possible that improved audit quality stimulates the use of real earnings management. The next section will discuss this switch between accrual earnings management and real earnings management.

3.4 Accrual earnings management vs. Real earnings management

This section discusses prior literature concerning the switch between the two earnings management strategies. Starting with the analytical research by Ewert and Wagenhofer (2005), who suggested that tighter accounting standards would lead to greater real earnings management. Cohen et al. (2008) provided the initial empirical evidence that heightened scrutiny by SOx lead to greater real

earnings management. Subsequently this section will elaborate the findings of Chi et al. (2011), which find that enhanced audit quality lead to an increase in real earnings management. Finally this section will conclude with the research by Zang (2012) that elaborates the direct substitutive relation between the two earnings management strategies.

3.4.1 The switch

Ewert and Wagenhofer (2005) investigate the (theoretical) relation between tighter accounting standards and the decline in earnings management. The researchers divide earnings management in accrual earnings management and real earnings management. They argue that the standard setter can tighten the standards to limit discretionary accruals however they can do little to real earnings management. Ewert and Wagenhofer (2005) find that firms resort to real earnings management when their accounting flexibility is limited. According to the researchers there is a substitution effect. The reduction of accounting flexibility can be caused by tighter regulation but also by high quality auditors (Chi et al. 2011).

Cohen et al. (2008) investigate the trends in earnings management and the influence of SOx in 2002. Based on U.S. listed firms over the period 1987 to 2005 they investigate both accrual earnings management and real earnings management around the passage of SOx and whether earnings management declined with the implementation of SOx. The researchers divided their sample into two parts consisting of the pre-SOx period (1987 through 2005) and the post-SOx period (2002 through 2005). Additionally they have subdivided the pre-SOx period into two sub periods: period prior to the major scandals (pre-SCA period: 1987 – 1999) and the period immediately preceding the passage of SOx with occurrence of major scandals (SCA period: 2000 – 2001). Cohen et al. (2008) find that accrual earnings management was dominant in the pre-SOx period with large increases in the SCA period but also low levels of real earnings management. In the period after the implementation of SOx, accrual earnings management declined significantly, whilst real earnings management increased significantly. This consist with the research of Kim et al. (2010), which suggest that firms adopt real earnings management due to the lower probability of drawing auditor or regulatory scrutiny. Due to the increased scrutiny by SOx firms resort to real earnings management. Despite this research investigates U.S. listed firms the findings correspond with Van Tendeloo and Vanstraelen (2008), who also find that strong (legal) enforcements have a downward effect on accrual earnings management.

The research of Chi et al. (2011) investigates the relation of enhanced audit quality and greater real earnings management. The researchers expect that firms will more likely adopt extensive real earnings management when their ability to practice accrual earnings management is constrained. The researchers argue that clients of high quality auditors have less accounting

flexibility, thus limits the ability to use accrual earnings management. To investigate this relation, a sample of U.S. listed firms over the period 2001 to 2008 is used. Furthermore, Chi et al. (2011) use auditor industry expertise and audit firm size as indicators for audit quality to investigate the relation with levels of real earnings management. Subsequently, auditor industry expertise is measured as the audit fee market share of each auditor in each industry at both the national and the city level. Like prior studies (Becker et al. 1998; Francis et al. 1999) the researchers adopt Big N or non-Big N auditors as an indicator for audit firm size. Finally, real earnings management is estimated by the firm's abnormal cash flows, abnormal inventory production, abnormal discretionary expenditures, and a summary measure combining these three indicators. Chi et al. (2011) find that higher quality auditing is related with higher levels of real earnings management. They find that Big N auditors lead to more real earnings management. However the sample consists of 96.8% of clients audited by Big N firms, which may have weaken the results. Additionally, they find that long audit firm tenure is related with greater real earnings management, which suggest that long audit firm tenure is related with higher audit quality. Based on audit fee to capture audit effort, the researchers assume that higher audit fees leads to higher quality auditing and therefore constrains accrual earnings management. Suggesting that higher quality auditing is related to real earnings management Chi et al. (2011) do find that higher audit fees are related with greater real earnings management. Nonetheless, Chi et al. (2011) assumed that higher quality auditors are related to higher audit fees. While according to Ghosh et al. (2009), audit fees rose significantly because of the implementation of SOx and its requirements. Chi et al. (2011) did not mention the influence of SOx like described by Ghosh et al. (2009) in their research. Neither did they take SOx into account while their sample was 2001 till 2008. Within this time period SOx would have a certain effect as well.

Zang (2012) investigates how managers trade off accrual earnings management and real earnings management. Zang expects that firms make a trade off based on the relative costliness, which suggest that if one activity is relatively more costly, firms will engage in the other. Zang (2012) also underlines that real earnings management occurs during the fiscal year and is realized in the fiscal year-end. This suggests that managers have the opportunity to adjust the accruals and thus accrual earnings management based on the outcome of the real earnings management strategy. Based on a sample over the period 1987-2008, Zang (2012) finds that accrual earnings management is constrained by high-quality auditors and higher scrutiny by accounting regulators after the implementation of SOx. In addition, Zang finds that real earnings management is constrained by firms' competitive status in the industry, financial health, scrutiny from institutional investors, and the immediate tax consequences of manipulation. Furthermore, Zang finds evidence that support the hypothesis that there is a trade-off between the two earnings management strategies based on their relative costliness. Their research also finds evidence that support the notion that management

adjust accruals based on the outcomes of real earnings management. This finding suggests a direct substitutive relation between the two earnings management strategies.

3.4.2 Explanation and analysis

These studies (Cohen et al. 2008; Chi et al. 2011; Zang 2012) explain factors that influence the switch from accrual earnings management and real earnings management. Cohen et al. (2008) explains that real earnings management is stimulated by reduced accounting flexibility due to the implementation of SOx in 2002. The study of Cohen et al. (2008) also provides a general notion that strong enforcements will ultimately lead to greater real earnings management. This might imply that the PCAOB would lead to greater level of real earnings management as well. From a different perspective Chi et al. (2011) explains that audit quality also influences the choice of real earnings management. Higher quality auditors constrain accrual earnings management and therefore firms resort to real earnings management. Finally, Zang (2012) explains the substitutive relation between accrual earnings management and real earnings management. Central in these studies is the reference to the Roychowdhury (2006) research. The research by Roychowdhury added real earnings management in the existing earnings management literature. The Roychowdhury (2006) study provided new insights regarding methods to detect real earnings management. These detection models of Roychowdhury (2006) are all used in the literature reviewed and will also be implemented in this research. That will be discussed in the next chapter.

3.5 Summary

This chapter provide the literature review of studies related to the main topic of this research. Furthermore it provides answers to the following sub questions: How does audit quality influence earnings management? What is the relation between the PCAOB inspections and earnings management? What is the reason to switch between the two strategies of earnings management?

First, the literature regarding audit quality is reviewed and an answer is provided to the question: *How does audit quality influence earnings management?* For this research two proxies for audit quality are used, which are auditor size and audit firm tenure. Prior studies (Becker et al. 1998; Francis et al. 1999) find that Big N auditors are related with higher quality auditing services and a decrease in earnings management. The reason that Big N auditors provide higher quality auditing is due to their valuable reputations (DeAngelo, 1981). Reputation loss has more adverse effects on larger audit firms than smaller audit firms. Furthermore, due to their larger client base Big N auditors are more independent. Additionally, Dye (1993) explains that larger audit firms are more accurate since they have more wealth at risk from litigation. Studies regarding audit firm tenure resulted in mixed evidence. The majority of the researches (Johnson et al. 2002; Myers et al. 2003; Carcello and

Nagy, 2004) find that long audit firm tenure is related to higher audit quality and a decrease in earnings management. However, Davis et al. (2009) find that both short and long audit firm tenure is related to the impairment of audit quality. The difference is related to the methodology and the sample of these studies. Finally, the study of Chi et al. (2011) report that enhanced audit quality is related to greater levels of real earnings management. This finding suggests that firms resort to real earnings management when accrual earnings management is constrained.

Second, this chapter provide an answer to the following sub question: *What is the relation between the PCAOB inspections and earnings management?* The study of Carcello et al. (2011) finds that the PCAOB inspections are related with a decline in accrual earnings management.

Finally, this chapter provide an answer to the following sub question: *What is the reason to switch between the two strategies of earnings management?* According to Cohen et al. (2008) firms switch from accrual earnings management to real earnings management due to the heightened scrutiny by SOx. Since the implementation of SOx in 2002, accrual earnings management declined significantly, while real earnings management increased. Chi et al. (2011) find that enhanced audit quality is the reason that firms resort to real earnings management. Due to better quality auditors firms have less flexibility to use accrual earnings management and therefore resort to real earnings management. Finally, Zang (2012) reports that firms make their choice based on the costliness of the two strategies of earnings management.

The following chapter will provide the hypotheses of this research based on the literature as described in this chapter. Furthermore the following chapter continues with the estimation models and empirical models of the research and will finally end with the sample selection.

4. Research design

4.1 Introduction

This chapter will discuss the methodology of this research and the sample. Moreover, it will provide an answer to the question; *how can the switch in earnings management method be measured*? First, the difference between quantitative and qualitative analysis are explained. Second, the hypotheses of this research are elaborated. Third, the estimated models are discussed, including the control variables. Fourth, the sample selection method and the source of the data will be explained. Finally, this chapter will conclude with a brief summary.

4.2 Quantitative and qualitative analysis

There are two types of research analysis available, the quantitative and the qualitative analysis.

Quantitative analysis uses statistical data and models to investigate the main research questions and the hypotheses (Miles and Huberman, 1994). Actual data necessary to investigate the mains research question are derived from databases. According to Miles and Huberman (1994), the outcomes/conclusions of quantitative analysis is more precise and accurate, thus more valuable than qualitative analysis.

Central in the qualitative analysis is the analysis of non-statistical data, which are collected through group discussions, surveys and interviews (F.Plooij, 2008). Qualitative analysis is rather subjective than objective, as it mostly depends on the interpretation of the researcher. The researcher is responsible for gathering the data and for the analysis. Results of interviews and group discussions can be driven by factors like social norm or various unconscious motives. It is up to the researcher to listen and read between the lines to filter these factors out that may influence the results (F. Plooij, 2008). Thus, the conclusions drawn from a qualitative analysis is rather subjective than objective in comparison with the quantitative analysis.

Based on the above description of these two forms of analysis this research will adopt the quantitative analysis.

4.3 Hypotheses

This section provides the hypotheses of this research. Based on the findings of prior literature as was discussed in the previous chapter three hypotheses are formulated. First, the hypotheses regarding audit quality are formulated. Second, the hypothesis concerning the PCAOB is formulated. Finally a brief summary of the chapter is given.

4.3.1 Audit quality and earnings management

The evidence in prior empirical literature (Becker et al. 1998; Francis et al. 1999; Chen et al. 2005; Tendeloo and Vanstraelen 2008; Johnson et al. 2002; Myers et al. 2003; Carcello and Nagy 2004) provides evidence that high quality auditors constrain accrual earnings management. In addition, Chi et al. (2011) provide evidence that enhanced audit quality leads to greater levels of real earnings management.

Auditor size and earnings management

The literature (Becker et al. 1998; Francis et al. 1999) provide evidence that Big Four auditors provide higher quality auditing services and thus constrain accounting flexibility of discretionary accruals. Like the previous studies this research also expect that larger audit firms (Big N firms) are of higher quality than non-Big N firms. Due to the fear of both reputation and litigation loss, larger audit firms have larger incentives to provide higher quality auditing services and therefore are able to constrain accrual earnings management. However, Chi et al. (2011) also find that higher quality auditing is related with greater levels of earnings management. Managers are more likely to resort to real earnings management when their accounting flexibility is reduced due quality auditors. As audit quality is indicated by auditor size the following hypothesis is formulated.

H1a: Audit quality as operationalized by auditor size is related with greater levels of real earnings management.

Audit firm tenure and earnings management

In the ongoing debate whether mandatory audit firm rotation is necessary, prior literature (Johnson et al. 2002; Myers et al. 2003) investigated whether longer audit firm tenure impairs auditors' independence. Proponents of mandatory audit firm rotation argue that this will improve auditor independence and thus audit quality. However, opponents of mandatory rotation argues that the longer the tenure the better the knowledge and experience and consequently the higher the audit quality. Mixed findings are found regarding audit firm tenure. Johnson et al. (2002), Myers et al. (2003), Carcello and Nagy (2004) find evidence that long audit firm tenure is related with higher audit quality. Furthermore, they find the opposite results for short audit firm tenure. They found that short audit firm tenure is related with lower audit quality. Nevertheless, in contrast with previous studies (Johnson et al. 2002; Myers et al. 2003; Carcello et al. 2004) the research by Davis et al. (2009) find empirical evidence that when audit firm tenure is too long (fifteen years or more) audit quality is deteriorating. This suggests that long audit firm tenure can both improve audit quality but also harm audit quality when it is too long. In addition, Chi et al. (2011) find evidence that longer audit firm

tenure is related with greater levels of real earnings management, suggesting that longer audit firm tenure have a positive effect on audit quality. Despite the mixed evidence that is found the majority of the literature find that long audit tenure do not impair audit quality.

H1b: Long audit firm tenure is related with greater levels of real earnings management.

4.3.2 PCAOB and earnings management

With the implementation of SOx in 2002 the PCAOB was also established. The purpose of the PCAOB is to oversee the quality of auditing firms in the United States. The PCAOB have unprecedented access to documents of auditing firms and their clients and therefore are better capable of inspecting the quality of the audits (Gunny et al. 2012). In their analytical model, Ewert and Wagenhofer (2003) find that firms will more likely resort to real earnings management when there is heightened scrutiny by regulators. Cohen et al. (2008) find empirical evidence that supported the findings of Ewert and Wagenhofer (2005). They investigated the influence of SOx and find that SOx constrained accrual earnings management as this method of earnings management declined after the implementation of SOx in 2002. However, the decline of accrual earnings management is coupled with an increase of real earnings management. This suggests that firms resort to real earnings management due to the heightened scrutiny. Finally, the study of Carcello et al (2011) investigated the influence of the PCAOB inspection process on accrual earnings management. They find evidence that the implementation of the PCAOB inspection process is coupled with an improvement in audit quality. Moreover, following Chi et al. (2011) improvement in audit quality should lead to greater levels of real earnings management. Therefore, the following hypothesis is formulated.

H2: The PCAOB inspection process is related with greater levels of real earnings management

4.4 Research model

This section will elaborate the research model of this research and its control variables. First, the proxies for real earnings management are elaborated, including the estimation models of each proxy. Furthermore, the proxies for audit quality and the control variables are discussed. Finally, the sample selection will be elaborated in detail.

4.4.1 Measuring real earnings management

This research will follow the researches by Roychowdhury (2006), Cohen et al. (2008), and Chi et al. (2011) to define the proxies of real earnings management. Graham et al. (2005) report that 80 percent of the managers are willing to cut in their discretionary expenditures in order to meet short-

term targets. Like Roychowdhury (2006) and Cohen et al. (2008), this research will take the abnormal levels of cash flows from operations, discretionary expenses and production costs to examine the levels of real earnings management. Previous researches (Roychowdhury, 2006; Cohen et al. 2008; Zang, 2012) provide confidence in the construct validity of these proxies. In their research Roychowdhury (2006) and Cohen et al. (2008) described several manipulation methods of real earnings management.

First, firms can adopt real earnings management through the acceleration of sales. The acceleration of sales can be achieved through the use of price discounts and lenient credit terms, with the intention to persuade more customers. By introducing price discounts firms can accelerate their sales from the next year to the current year. However, the increase in sales is temporarily situation. When the old prices are re-enacted the situation will reverse again. The price discounts will boost total earnings in the current period but it will also lead to lower margins. This would subsequently lead to a situation where production costs relatively to sales will be abnormally high (Roychowdhury, 2006).

Moreover, firms can lower their costs of goods sold through an increase of their productions. By increasing their production more than normal, firms can spread the fixed overhead costs over more units. This would subsequently decrease the fixed cost per unit. However, due to the overproduction firms might contract additional holding costs and therefore cash flows from operations are lower than the normal sales levels (Roychowdhury, 2006).

Finally, firms can decide to alter the levels of discretionary expenditures such as advertising, R&D and selling, general and administrative (SGA) expenses (Roychowdhury, 2006). By reducing these expenses firms can increase their current period earnings, which subsequently leads to an increase of the current period cash flows when these expenses are paid in cash. However, there is a risk that this may negatively affect the cash flows in the future (Roychowdhury, 2006).

The methods of real earnings management as described by Roychowdhury (2006) and Cohen et al. (2008) all may have adverse effects on the future, as it primarily concerns a short-term strategy.

The estimations of this research are based on the research of Cohen et al. (2008), which are derived from the Roychowdhury (2006) research.

Abnormal cash flow from operations

The normal cash flow from operations is expressed as a linear function of sales and change in sales in the current period. To estimate the model, this research will run the following cross-sectional regression for each year and industry: **Equation 1**

$$\mathbf{CFO_{it}\ /Assets_{i,t\text{-}1} = a_0 + a_{1t}\ (1/Assets_{i,t\text{-}1}) + a_{2t}\ (Sales_{i,t}/Assets_{i,t\text{-}1}) + a_{3t}\ (\Delta Sales_{i,t}/Assets_{i,t\text{-}1}) + \varepsilon_{it}}$$

The calculation of abnormal cash flow from operations is, the actual CFO minus the normal level of CFO calculated with the estimated coefficient from equation 1.

Abnormal production costs

Roychowdhury (2006) defined production cost as the sum of COGS and the change in inventory. ($PROD_t = COGS_t + \Delta INV_t$). Like Roychowdhury (2006) and Cohen et al. (2009) the expenses are expressed as a linear function of contemporaneous sales: **Equation 2**

$$\mathbf{COGS_{it}/Assets_{i,t\text{-}1} = a_0 + a_{1t}\ (1/Assets_{i,t\text{-}1}) + a_{2t}\ (Sales_{i,t}/Assets_{i,t\text{-}1}) + \varepsilon_{it}}$$

Additionally the regression for inventory growth is as follows: **Equation 3**

$$\mathbf{\Delta INV_{it}/Assets_{i,t\text{-}1} = a_{1t}\ (1/Assets_{i,t\text{-}1}) + a_{2t}\ (\Delta Sales_{i,t}/Assets_{i,t\text{-}1}) + a_{3t}\ (\Delta Sales_{i,t}/Assets_{i,t\text{-}1}) + \varepsilon_{it}}$$

ΔINV_{it} is the change in inventory in period t.

$Prod_{it}$ is calculated by $\mathbf{COGS_{it} + \Delta INV_{it}}$ and based on Equation 2 and 3 the regression of the estimated normal level of production costs is as follows: **Equation 4**

$$\mathbf{Prod_{it}\ /\ Assets_{i,t\text{-}1} = a_{1t}\ (1/Assets_{i,t\text{-}1}) + a_{2t}\ (Sales_{i,t}/Assets_{i,t\text{-}1}) + a_{3t}\ (\Delta Sales_{i,t}/Assets_{i,t\text{-}1})}$$

$$\mathbf{+ a_{4t}\ (\Delta Sales_{i,t\text{-}1}/Assets_{i,t\text{-}1}) + \varepsilon_{it}}$$

Abnormal discretionary expenses

Finally, the last proxy for real earnings management is the abnormal discretionary expense. Similar to the COGS model, the discretionary expenses are also expressed as a linear function of contemporaneous sales. The regression is as follows:

$$\mathbf{DiscExp_{it}\ /\ Assets_{i,t\text{-}1} = a_{1t}\ (1/Assets_{i,t\text{-}1}) + a_{2t}\ (Sales_{i,t}/Assets_{i,t\text{-}1}) + \varepsilon_{it}} \qquad \mathbf{(5)}$$

DiscExp is defined as the sum of R&D expenses, advertising expenses, and SG&A expenses in period *t*

The proxies defined for real earnings management are: Abn_CFO (abnormal cash flow from operations), Abn_Prod (abnormal production cost), and Abn_Discexp (abnormal discretionary expenses). Like Cohen et al. (2008) and Chi et al. (2011) this research will use a comprehensive

measure of real earnings management, which is the REM_Index. The standardized[2] variables, Abn_CFO, Abn_Prod, and Abn_Discexp compute the REM_Index to capture the effects of real earnings management. The levels of the REM_Index indicate the levels of overall real earnings management (Chi et al. 2011), which means that the higher the REM_Index the higher the overall real earnings management. However, like Cohen et al. (2008) and Chi et al. (2011) this research will also report the results of the individual real earnings management proxies, as the REM_Index alone will not provide sufficient information. The results of the individual proxies will in addition provide richer information (Chi et al. 2011). But the variable of interest is mainly the REM Index.

The data line items as retrieved from CRSP/COMPUSTAT merged are as follows:

CFO : Operating cash flow: item 308 (OANCF)

Assets : Total Assets: item 6 (AT)

Sales : Sales: item 12 (SALE)

COGS : Cost of goods sold: item 41 (COGS)

ΔINV : Change in inventory: item 303 (INVCH)

Advertising expense : item 45 (XAD)

R&D expense : item 46 (XRD)

SG&A expense : item 132 (XSGA)

4.4.2 Empirical model

To test the formulated hypotheses as discussed in the previous chapter, two additional proxies of audit quality are added to capture the effects of auditor size and audit firm tenure. Like previous studies (Becker et al. 1998; Chen et al. 2005; Van Tendeloo and Van Straelen, 2008) this research will adopt the dichotomous variables Big N or non-Big N, which indicates auditor size. When the auditors are Big N auditors it will take the value 1 or 0 otherwise.

Previous studies (Johnson et al. 2002; Myers et al. 2003; Davis et al. 2009) debated whether longer auditor tenure is associated with higher or lower audit quality. Regulators are concerned of familiarity between the client and the audit firm, which could impair their independence (Chen et al. 2008). However, empirical evidence as discussed in the previous chapter finds mixed evidence, whether shorter or longer audit tenure are related with audit quality. Johnson et al. (2002) and Myers et al. (2003) find that audit quality is related with longer audit tenure, as it indicates lower discretionary accruals. Nonetheless, Davis et al. (2009) find that long audit firm tenure have a deteriorating effect on audit quality. While prior research focuses on accrual earnings management,

[2] The standardized measure for each variable = (variable – mean (variable)/standard deviation (variable)

this research will provide additional results that are related to real earnings management. This research will adopt audit tenure as the consecutive years the auditor has audited the client.

Control variables

Moreover, this research investigates the influence of the PCAOB inspections. To investigate the PCAOB inspection process the *PCAOB* is adopted as a control variable. The *PCAOB* control variable is a dichotomous variable, which split the sample into two groups, which are the pre-PCAOB period as marked 1998 – 2003 and the post-PCAOB period, which is 2004 and later. According to the research by Carcello et al. (2011) audit quality should improve after the implementation in 2004.

Beside the influence of the PCAOB this research will also examine the influence of SOx. Through the use of a dummy variable the sample will be split into two parts resulting in a pre-SOx period (1998 – 2002) and post-SOx period (2003 – 2011). This research assumes that in the year 2002 SOx is not fully implemented and therefore the year 2003 is the staring point of SOx. The SOx control variable is important in this research. The purpose of SOx is to make financial reporting more transparent (section 302 & section 404). Hence, SOx can influence both real and accrual earnings management.

The next control variable is the crisis variable. The financial crisis variable represents the year 2007 – 2011. The financial crisis might influence the financial health of firms. According to Zang (2012) their financial health is an important motivation to apply a certain earnings management method. Firms in poor financial health will prefer accrual earnings management due to the costliness of real earnings management. The purpose of this control variable is to examine the influence of the financial crisis on both real and accrual earnings management.

Similar to the Roychowdhury research in 2006, this research will use SIZE as a control variable, as measured by the logarithm of assets at the beginning of the year. Larger firms have fewer incentives to engage in earnings management, as the political cost hypothesis of Watts and Zimmerman (1990) explains that larger firms are more likely to adopt accounting methods that would reduce the reported income. This would prevent political attention and thus political costs.

Moreover, the second control variable is Distress as measured by the ratio cash flow-to-total-debt. The research of Beaver (1966) finds that the cash-flow-total-debt ratio is a relatively accurate ratio to predict financial distress. The research of Zang (2012) used the Z-score (Altman, 1968) as a proxy for financial distress, which is more commonly used. However, the Z-score of Altman (1968) is not always applicable in certain industries, which might influence the results of this research. Furthermore, this would provide an opportunity to research financial distress from a different angle. A higher cash flow-to-total debt ratio suggests less financial distress.

Moreover, Roychowdhury (2006) adopted the market to book ratio (MTB) to factor the growth opportunities of firms. The MTB value is based on the market value of equity to the book value of equity (Roychowdhury, 2006).

Roychowdhury (2006) also adopted net income (NI) as a control variable, which would control the abnormal values of the estimation model that could have measurement errors correlated with the performance. Roychowdhury (2006) scaled the net income figure by lagged total asset.

The last control variable for this research is leverage (LEV). Becker et al. (1998) as derived from DeAngelo (1994) argued that the level of leverage is an incentive for firms to engage in earnings management. Leverage is calculated as the ratio of total debt to total assets. Based on the proxies for audit quality and the control variables the following empirical model will be tested: **Equation 6**

$$REM_t = \alpha_0 + \alpha_1 BigN_t + \alpha_2 Tenure_t + \alpha_3 PCAOB_t + \alpha_4 SOx + \alpha_5 SIZE_+ \alpha_6 DISTRESS_t + \alpha_7 MTB_t + \alpha_8 NI_t + \alpha_9 LEV_t + \varepsilon_{it}$$

REM_t = Real earnings management variable as based on Cohen et al. (2008):

Abn_CFO = abnormal cash flows

Abn_Prod = abnormal inventory over-production

Abn_Discexp = abnormal discretionary expenses

REM_Index = Sum of the individual proxies as derived from Cohen et al. (2008)

$BigN_t$ = 1 if auditor is BIG N audit firm, and 0 otherwise

$Tenure_t$ = number of consecutive years the auditor has audited the company's financial statement

$PCAOB_t$= prior or post PCAOB (post-PCAOB 1, or pre-PCAOB 0)

SOx_t = prior or post SOx (post- SOx 1, or pre-SOx 0)

$Crisis_t$ = Crisis period = 1 or pre-Crisis period = 0

$SIZE_t$ = natural logarithm of the market value at the beginning of the year

MTB_t = Market to book ratio: market value of equity to the book value of equity

$DISTRESS_t$ = Distress ratio to proxy for financial distress (cash flow-to-total debt)

NI_t = Net income scaled by lagged total assets for period t

LEV_t = Leverage, ratio of total debt to total assets of company for period t

Expectations real earnings management

Based on prior literature (Chi et al. 2011) there are certain expectations, which will be discussed in this section. If Big N auditors constrain accrual earnings management (Becker et al., 1998) it is expected that clients resort to real earnings management as a substitute. It is expected that the coefficient is positive (**+**) when REM_Index is the dependent variable. The expectations for the individual real earnings management components, Abn_CFO, Abn_Prod, and Abn_Discexp as the dependent variable are respectively, negative (**-**), positive (**+**), and negative (**-**).

Furthermore, audit firm tenure will be investigated in this research. Prior literature (Johnson et al. 2002; Myers et al. 2003; Davis et al. 2009) indicated mixed evidence regarding audit firm tenure. If short audit firm tenure is related with higher audit quality it is expected that short-term auditors constrain accrual earnings management and therefore clients might resort to real earnings management. It is expected that (short) audit firm tenure is negative (**-**) when REM_Index is the dependent variable. For the individual components, Abn_CFO, Abn_Prod, and Abn_Discexp it is expected that the coefficients are respectively, positive (**+**), negative (**-**), and positive (**+**). At the other hand when long audit firm tenure is related with higher audit quality it is expected that the REM_Index is positive (**+**), while the individual components, Abn_CFO, Abn_Prod, and Abn_Discexp are respectively, negative (**-**), positive (**+**), and negative (**-**).

Moreover, this research investigates the influence of the PCAOB inspections. According to Carcello et al. (2011) the PCAOB inspections improved audit quality. The improvement of audit quality would constrain accrual earnings management and therefore clients might resort to real earnings management. With the REM_Index as dependent variable it is expected that the PCAOB coefficient is positive (**+**). The expectations of the individual real earnings management components, Abn_CFO, Abn_Prod, and Abn_Discexp are, negative (**-**), positive (+), and negative (**-**), respectively.

Prior literature (Cohen et al. 2008; Zang 2012) finds that SOx is related with lower accrual earnings management and also find that due to SOx real earnings management rose significantly. Therefore, the expectation of overall real earnings management (REM_Index) and SOx is positive (+).

Finally, the last variable of interest is the crisis variable. According to Zang (2012) firms with low financial health are more reluctant to engage in real earnings management, due to the costliness firms might resort to accrual earnings management. With the crisis as a possible driver of poor financial health it might be possible that during the crisis firms resort to accrual earnings management, rather than applying real earnings management. Thus, the expectation of the crisis variable is negative (-).

4.4.3 Measuring accrual earnings management

Moreover, this research will additionally test the levels of accruals through the cross-sectional modified by Dechow et al. (1995) as adapted by Cohen et al. (2008) to calculate the discretionary accruals. The first step is the calculation of total accruals: **Equation 7**

$$TA_{it}/Assets_{it-1} = a_0 + a_1(1 / Assets_{it-1}) + a_2(\Delta Sales_{it} / Assets_{it-1}) + a_3(PPE_{it} / Assets_{it-1}) + \varepsilon_{it}$$

TA = Income before extraordinary items – operating cash flow

The second step is the calculation of the normal accruals using the following equation with the coefficients derived from the previous equation: **Equation 8**

$$NA_{it} = a_0 + a_1(1 / Assets_{it-1}) + a_2((\Delta Sales_{it} - \Delta AR_{it})/ Assets_{it-1}) + a_3(PPE_{it} / Assets_{it-1}) + \varepsilon_{it}$$

The third and final step is the calculation of the discretionary accruals: **Equation 9**

$$DA_{it} = TA_{it}/Assets_{it-1} - a_0 + a_1(1 / Assets_{it-1}) + a_2((\Delta Sales_{it} - \Delta AR_{it})/ Assets_{it-1}) + a_3(PPE_{it} / Assets_{it-1}) + \varepsilon_{it}$$

Prior literature discussed the negative relation between audit quality and accrual earnings management. To verify the findings of prior literature this research will run the following regression model: **Equation 10**

$$DA_t = \alpha_0 + \alpha_1 BigN_t + \alpha_2 Tenure_t + \alpha_3 PCAOB_t + \alpha_4 SOx + \alpha_5 SIZE_+ \alpha_6 DISTRESS_t + \alpha_7 MTB_t + \alpha_8 NI_t + \alpha_9 LEV_t + \varepsilon_{it}$$

DA = Discretionary accruals by the modified Jones (1991) model modified by Dechow et al. (1995) as adapted by Cohen et al. (2008). The other variables in the model are defined as before.

The data line items as retrieved from CRSP/COMPUSTAT merged are as follows:
Income before extraordinary items: item 123 (IBC)
PPE: item 7 (PPEGT)

Expectations accrual earnings management

The Big N coefficient is expected to be negative (**-**). That means that larger audit (Big N) firms are related with lower levels of accrual earnings management.

Furthermore, when short audit firm tenure is related with higher audit quality it is expected that the tenure coefficient is positive (**+**). When long audit firm tenure is related with lower accrual earnings management the tenure is expected to be negative (**-**).

Finally, according to Carcello et al. (2011) the PCAOB inspections constrain accrual earnings management. The PCAOB coefficient is expected to be negative (-). Finally, the last two variables of interest are SOx and the economic crisis of 2007 – 2011. The influence of SOx should have a downward effect on accrual earnings management. Therefore, the SOx coefficient is expected to be negative (-). The relation between accrual earnings management and crisis is expected to be positive (+). Due to the crisis it might be possible that firms resort to accrual earnings management, as real earnings management is too costly.

4.5 Sample selection

This section of the chapter describes the sampling procedure of the available data from CRSP/COMPUSTAT merged. The first part of this section discusses the sample selection according literature. The second part of this section elaborates the method applied in this research.

4.5.1 Sample selection literature

The sample of this research consists of NASDAQ and NYSE firms obtained from the COMPUSTAT annual industrial and research files over the years 2002 to 2012. Both financial data and audit firm data are available in the CRSP/COMPUSTAT merged database in order to include the firm in the sample. Likewise, these firms are audited more than once during the sample period.

The sample is primarily focussed on NASDAQ and NYSE listed firms, which concerns major firms across different industries. The reason to choose for these two specific stock exchange markets is based on their size and listings of companies. NASDAQ includes firms across different industries such as, computer hardware and software, telecommunications, retail/wholesale trade and biotechnology. While NYSE includes various listed firms.

Consistent with previous studies (Becker et al. 1998; Van Tendeloo and Vanstraelen 2008) financial institutions (SIC codes 6000 – 6999), mining and utility companies (SIC codes 4400 – 4999) are eliminated from the sample. Financial institutions and insurance companies are subjected to different regulatory requirements, which could influence the discretionary accruals (Becker et al. 1998). Similarly, due to their industry regulations Becker et al. (1998) excluded mining and utility companies, as the incentives for earnings management may be different from unregulated industries.

4.5.2 Sample selection research

To collect the data necessary to calculate both accrual and real earnings management this research will use data from CRSP/COMPUSTAT merged covering the period 1996 till 2011. The research itself covers the period 1998-2011 however certain calculations needs data prior to the first sample year

and therefore two additional years prior to the initial sample year are collected as well. This leads to an initial sample size of 109.826 firm-year observations. The second and third stage of the sample collection concerns the exclusion of non-NASDAQ and NYSE firms and the exclusion of all financial institutions, insurance companies, mining companies, and utility companies as is described in prior literature (Becker et al. 1998; Roychowdhury, 2006; Van Tendeloo and Vanstraelen 2008). This leads to 51.950 firm-year observations. Like Cohen et al. (2008) this research will replace all missing values of advertising expense and research and development expenses with zero. Only missing values regarding SG&A are excluded from the sample. Finally the final stage of the sample selection consists of the exclusion of all missing values and the years 1996 and 1997. All missing data necessary for the calculation of real earnings management and control variables are excluded from the sample. Thus, the final sample consists of 26.777 firm-year observations.

4.6 Summary

This chapter provide the hypotheses, the empirical model, and the sample selection of this research. This chapter will find an answer to the following sub question: *how can the switch in earnings management method be measured*?

First the hypotheses expect that Big N auditors, longer tenure, and PCAOB inspections are related to greater levels of real earnings management. These expectations are based on prior literature (Becker et al. 1998; Myers et al. 2003; Carcello et al. 2011) and will be tested throughout the next chapter.

Furthermore, the estimation model necessary to estimate real earnings management is elaborated. The estimation model by Roychowdhury (2006) is of the estimation model of interest. To estimate discretionary accruals this research uses the modified Jones model (1991) as modified by Dechow et al. 1995 and adapted by Cohen et al. (2008).

The following section of the chapter elaborates the empirical models of this research involving its various variables and the related expectations of these variables. This section will give the answer to the formulated sub question: *how can the switch in earnings management method be measured*? The following empirical models will provide evidence of a switch in earnings management method:

$$\mathbf{REM_t} = \alpha_0 + \alpha_1 BigN_t + \alpha_2 SHORT\_Tenure_t + \alpha_3 LONG\_TENURE + \alpha_3 PCAOB_t + \alpha_4 SOx_t + \alpha_5 SIZE_t + \alpha_6 DISTRESS_t + \alpha_7 MTB_t + \alpha_8 NI_t + \alpha_9 LEV_t + \varepsilon_{it}$$

$$\mathbf{DA_t} = \alpha_0 + \alpha_1 BigN_t + \alpha_2 SHORT\_Tenure_t + \alpha_3 LONG\_TENURE + \alpha_3 PCAOB_t + \alpha_4 SOx_t + \alpha_5 SIZE_t + \alpha_6 DISTRESS_t + \alpha_7 MTB_t + \alpha_8 NI_t + \alpha_9 LEV_t + \varepsilon_{it}$$

Finally, the sample selection of this research is elaborated in the last section of the chapter. After all exclusions as prescribed by prior literature (Becker et al. 1998; Roychowdhury 2006) and the exclusion of all missing values the final sample consists of 26.777 firm-year observations.

The next chapter will first present the descriptive statistics of this research and furthermore present the results of the estimation models and empirical models. Moreover, the results will be analysed thoroughly and deviations from prior literature will be explained.

5. Results

5.1 Introduction

This chapter presents the results of this research on both real earnings management and accrual earnings management. In order to research both strategies of earnings management the "Statistical Package for Social Sciences" (SPSS) is used. Furthermore, the results are analysed thoroughly and differences with prior literature are explained as well. Based on the results and the analysis conclusions will be formulated as well. Finally the chapter concludes with a brief summary.

5.2 The results of two earnings management strategies

This section will provide the descriptive statistics, the results, and the analysis of the results. Finally, a sensitivity analysis regarding the discretionary accruals is also presented in this section.

5.2.1 Descriptive statistics

The descriptive statistics of this research are provided in table 1 and consists of the variables of interest of this research. The mean of the REM Index is 0.0011 while the mean of abnormal CFO, abnormal production costs and abnormal discretionary expenditures are -0.0004, 0.0003, and -0.002 respectively. The means of real earnings management are quite low but that is mainly related to the large amount of assets. Furthermore, the discretionary accruals have a mean of 0.002. The sample consists of 0.8552 Big N firms, which is approximately 85.52 percent of the sample. This large mean might influence the results of Big N firms, as Big N firms mainly dominate the sample. However, in comparison with Chi et al. (2011) and Zang (2012) the mean is relatively lower. The mean of tenure is 4.78 years, which is low in comparison with other researches, such as Chi et al. (2011) who reports a mean of 12.872 years. The mean of tenure is relatively small and therefore might influence the results of long tenure, as the sample mainly consist of short tenure. The PCAOB inspection is 47.02 percent of the sample, which suggest that the PCAOB inspections are almost evenly distributed. SOx is 61.28 percent of the sample and the crisis variable is 33.12 percent of the sample, which corresponds with the sample period. Finally, the descriptive statistics shows large standard deviations regarding the Distress, MTB, and Net income variable. These large standard deviations suggest that the mean of Distress, MTB, and Net income are not an accurate representation of the data. There is large variability in the variable, thus suggest that the mean of the variable is a poor fit of the data. However, bear in mind that the variables itself are not the main variables of this research as it do not involve the testing of the hypothesis, they are the control variables.

Furthermore, through the use of the Kolgomorov-Smironov test on SPSS this research will test the normal distribution of the sample. The output of the Kolgomorov-Smironov test can be found in appendix C. When the significance level is less than 0.05 this would indicate a deviation from normality. The results from the Kolgomorov-Smirnov test indicate significance levels less than 0.05, which suggest that the sample is not normally distributed. Despite the violation of the normality assumption the OLS regression is still applied. Substitutes of the OLS regression such as the logistic regression do not provide the same rich information, as the dependent variable has to be split into two dichotomous variables (groups). By splitting the dependent variable into two groups important information might get lost in the process and less richer information are provided. Also this research uses a large sample of 26.777 firm year observations, under the central limit theorem it is possible to apply a linear regression technique as it is allowed to approximate normal distribution (Field, 2009).

Table 1: Descriptive statistics

Variables	Mean	Std. Deviation	Median
REM Index	0.0011	0.80674	-0.0621
Abnormal CFO	-0.0004	0.28232	0.0046
Abnormal Prod	0.0003	0.61191	0.0349
Abnormal Discexp	-0.0002	0.75874	-0.0849
DA Cohen et al.	0.0002	0.46422	0.0186
Big N	0.8552	0.35186	1.0000
Tenure	4.78	0.3459	4.00
PCAOB	0.4702	0.49912	0.0000
SOx	0.6128	0.48712	1.0000
Crisis	0.3312	0.47066	0.0000
Size	6.2257	1.87656	6.2176
Distress	4.63718	54.190633	0.35416
MTB	2.97895	15.135834	1.96392
Net Income	0.0007	0.54759	0.0419
LEV	0.23643	0.242433	0.20355

The table summarizes the descriptive statistics of the sample of each relevant variable.

5.2.2 Estimation models

First the results of the estimated models that measure the abnormal levels of cash flow from operations, production costs, and discretionary expenditures are presented in table 2.

The estimation models of this research generally predict similar coefficients such as the research by Roychowdhury (2006). However, except for the production cost model the power of the other estimation models are quite low. The explanatory power for CFO is almost 30%, for production costs it is 92%, and for the discretionary expenditures 9.6%. Especially the explanatory power of the discretionary expenditure model is quite low in comparison with the other estimation models. Despite the models are all significant, the results should be interpreted with caution, especially the discretionary expenditure model. The estimation model of accruals also presents a relatively low adjusted r square suggesting low explanatory power.

The output of these estimation models will be implemented in equation one, four, five, and seven. Only the significant coefficients are implemented in these equations. Coefficients are regarded as significant when the significance level is equal or less than 1 or 5 %. The following estimations are used to calculate the normal levels:

Table 2: Estimation models

(A) CFO_{it} /$Assets_{i.t-1}$	
Intercept	0.065 ***
$1/Assets_{i.t-1}$	-2.425 ***
$Sales_{i.t}/Assets_{i.t-1}$	0.025 ***
$\Delta Sales_{i.t}/Assets_{i.t-1}$	0.040 ***
Adjusted R square	0.298

(B) $Prod_{it}$ / $Assets_{i.t-1}$	
Intercept	-0.237 ***
$1/Assets_{i.t-1}$	-3.161 ***
$Sales_{i.t}/Assets_{i.t-1}$	0.867 ***
$\Delta Sales_{i.t}/Assets_{i.t-1}$	-0.0144 ***
$\Delta Sales_{i.t-1}/Assets_{i.t-1}$	0.000
Adjusted R square	0.922

(C) $DiscExp_{it}$ / $Assets_{i.t-1}$	
Intercept	0.262 ***
$1/Assets_{i.t-1}$	9.320 ***
$Sales_{i.t}/Assets_{i.t-1}$	0.058 ***
Adjusted R square	0.096

(D) Accruals / $Assets_{i.t-1}$	
Intercept	-0.036 ***
$1/Assets_{i.t-1}$	-0.690 ***
$\Delta Sales_{i.t}/Assets_{i.t-1}$	-0.016 ***
PPE_{it} / $Assets_{it-1}$	-0.058 ***
Adjusted R square	0.191

***Significant at the 1% level

Table A reports the estimated coefficients of the following regressions:

(A) $CFO_{it}/Assets_{i,t-1} = a_0 + a_{1t}(1/Assets_{i,t-1}) + a_{2t}(Sales_{i,t}/Assets_{i,t-1}) + a_{3t}(\Delta Sales_{i,t}/Assets_{i,t-1}) + \varepsilon_{it}$

(B) $Prod_{it}/Assets_{i,t-1} = a_{1t}(1/Assets_{i,t-1}) + a_{2t}(Sales_{i,t}/Assets_{i,t-1}) + a_{3t}(\Delta Sales_{i,t}/Assets_{i,t-1}) + a_{4t}(\Delta Sales_{i,t-1}/Assets_{i,t-1}) + \varepsilon_{it}$

(C) $DiscExp_{it}/Assets_{i,t-1} = a_{1t}(1/Assets_{i,t-1}) + a_{2t}(Sales_{i,t}/Assets_{i,t-1}) + \varepsilon_{it}$

(D) $TA_{it}/Assets_{it-1} = a_0 + a_1(1/Assets_{it-1}) + a_2(\Delta Sales_{it}/Assets_{it-1}) + a_3(PPE_{it}/Assets_{it-1}) + \varepsilon_{it}$

To calculate the normal cash flow from operations

$\mathbf{CFO_{it}/Assets_{i,t-1}} = \mathbf{0.065} - \mathbf{2.425}(1/Assets_{i,t-1}) + \mathbf{0.025}(Sales_{i,t}/Assets_{i,t-1}) + \mathbf{0.040}(\Delta Sales_{i,t}/Assets_{i,t-1}) + \varepsilon_{it}$

To calculate the normal production costs

$$\mathbf{Prod_{it} / Assets_{i,t-1}} = \mathbf{-0.237} - \mathbf{3.161}\ (1/Assets_{i,t-1}) + \mathbf{0.867}\ (Sales_{i,t}/Assets_{i,t-1}) - \mathbf{0.144}\ (\Delta Sales_{i,t}/Assets_{i,t-1}) + \varepsilon_{it}$$

To calculate the normal discretionary expenditures

$$\mathbf{DiscExp_{it} / Assets_{i,t-1}} = \mathbf{0.262} + \mathbf{9.320}\ (1/Assets_{i,t-1}) + \mathbf{0.058}\ (Sales_{i,t}/Assets_{i,t-1}) + \varepsilon_{it}$$

To calculate the normal accruals

$$\mathbf{TA_{it}/Assets_{it-1}} = \mathbf{-0.036} - \mathbf{0.690}\ (1 / Assets_{it-1}) - \mathbf{0.016}\ (\Delta Sales_{it} / Assets_{it-1}) \ \mathbf{- 0.058}\ (PPE_{it} / Assets_{it-1}) + \varepsilon_{it}$$

5.2.3 Correlation matrix real and accrual earnings management

This section presents the correlation coefficients of the regressions. Table 3 present the results of the Pearson correlation and the Spearman correlation matrix for both real earnings management and accrual earnings management. The Pearson correlation is only allowed when the sampling distribution is normal or when the sample is large (Field, 2009). This research qualifies as having large sample (26.777 firm-year observations) so the Pearson correlation is justified. Nevertheless, to be certain an additional Spearman correlation test is also performed.

The correlation matrix shows that abnormal CFO, abnormal production costs, and abnormal discretionary expenditures are correlated negatively, positively, and positively with the REM Index, respectively. Both abnormal CFO and abnormal production costs corresponds with the research by Chi et al. (2011), however this is not the case with the abnormal discretionary expenditures. Instead of a negative correlation, a positive correlation is found. The Pearson correlation matrix reports a negative correlation (-0,262) and Spearman (-0.284) between discretionary accruals and REM Index. This negative correlation perhaps explains that an increase in discretionary accruals leads to a decrease in real earnings management and vice versa. This might provide evidence of the substitutive relationship between real earnings management and accrual earnings management, as explained by Zang (2012).

Furthermore, the correlation matrix indicate a positive correlation between Big N and the REM index, perhaps suggesting that Big N auditors are related with greater levels of real earnings management, the Pearson correlation coefficient is (highly) significant but not particularly strong (0,068). While the Spearman correlation indicates a stronger correlation (0.125) and suggesting a stronger relation between Big N and overall real earnings management. The Pearson correlation between Big N auditors and discretionary accruals is less significant but negative (-0,015), which suggest that Big N auditors have a downward effect on accrual earnings management. Similarly the Spearman correlation finds a relatively stronger negative relation (-0.052) between discretionary

accruals and Big N audit firms. These findings would confirm the findings of prior literature (Becker et al. 1998, Francis et al. (1999).

The Pearson correlation coefficient of tenure is negatively correlated (-0,042) with the REM Index, probably suggesting that longer audit firm tenure is correlated with lower levels of real earnings management. However, the Spearman correlation finds a positive correlation (0.039) between audit firm tenure and overall real earnings management. This would confirm the notion that long audit firm tenure would increase real earnings management as suggested by Chi et al. (2011). The Pearson correlation between tenure and discretionary accruals is positive (0.017), which suggest that longer audit firm tenure have an upward effect on accrual earnings management. This would contradict prior literature (Johnson et al., 2002; Myers et al. (2003), as they mostly find that long audit firm tenure constrain accrual earnings management. Nonetheless, the Spearman correlation contradicts this finding by presenting a small significant negative correlation (-0.015), which would confirm prior literature. Nonetheless, the Pearson and Spearman correlation presents different results, which could be caused by the distribution of the sample.

However, both the correlation between tenure and REM Index and Discretionary accruals are not high for both Pearson and Spearman. This means that the correlation is not particular strong.

Both the PCAOB and SOx variable do not report significant correlations regarding the REM_Index when the Pearson correlation is applied. When the Spearman correlation is applied both the PCAOB and SOx indicate significant positive correlations. This would imply that both the PCAOB and SOx have an upward effect on real earnings management, as was expected based on prior literature (Cohen et al. 2008; Chi et al. 2011). But bear in mind that the correlations are weak.

Similarly, when the Pearson correlation is applied the correlation of crisis with real earnings management and accrual earnings management is very low (weak) and not significant. Nevertheless, like assumed the correlation between the crisis variable and distress presents a positive significant correlation (0.021). This finding suggests that the economic crisis (2007-2011) is related to financial distress. Also the correlation between the PCAOB and SOx is very strong, which also confirms prior literature, as the PCAOB is a result of SOx. Also the strong correlation between the crisis, SOx and the PCAOB is interesting. But this can be explained with the period as it all happens in the same time frame, 2002 – 2011.

While the Pearson correlations do not indicate significant values on the crisis and distress variable, the Spearman correlation does. The Spearman correlation indicates a positive significant value on crisis and REM (0.020) and a significant negative value on distress and REM (-0.134). The crisis variable contradicts the expectation that due to the crisis more accrual earnings management is applied. The correlation suggests that the crisis leads to more real earnings management rather than diminishing it. The distress variable confirms the expectation that firms in financial distress less likely

apply real earnings management, as it is too costly to apply. Likewise, the correlation between distress and crisis is positive and significant (0.048) like the Pearson correlation.

The results of the Pearson and Spearman correlation differ from each other on certain aspects. The Spearman correlations provide in several occasions stronger results and mostly confirm the expectations of this research and literature, such as audit firm tenure, and SOx. The Spearman correlation is a non-parametric statistic and since the sample of this research is not normally distributed this might be an explanation why the Spearman correlation provide stronger results, as it is more justified to apply this statistic.

Finally, these results are merely bivariate relations and thus the next section will present the results of the multivariate regression and its analysis. The following section will provide answers concerning the formulated hypotheses.

Table 3: Correlation Matrix

	REM_Index	Abn_CFO	Abn_Prod	Abn_Discexp	DA	BigN	Tenure
REM_Index	1	-0.396 **	0.124 **	0.495 **	-0.284 **	0.125 **	0.039 **
Abn_CFO	-0.333 **	1	-0.297 **	-0.107 **	-0.277 **	-0.024 **	0.051 **
Abn_Prod	0.242 **	-0.313 **	1	-0.700 **	0.010	-0.073 **	-0.029 **
Abn_Discexp	0.645 **	-0.116 **	-0.580 **	1	-0.143 **	0.145 **	0.029 **
DA	-0.262 **	-0.153 **	0.004	-0.199 **	1	-0.052 **	-0.015 *
BigN	0.068 **	-0.016 *	-0.034 **	0.083 **	-0.015 *	1	0.124
Tenure	-0.042 **	0.028 **	0.005	-0.041 **	0.017 **	0.130 **	1
PCAOB	-0.001	0.019 **	-0.003	-0.001	0.008	-0.155 **	0.543 **
SOx	-0.006	0.028 **	0.002	-0.009	0.013 *	-0.139 **	0.534 **
Crisis	-0.001	0.021 **	-0.003	0.000	-0.008	-0.132 **	0.520 **
SIZE	0.029 **	0.075 **	-0.011	0.025 **	0.000	0.382 **	0.326 **
DISTRESS	-0.018 **	0.085 **	-0.036 **	0.006	-0.001	0.011	0.028 **
MTB	0.008	0.002	-0.017 **	0.020 **	-0.006	0.018 **	-0.009
NI	-0.345 **	0.320 **	-0.190 **	-0.157 **	0.781 **	0.026 **	0.048 **
LEV	0.014 *	-0.043 **	0.039 **	-0.015 **	-0.011	0.029 **	-0.025 **

	PCAOB	SOx	Crisis	Size	DISTRESS	MTB	Net Income	LEV
REM_Index	0.023 **	0.039 **	0.020 **	0.052 **	-0.134 **	-0.031 **	-0,356 **	0.115 **
Abn_CFO	0.014 *	0.017 **	0.018 **	0.089 **	0.692 **	0.208 **	-0.527 **	-0.051 **
Abn_Prod	0.009	0.012 *	0.017 **	-0.023 **	-0.286 **	-0.306 **	-0.370 **	0.147 **
Abn_Discexp	-0.011	-0.010	-0.014 *	0.014 *	0.050 **	0.240 **	0.032 **	-0.190 **
DA	-0.016 *	-0.003	-0.059 **	-0.026 **	-0.182 **	0.016 *	0.362 **	0.008
BigN	-0.155 **	-0.139 **	-0.132 **	0.382 **	0.055 **	0.085 **	0.074 **	0.062 **
Tenure	0.508 **	0.545 **	0.454 **	0.318 **	0.123 **	0.005	0.087 **	-0.004
PCAOB	1	0.749 **	0.747 **	0.187 **	0.065 **	0.010	0.052 **	-0.016 **
SOx	0.749 **	1	0.559 **	0.185 **	0.081 **	0.070 **	0.066 **	-0.032 **
Crisis	0.747 **	0.559 **	1	0.167 **	0.048 **	-0.072 **	0.003	0.003
SIZE	0.187 **	0.184 **	0.167 **	1	0.131 **	0.112 **	0.252 **	0.255 **
DISTRESS	0.030	0.030 **	0.021 **	0.033 **	1	0.168 **	0.527 **	-0.472 **
MTB	-0.006 **	-0.006	-0.019 **	-0.005	0.008	1	0.308 **	-0.109 **
NI	0.030 **	0.030 **	0.016 **	0.113 **	0.051 **	-0.010	1	-0.111 **
LEV	-0.013 *	-0.013 **	-0.002	0.123 **	-0.079 **	-0.013 *	-0.050 **	1

The Pearson correlations are presented in the lower diagonal (White) and the Spearman correlations upper diagonal (Gray).

**Correlation is significant at the 1% level *Correlation is significant at the 5% level

5.2.4 Real and accrual earnings management

This research investigates the relation between real earnings management and several independent variables as was presented in section 4.4.2. The primary intention is the relation between audit quality and real earnings management. The analysis of the coefficients and the relation between real

earnings management and the independent variables are elaborated thoroughly in this section. Possible differences with prior literature are explained as well. The following regression will be investigated:

$$\mathbf{REM_t} = \alpha_0 + \alpha_1 BigN_t + \alpha_2 SHORT\_Tenure_t + \alpha_3 LONG\_TENURE + \alpha_3 PCAOB_t + \alpha_4 SOx_t + \alpha_5 SIZE_t + \alpha_6 DISTRESS_t + \alpha_7 MTB_t + \alpha_8 NI_t + \alpha_9 LEV_t + \varepsilon_{it}$$

$$\mathbf{DA_t} = \alpha_0 + \alpha_1 BigN_t + \alpha_2 SHORT\_Tenure_t + \alpha_3 LONG\_TENURE + \alpha_3 PCAOB_t + \alpha_4 SOx_t + \alpha_5 SIZE_t + \alpha_6 DISTRESS_t + \alpha_7 MTB_t + \alpha_8 NI_t + \alpha_9 LEV_t + \varepsilon_{it}$$

The proxies for real earnings management are abnormal cash flow from operations (Abn_CFO), abnormal production costs, and abnormal discretionary expenditures (Abn_Prod). Following Cohen et al. (2008) and Chi et al. (2011) this research will also adopt a comprehensive measure of real earnings management, which is the sum of the three individual proxies, the REM_Index and which is the main variable of interest. The results of this regression are presented in table 3. But before the results of the multivariate regression model are elaborated two additional tests are performed, which are the multicollinearity test and Durbin and Watson test.

Multicollinearity defines whether a strong correlation exists between two or more predictors in a regression model (Field, 2009). The problem of multicollinearity appears when there is a perfect collinearity between two predictor variables, which makes it impossible to retrieve unique estimates, as the values of the variables are interchangeable. To identify whether there is multicollinearity in the variables of interest this research measures multicollinearity through the variance inflation factor (VIF) of SPSS. The VIF prove whether a variable has multicollinearity with other variables. However, no scientific rules are connected to the VIF, which makes various interpretations possible (Field, 2009). Nonetheless, a most common guideline regarding the VIF is the value 10. When the VIF indicates a 10 there is multicollinearity and it is a value that justifies any worries. The output of the VIF can be found in appendix D. The results suggest that there is no multicollinearity between the various variables. The highest VIF concerns the PCAOB variable that presents a VIF of 3.595. Related to the VIF as suggested by Field (2009) is the tolerance statistic, which is calculated by 1/VIF. The guideline regarding the tolerance statistic is that serious problems of multicollinearity appear when the tolerance statistic is below 0.1 and worries are also justified when it is below 0.2. Similar to the VIF the tolerance statistic does not presents results that would justify any worries, as the tolerance level all appear to be above 0.2. To conclude based on the collinearity statistics the variables of this

research do not appear to demonstrate multicollinearity and therewith justifies the use of them in this research.

Second, to test for independent errors or autocorrelation an additional Durbin-Watson test is performed. The Durbin-Watson tests whether residuals are correlated with each other. The Durbin-Watson statistic can vary between 0 and 4 whereby the value of 2 suggests that the correlations are uncorrelated. The conservative guideline regarding the Durbin-Watson test is that is problematic when the value is less than 1 or greater than 3. The results of the Durbin-Watson test on this research can be found in appendix D. The results indicate that the statistics are all close to 2, which suggest that there are no independent errors in the sample. This would suggest that the variables can be used in the regression.

These two tests (multicollinearity and Durbin-Watson test) show that it is justified to apply an OLS regression for this research, as it will not effect the regression and therewith the results.

Table 3: Multivariate results

	REM_Index	Abn_CFO	Abn_Prod	Abn_Discexp	Accruals
Intercept	-0.249 ***	-0.017 ***	0.001	-0.186 ***	0.127 ***
$BigN_t$	0.177 ***	-0.039 ***	-0.075 ***	0.220 ***	-0.005
$Tenure_t$	-0.022 ***	0.000	0.005 ***	-0.021 ***	0.003 ***
$PCAOB_t$	0.045 ***	-0.017 ***	-0.016	0.055 ***	0.008
SOx_t	0.041 ***	0.006	0.006	0.024	-0.001
$Crisis_t$	0.032 **	0.009 *	-0.020 ***	0.043 ***	-0.020 ***
$SIZE_t$	0.025 ***	0.000 ***	0.006 ***	0.010 ***	-0.024 ***
$DISTRESS_t$	0.000	0.000 ***	0.000 ***	0.000 *	0.000 ***
MTB_t	0.000	0.000	-0.001 ***	0.001 ***	0.000
NI_t	-0.519 ***	0.003 ***	-0.212 ***	-0.225 ***	0.673 ***
LEV_t	-0.047 **	0.007 ***	0.067 ***	-0.094 ***	0.074 ***
Adjusted R2	0.132	0.111	0.039	0.039	0.620

***Significant at the 1% level **Significant at the 5 level *Significant at the 10% level

This table provide the regression of real earnings management and accrual earnings management measures on audit quality variables such as auditor size, audit firm tenure, and the PCAOB. It also presents the associated control variables. The output from SPSS can be found in the appendix.

The results of the regression indicate that Big N auditors have a positive relation with overall real earnings management, as indicated by the REM_Index (0.177). This finding suggests that Big N auditors are related with more overall real earnings management. This confirms the findings of Chi et

al. (2011). The study by Chi et al. (2011) finds a positive relation between clients audited by Big N auditors and overall real earnings management. However, this contradicts the findings of Zang (2012). Zang (2012) performed a similar test but did not find a significant relation between auditor size and real earnings management. According to Zang (2012) this can be due their sample size, 93.7 percent of their sample firms had Big 8 auditors. This research has a larger variation, consisting of approximate 86 percent Big N auditors, which might explain the difference with the research by Zang (2012). However, Chi et al. (2011) had a sample consisting of 96.8 percent Big N auditors. The difference with Zang (2012) might be different than the sample variation of Big N auditors. However, the individual real earnings management proxies in general do not support the REM_Index, except the Abn_CFO proxy. Unlike the expectations, both the Abn_Prod and Abn_Discexp proxy suggests that Big N auditors are related with lower production costs and higher discretionary expenditures. This contradicts the findings of Chi et al. (2011), which do find insignificant results that Big N auditors are related with higher production costs and lower discretionary expenditures. The difference in results might be related to the sample period difference with Chi et al. (2011). Chi et al. (2011) adopted the time-period 2001-2008, while this research adopted a sample period of 1998-2011. Moreover, a different research design was used for this research concerning the discretionary expenditures compared to Chi et al. (2011). Following Cohen et al. (2008) this research replaced all missing values of advertising expense and research & development expenses with zero. Only missing values of SGA expenses were eliminated from the sample, this might explain the difference with the Abn_Discexp variable. The results of the accrual model do not yield significant value. The coefficient is negative, which would have confirmed the literature when it was significant. Based on these findings some evidence is provided, which suggests that Big N auditors are related with greater real earnings management. Nevertheless, no significant findings were made regarding accrual earnings management.

Furthermore, the regression elaborates the role of audit firm tenure and its relation with real earnings management. Chi et al. (2011) find that greater levels of real earnings management is related to long audit firm tenure on both overall real earnings management and its individual components. However, the findings of this research contradict the findings by Chi et al. (2011). The results suggest that short audit firm tenure leads to greater real earnings management and not long audit firm tenure, as the regression indicate a negative coefficient. Besides using tenure as the number of years the auditor has audited the company's financial statement, two additional tests are performed. Following Zang (2012) a dichotomous variable is used that equals 1 when the number of years the auditor audited the client is above the sample mean of 5 and 0 otherwise. The test following Zang (2012) still provides the same results suggesting that long audit firm tenure is not related with greater levels of real earnings management but lower levels of real earnings

management. The dichotomous variable Zang_Long provide a significant negative relation between real earnings management and long audit firm tenure. Using the dichotomous variables as suggested by Johnson et al. (2002) a short tenure variable (three years or less) and long tenure variable (nine years and longer) are formulated. The Johnson test shows both significant values for short and long tenure and indicates that both short audit firm tenure and long audit tenure are related to lower real earnings management. These results are quite odd as both long and short have a negative relation. The difference can be related to the large difference in sample mean. The mean of audit tenure by Chi et al. (2011) is 12.872 years while this research has a mean of 4.79 years. This might introduce a bias towards short audit firm tenure in the results. Additionally, the accrual model suggests that shorter auditor tenure is related with lower accrual earnings management. This confirms the concerns of regulators that long audit firm tenure is related with higher accruals. However, the coefficient is quite marginal (0.003) so the variable has a marginal effect on accrual earnings management. This finding contradicts existing literature regarding the influence of short audit firm tenure on accrual earnings management. According to prior literature (Johnson et al. 2003; Myers et al. 2003) short audit firm tenure is related with low quality audits and thus higher discretionary accruals. This finding can be explained due to the limited sample of long audit firm tenure in the research sample. Large part of the sample consists of tenure equal to four or less than four. An additional test following the Johnson et al. (2002) method only indicates a significant value of long audit firm tenure. The variable also indicates that long audit firm tenure is related to higher discretionary accruals. No significant results are found for short audit firm tenure (2 or 3 years). The results (might) imply that auditors are of higher quality in the beginning of the relationship. Nevertheless, the findings should be interpreted with caution, as the effects are relatively low despite its high significance level.

Carcello et al. (2011) found evidence that accrual earnings management declined due to the PCAOB inspections. The PCAOB variable indicates a (highly) significant and positive relationship with the overall real earnings management. The intention of the PCAOB was to improve audit quality by extensive inspections of public audit firms. The result of the regression suggests that the PCAOB inspections have a positive relation with real earnings management. Nevertheless, the result should be interpreted with caution, as the effects are relatively low. Despite the high significance level it is possible that other factors are involved with this relation as well. Additionally, the accrual earnings management model do not find significant results, despite the negative coefficient of the PCAOB inspections. The findings regarding real earnings management confirm the findings of Carcello et al. (2011) but no significant results were found for accrual earnings management.

Moreover, this research presents a highly significant positive coefficient of SOx on overall real earnings management (0.041), which is similar to the research by Cohen et al. (2008) and Zang

(2012). Cohen et al. (2008) found evidence that real earnings management increased in the post-SOx era. In addition to Cohen et al. (2008), Zang (2012) also finds evidence that SOx is related to greater levels of real earnings management. However, the accrual earnings management model does not indicate a significant value, for this reason no interpretation can be made from the results. Previous literature such as Zang (2012) did find evidence between SOx and accrual earnings management. Zang (2012) applied the same method as this research but still different results are found. This might be caused by a different sample or different model. Zang (2012) uses the sample period 1987-2008 which is much larger than this research. Similarly, Cohen et al. (2008) uses the sample period 1987-2005. Both researches by Cohen et al. (2008) and Zang (2012) covers a longer period than this research. Furthermore, Zang (2012) uses the modified Jones model 1991 to measure discretionary accruals, while this research uses the modified Jones model (1991) by Dechow et al. (1995). Cohen et al. (2008) used the same model as this research but in combination with other variables. Finally, using a sample consisting of NYSE and NASDAQ listed firms might also cause the difference in results.

The crisis variable is added to the regression as a proxy for financial distress. According to Zang (2012) firms would perceive real earnings management as an expensive strategy in periods of financial distress. The assumption of this research would be that the crisis stimulates financial distress and therefore firms during the crisis period would less likely engage in real earnings management. The results indicate otherwise. The regression indicates that the crisis variable is positively related with overall real earnings management. The results suggest that the crisis stimulates real earnings management rather than constrain it. The accrual regression finds a negative relation between accrual earnings management and crisis. A possible conclusion for the crisis variable is that other factors influence the relation as well. The crisis period (2007 – 2011) is related with the implementation of SOx in 2002 and the adoption of PCAOB inspections after 2004 as the correlation matrix suggested. Due to strict regulations and higher scrutiny as result of both SOx and the PCAOB in the past, firms resort to real earnings management, as accrual earnings management is less possible.

The next variable of interest is the SIZE variable, which report a significant positive relation (0.025) between the size of the client and overall real earnings management. The SIZE variable indicates that larger clients are related with greater levels of real earnings management. Watts and Zimmerman (1991) explains through the political cost hypothesis that firms more likely manage their earnings downwards due to possible negative publicity. However, another explanation is that firms might apply real earnings management rather than accrual earnings management, as it is less visible than accrual earnings management. According to Kim et al. (2010), real earnings management cannot influence the auditors' opinion or regulators' action when it is properly disclosed. Possible detection of accrual earnings management might be accompanied with high political and media

costs. The results of the accrual earnings model confirm this possible explanation. The regression reports a negative coefficient (-0.024). Thus, suggesting that bigger clients engage less in accrual earnings management.

The findings of Distress as calculated by cash flow-to-total debt yield no significant results for both overall real earnings management and accrual earnings management. The distress variable is only significant on both the Abn_CFO and Abn_Prod variable, however both report a 0.000 coefficient. Therefore no opinion can be formulated regarding the influence of financial distress on real earnings management.

The market to book ratio do not report significant results for both overall real earnings management and accrual earnings management. Only the Abn_Prod variable reports a low significant value, however the results indicate a weak coefficient, which diminishes the value of the result.

The net income variable finds a significant negative relation with real earnings management. This indicates that firms with higher net incomes engage less in real earnings management. The accrual earnings management model finds opposite results and suggests that firms with higher net incomes engage more in accrual earnings management.

Finally the last variable of interest is leverage. The result of leverage regarding accrual earnings management confirms the findings of previous literature (Becker et al. 1998). According to Becker et al. (1998) high leverage is related with discretionary accruals, as managers have incentives to bias earnings upwards. The results of this research indicate that this is the case for the relation between leverage and accrual earnings management. When firms have debt requirements they more likely engage in accrual earnings management. The relation between real earnings management and leverage is negative and suggest that higher leverage is related with lower real earnings management. The individual components of overall real earnings management suggest that higher leverage is related with lower abnormal cash flow from operations, higher abnormal production cost and lower discretionary expenditures. These results confirm the findings of Chi et al. (2011), who find similar results.

The explanatory power of the various real earnings management models is quite weak. The R Square explains the extent in which the variance is explained by the regression model (Pallant, 2010). However, the R Square is optimistic and more likely to provide overestimations when the sample is small. To compensate the overestimations the adjusted R square provides a correction regarding the overestimation by the R Square (Pallant, 2010). When the adjusted R Square is closer to zero the explanation of the variance in the dependent variable is low and when it is closer to one the explanatory power is high. The Adjusted R Square of the various real earnings management models is

close to zero, which means that the explanatory power of the models is low. The REM Index model has an adjusted R Square of 13.2 % that means that 86.8% of the model cannot be explained. The accrual model by Dechow et al. 1995 presents an adjusted R Square of 62%, which means that 38% cannot be explained. This is quite a contrast with the REM Index model. Thus, despite the significance of the REM Index model caution is needed with the explanatory power of the model.

5.2.4.1 Results and conclusion of the analysis

This section will discuss the results and conclusion of the previous analysis. The hypotheses are repeated in combination with the results of the analyses. Furthermore, this section will serve as a stepping-stone for the final chapter by providing a preview of the final conclusion.

H1a: *Audit quality as operationalized by auditor size is related with greater levels of real earnings management.*

Chi et al. 2011 investigated the relation between real earnings management and audit quality as defined by Big N auditors. They find that Big N auditors lead to greater levels of real earnings management. Similar to the research by Chi et al. (2011) this research find similar evidence that Big N auditors are related to greater levels of real earnings management. To verify the switch from accrual earnings management to real earnings management also accrual earnings management is investigated. The results remain inconclusive, despite the correct direction of the coefficient the coefficient is insignificant. Thus no conclusion can be made regarding the relation between Big N auditors and accrual earnings management. In order to investigate the relation between accrual earnings management and Big N auditors, the Kothari et al. (2005) model is tested in the next section as part of the sensitivity analysis. Nonetheless the result of real earnings management confirms the formulated hypothesis. Thus it can be concluded that hypothesis 1a is *accepted.*

H1b: *Long audit firm tenure is related with greater levels of real earnings management.*

Regulators have often debated whether audit quality improved with short audit firm tenure. Prior literature (Johnson et al. 2002; Myers et al. 2003) finds a negative relation between audit firm tenure and accrual earnings management. The contribution of this research is the investigation of tenure and real earnings management. Based on prior research (Johnson et al. 2002; Myers et al. 2003; Chi et al. 2011) it is expected that audit firm tenure is positively related with real earnings management. However, the results of this research contradict the findings of prior literature. The results indicate a negative relation between audit firm tenure and real earnings management. This suggests that audit quality is related with short audit firm tenure. This contradicts prior literature, which suggest that short audit firm tenure is related with lower audit quality. Similar results were found regarding

accrual earnings management. The results indicate that long audit firm tenure is related with lower accrual earnings management, which contradicts prior literature. Nevertheless, the results of the relation between tenure and accrual earnings management suggest a marginal effect (0.003). The next section performs an additional sensitivity analysis to verify this finding. But in general these results would favour the idea of regulators to introduce a mandatory rotation for audit firms, as shortened audit firm tenure seems to constrain accrual earnings management. However, regulators should bear in mind that a mandatory audit firm rotation would also stimulate real earnings management. Regulators can decide to implement a mandatory audit firm rotation when constraining accrual earnings management is their primary agenda. Finally, based on the results hypothesis 1b is *rejected*.

H2: *The PCAOB inspection process is related with greater levels of real earnings management*
The PCAOB was never investigated before in relation with real earnings management. However, Carcello et al. (2011) made an attempt to investigate the relation between the PCAOB and accrual earnings management. They find that the PCAOB inspections lead to a decline in accrual earnings management. The study by Zang (2012) elaborates the substitutive character of these two earnings management methods, which might imply that if the PCAOB inspections would lead to a decline in accrual earnings management this would lead to greater levels of real earnings management. The results of the previous chapter indicate that the PCAOB inspections are related with greater levels of real earnings management. However, it is significant on the unconventional level of 10%, which imply that caution is needed with interpreting the results. It is also possible to regard the results as weak. No strong evidence is provided whether the PCAOB inspections are related to greater levels of real earnings management. The results of the accrual earnings management model indicate an insignificant result and therefore no conclusion is made. To investigate the PCAOB inspections and accrual earnings management even more, the next section provide an additional sensitivity analysis. Thus to conclude, the results regarding the PCAOB inspections in relation with real earnings management provide (very) weak evidence that the PCAOB inspections are related with greater levels of real earnings management. Despite the weak the results and evidence hypothesis 2 is *accepted with caution*.

To conclude this subsection the results indicate that Big N auditors are related with greater levels of real earnings management. This would confirm the findings of Chi et al. (2011) and the notion that Big N auditors do provide higher audit quality. Nevertheless, the results also indicate contradicting findings concerning audit firm tenure. The findings suggest that short audit firm tenure is related with higher audit quality, which support the idea of regulators to enact a mandatory audit firm

rotation. The results find that long audit firm tenure is related with lower real earnings management and greater levels of accrual earnings management. Finally, the results of the PCAOB concerning real earnings management show a positive relation and thus suggesting that due to the PCAOB inspections audit quality improved.

5.2.5 Sensitivity analysis

The results of the accrual earnings management model by Dechow et al. (1995) did not provide conclusive answers and for this reason this research will add an additional model to test accrual earnings management. The Kothari et al. model (2005) will be tested as well. The Kothari et al. model (2005) adds an additional control variable to the modified Jones model (1991), which is the ROA. Their motivation behind the ROA is that it controls for the effect of performance on measured discretionary accruals. The ROA variable would reduce the likelihood that normal (non-discretionary) accruals will be identified as discretionary accruals. The model by Kothari et al. (2005) is as follows:

$$\mathbf{TA/Assets_{it}} = a_0 + a_1(1 / Assets_{it-1}) + a_2((\Delta Sales_{it} - \Delta AR_{it})/ Assets_{it-1}) + a_3(PPE_{it} / Assets_{it-1}) + a_4\, ROA_{it} \text{ (or } ROA_{i-1}) + \varepsilon_{it}$$

Table 4: Estimation results Kothari et al. 2005 models

Kothari ROAt			Kothari ROAt-1		
Intercept	-0.044	***	Intercept	-0.079	***
$1/Assets_{i.t-1}$	0.711	***	$1/Assets_{i.t-1}$	1.716	***
$(\Delta Sales_{it} - \Delta AR_{it})/ Assets_{it-1}$	-0.019	***	$(\Delta Sales_{it} - \Delta AR_{it})/ Assets_{it-1}$	-0.038	***
$PPE_{it} / Assets_{it-1}$	-0.057	***	$PPE_{it} / Assets_{it-1}$	-0.031	***
ROA_{it}	0.583	***	ROA_{it}-1	772	***
Adjusted R square	0.333		Adjusted R square	0.759	

***Significant at the 1% level

Kothari et al. (2005) discuss two options for the ROA variable, which is ROA, based on total assets or ROA based on lagged total assets. For means of comparison both options are investigated.

The results of the Kothari et al. (2005) models (hereafter K-models) are presented in table 5 and are compared to the results of the Dechow et al. (1995) model (hereafter D-model). The regressions indicate that the K-models provide significant results for the BigN variable while the D-model do not yield significant results. The findings indicate that Big N auditors are providing higher audit quality as they are related to lower discretionary accruals. This also provides further evidence that BigN auditors are better in constraining accrual earnings management.

The results of the K-models also support the findings of the D-model regarding audit firm tenure. However, higher significant values are found for the K-models and it is still in contradiction with prior literature. The models still indicate that longer audit firm tenure are related to more accrual earnings management and thus lower audit quality. These findings justify the concerns of regulators.

The findings of the K-models regarding the PCAOB inspections contradict the findings of the D-model. The K-models find that the PCAOB inspections are related to lower accrual earnings management and thus confirm the findings of Carcello et al. (2011). Due to the adoption of the PCAOB inspections, audit quality should have improved, which the K-model with ROA_{it-1} confirms. However, the result indicates a low coefficient and low significance on the unconventional level of 10%. The effects of the PCAOB can still be considered as weak. So caution is needed for the interpretation of the results.

Similar to the PCAOB inspections both K-models find evidence that SOx is related to lower accrual earnings management, as Cohen et al. (2008) reported. But like with the PCAOB the results should be interpreted with caution, as the coefficients are relatively weak. Nevertheless, the significance level of SOx is higher than the PCAOB.

Furthermore, like the D-model both K-models find evidence that the economic crisis is related with lower discretionary accruals. According to Zang (2012) firms would reduce their real earnings management method when they are in financial distress. The assumption would be that the financial crisis would lead to a higher financial distress and therefore firms would less likely engage in real earnings management and thus apply accrual earnings management. However, both K-models do not find such evidence.

Furthermore, the K-model with ROA_{it-1} confirms the findings of prior literature regarding Size, which indicates negative values and thus suggest that larger firms are less willing to engage in accrual earnings management. The costs associated with the detection of accrual earnings management can be high for larger firms. This might harm their legitimacy when detected.

The distress variable does not provide significant results and thus it might be possible that distress do not influence accrual earnings management at all. Similar results are found for the MTB variable that also indicates 0,000.

The net income variable provides significant values and suggests that firms with higher net incomes are related to more accrual earnings management.

Finally, the findings of both K-models contradicts the findings of the D-model and prior literature (Becker et al. 1998; Chi et al. 2011). Unlike these studies both K-models do not find evidence that debt requirements is a motivation to engage in accrual earnings management.

The difference between the D-model and the K-models are the results regarding the PCAOB and leverage. Moreover, the K-models provide higher significant values regarding the variables of interest: BigN, PCAOB, and SOx. The difference in the first stage calculation and the addition of the ROA as a control variable might be the explanation for these differences. The K-models indicate that larger auditors, the PCAOB and SOx are related with lower accrual earnings management. However, the results of real earnings management indicate that the same variables are related with greater levels of real earnings management. The results might indicate that firms when confronted with higher audit quality will switch from accrual earnings management to real earnings management as Cohen et al. (2008) suggested. Another reason would be the visibility of real earnings management. Real earnings management is less visible and therefore more attractive to apply for firms.

The R Square and adjusted R Square provide the explanatory power of the Kothari et al. 2005 model. The Kothari model (2005) with ROA_t shows a very low adjusted R square (0.078), which means that the discretionary accrual variable cannot be explained by the independent variables. Thus, the explanatory power is quite low. The Kothari model (2005) with ROA_{t-1} presents a higher adjusted R Square (0.727). This model provides a higher explanatory power in comparison with the other Kothari et al. (2005) model. The difference lies with the adjusted ROA. Moreover, this model provides a higher explanatory power than the Dechow et al. (1995) model. Thus, the Kothari et al. (2005) model seems to be best suitable model to examine discretionary accruals and it can be used for future research.

5.2.5.1 Results and conclusion of the sensitivity analysis

This subsection will discuss the results and conclusion of the sensitivity analysis. The hypotheses are repeated in combination with the results of the analyses.

H1a: *Audit quality as operationalized by auditor size is related with greater levels of real earnings management.*

The Dechow et al. (1995) model did not find significant results and thereby no conclusion can be formulated. The sensitivity analysis with the Kothari et al. (2005) model do provide significant results, as both K-models presents significant negative values. These values confirm prior literature (Becker et al. 1998; Francis et al. 1999) by indicating that Big N auditors constrain accrual earnings management. Due to constrain of accrual earnings management by Big N auditors, firms might presumably resort to real earnings management such as the previous results indicated. These findings still lead to the *acceptance* of hypothesis 1a.

H1b: *Long audit firm tenure is related with greater levels of real earnings management.*
Similar to the Dechow et al. (1995) model both K-models also find that tenure is positively related with accrual earnings management. The results still contradict prior literature (Johnson et al. 2002; Myers et al. 2003). The findings also imply that the concerns of regulators are grounded but that they should also bear in mind that a mandatory audit firm rotation would stimulate real earnings management. Finally, hypothesis 1b is still *rejected*.

H2: *The PCAOB inspection process is related with greater levels of real earnings management*
In contrast with the Dechow et al. (1995) the Kothari model with ROA_{t-1} as control variable presents a weak significant value that indicates that the PCAOB inspections lead to a decline in accrual earnings management. This is in line with the results of Carcello et al. (2011). Nevertheless, the evidence is quite weak therefore the results should be interpreted with caution. Thus, to conclude the results regarding the PCAOB inspections in relation with real earnings management provide weak evidence that the PCAOB inspections are related with greater levels of real earnings management. Despite the weak the results and evidence hypothesis 2 is *accepted,* however with caution.

To conclude this section the results of the sensitivity models provide stronger results than the Dechow et al. (1995) model. Likewise the results of the Big N variable confirm the findings of previous literature (Becker et al. 1998; Francis et al. 1999; Van Tendeloo and Vanstraelen, 2008). Big N auditors provide higher audit quality and therewith constrain accrual earnings management. Nonetheless, this sensitivity analysis still finds contradicting evidence regarding audit firm tenure and accrual earnings management. The findings suggest that long audit firm tenure stimulates accrual earnings management, while previous researches (Johnson et al. 2002; Myers et al. 2003) find evidence, which suggest the opposite. The findings of this research however confirm the concerns of regulators and support the notion of a mandatory audit firm rotation. Finally, weak results are found regarding the PCAOB inspections but nonetheless the result suggests that the PCAOB inspections constrain accrual earnings management. Finally the sensitivity analysis shows that the model is robust.

Table 5: Sensitivity regressions

Variables	Dechow et al.	Kothari et al.	Kothari et al.
		ROAt	*ROAt-1*
Constant	0.127 ***	-0.059 ***	0.089 ***
BigN	-0.005	-0.040 ***	-0.023 ***
Tenure	0.003 ***	0.014 ***	0.006 ***
PCAOB	0.008	-0.015	-0.009 *
SOx	-0.001	-0.024 *	-0.013 *
Crisis	-0.020 ***	-0.021 *	-0.006
Size	-0.024 ***	-0.002	-0.016 ***
Distress	0.000 ***	0.000 *	0.000
MTB	0.000	0.000	0.000 *
Net Income	0.673 ***	0.244 ***	0.701 ***
LEV	0.074 ***	-0.119 ***	-0.009
Adjusted R Square	0.620	0.078	0.727

***Significant at the 1% level **Significant at the 5% level *Significant at the 10% level

This table provide the regression of accrual earnings management measures on audit quality variables such as auditor size, audit firm tenure, the PCAOB, and the associated control variables. Finally, the differences between the different models are presented. The output from SPSS can be found in the appendix.

5.3 Summary

This chapter provided the results and analyses of the findings. Additionally, a sensitive analysis was performed to provide more conclusive answers regarding accrual earnings management. The results are: Big N auditors are related with greater levels of real earnings management, longer audit firm tenure is related with lower levels of real earnings management, and the PCAOB inspections are related with greater levels of real earnings management. Furthermore, the various tests regarding accrual earnings management provide the following results: Big N auditors are better capable of constraining accrual earnings management, longer audit tenure is related with more accrual earnings management, and the adoption of the PCAOB inspections have lead to a constrain of accrual earnings management.

The next chapter will continue with the final conclusion of the hypotheses and the main research question. Furthermore, the next chapter will discuss the limitations of this research and provide suggestions for future research.

6. The final chapter

This chapter will provide the final conclusion of this thesis and will provide an answer to the main research question. The final conclusion is drawn from the results and the conclusion as formulated in the previous section. Likewise, the limitations of the research will be discussed as well in the second section. Finally, the final chapter will conclude with suggestions for the future.

6.1 Conclusion

This section provides a final conclusion and answer to the main research question, which is derived from the conclusions as formulated in the previous chapter. The main research question was as follows:

"What is the impact of the adoption of the PCAOB inspections and the influence of audit quality on the switch in earnings management method by NASDAQ and NYSE quoted companies?"

Based on a sample of NASDAQ and NYSE listed firms the results indicate that the PCAOB has a weak relation with both real earnings management and accrual earnings management. The answer on the impact of the PCAOB inspections on earnings management is that it has a positive impact on real earnings management and a negative impact on accrual earnings management. Therewith, the results confirm prior literature (Carcello et al. 2011 and Chi et al. 2011). The results imply that due to the PCAOB inspections audit quality of audit firms improved and therefore a probable switch was made from accrual to real earnings management. The results of real earnings management are stronger than the results of accrual earnings management. Despite the weak evidence it leads to the acceptance of hypothesis 2. So the impact of the PCAOB on NASDAQ and NYSE quoted companies is that it has lead to greater levels of real earnings management but bear in mind that the results are weak and therefore caution is needed with interpreting the results.

This research also investigates the influence of audit quality as measured by Big N firms and audit firm tenure. According to prior literature (Becker et al. 1998; Chi et al. 2011) Big N audit firms are delivering higher audit quality. Due to this quality they constrain accrual earnings management but also stimulates real earnings management (Chi et al. 2011). This research confirms these findings, as the findings indeed indicate that Big N firms are positively related with real earnings management and negatively related with accrual earnings management. Based on a sample of NASDAQ and NYSE quoted firms Big N firms should imagine that their operations might stimulate real earnings

management. To answer the main research question, the quality that Big N audit firms deliver stimulates the use of real earnings management of NASDAQ and NYSE audit firms.
Additionally, prior literature (Johnson et al., 2002; Myers et al. 2003) find that long audit firm tenure constrain accrual earnings management and therewith are better capable of providing higher audit quality. Nevertheless, based on a sample of NASDAQ and NYSE quoted firms this research finds contradicting evidence suggesting that short audit firm tenure is related with better audit quality. This would justify the idea of regulators to introduce a mandatory audit firm rotation to counteract accrual earnings management. Nonetheless, regulators should also bear in mind that enacting a mandatory audit firm rotation would stimulate real earnings management as an unintended effect. Before regulators decide to adopt a mandatory audit firm rotation they should acknowledge the effect on real earnings management and imagine precautions to tackle both real and accrual earnings management.

Finally, this research shows that certain audit quality aspects have unintended consequences as higher audit quality leads to greater levels of real earnings management. Beside the attention of mandatory audit firm rotation, regulators and other monitoring bodies should also look at the implications of higher audit quality, as it not only constrain accrual earnings management but also stimulates firms to be creative through the use of real earnings management.

6.2. Limitations

First limitation is that both accrual earnings management and real earnings management can be influenced by a variety of factors that are not implemented in this research. These factors can influence the results in certain ways. This is also the case with the results of the PCAOB. Despite the finding that the PCAOB inspections would lead to greater levels of real earnings management, other possibilities that may affect this relation cannot be completely ruled out. This research cannot determine whether the greater levels of real earnings management are solely attributable to the PCAOB inspections and not other factors.

The second limitation is the multivariate regression model. Like was explained before earnings management can be triggered by several factors. Limited sets of variables are incorporated in the multivariate regression model to capture all these effects and therefore limit the regression model to predict factors that influence earnings management in general. The adjusted R-Square of the models implies that the independent variables have limited explanatory power to explain the dependent variable of overall real earnings management and its individual components. Thus, perhaps more independent variables of interest should be included in the multivariate regression model.

The third limitation that this research copes with is the substitutive character of accrual earnings management and real earnings management. According to Zang (2012) management can decide to choose for one strategy based on the costliness of the earnings management strategies. According to Zang (2012) management uses the opportunity to fine-tune their accruals based on the results of real earnings management. The sequential nature of these two earnings management strategies is not captured by this research.

The third limitation is the measurement of audit firm tenure and its validity. This research uses a sample of 1996 – 2011. To measure audit firm tenure it is assumed that 1996 is the first year of the audit client relationship. It might be possible that these audit client relationships go back until for example the year 1985. Thus, based on the start of the sample period assumptions were made regarding the first year of the audit client relationship. This assumption might have influenced the results of audit firm tenure in a certain extent. Furthermore, due to the sample size the mean audit firm tenure of this research is 4.8 years, which is limited. The bigger portion of short audit firm tenure rather than equal portions between short and long audit firm tenure might have caused this. Due to the limited median of audit firm tenure this might have biased the results regarding audit firm tenure.

The fourth limitation is the database of interest CRSP/COMPUSTAT merged. Like Cohen et al. (2008) all missing values on advertising expenses and research and development expenses are converted into zero and all missing values on SG&A expenses were eliminated from the sample. However, this method as applied by Cohen et al. (2008) might influence the results of the discretionary expenditures and therefore the abnormal discretionary expenditure component of real earnings management.

The fifth of this research might be the modified Jones model (1991) as modified by Dechow et al. (1993) and adapted by Cohen et al. (2008). This model has been criticized for its inability to measure the magnitude of discretionary accruals. However, this problem is offset by a sensitivity analysis with the modified Jones model (1991) by Kothari et al. (2005).

The sixth and final limitation of this research is that the distributions of the residuals are not normally distributed. However, the sample of this research is large enough according to the Central Limit Theorem to approximate a normal distribution. This would imply that the sample of this research (26.777 firm-year observations) would offset the non-normality and still justifies the use of an OLS regression.

6.3 Future research

There are several suggestions for future research. This research focuses on NASDAQ and NYSE listed firms specifically. A suggestion for the future would be all possible listed firm including NASDAQ and NYSE listed firms. This could perhaps enlarge the sample and provide richer information and also provide more evidence regarding the influence of the PCAOB and evidence regarding the influence of audit firm tenure.

Another suggestion would be to investigate the influence of financial distress, this research did not provide conclusive evidence of the effect of financial distress on firms. However, a suggestion for future research is to reinstate the Altman Z-score as a measurement of financial distress. The cash-flow-to-total-debt did not provide evidence of any influence by financial distress.

Real earnings management literature (Roychowdhury, 2006; Chi et al., 2011; Zang 2012) is solely about upward real earnings management. The question for the future as formulated by Chi et al. (2011) is to study whether real earnings management is adopted to manage earnings downwards? A suggestion would be this type of real earnings management in context with audit quality.

Bibliography

Arens, A. A., J. R. Elder and M. Beasley (2011). Auditing and Assurance Services, and An integrated approach. Pearson Education, Limited, 14th edition.

Baralexis, S. (2004). Creative Accounting in small advancing countries: The Greek Case. *Managerial Auditing Journal , 19* (3), 440-461.

Beaver, W. (1966). Financial Ratios as predictors of failure. *Journal of Accounting research* , 71-111.

Becker, C. L, DeFond, M.L., Jiambalvo, J., and Subramanyam K.R.(1998). The effect of audit quality on earnings management . *Contemporary Accounting Research , 15* (1), 1-24.

Carcello, J.V., Hollingsworth, C., & Mastrolia, S.A. (2004). Audit firm tenure and fraudulent financial reporting . *Auditing: A Journal of Practice & Theory , 23* (2), 55-69.

Carcello, J.V., and Nagy, A.L. (2011). The effect of PCAOB inspections on Big 4 audit quality. *Research in Accounting regulation , 23*, 85-96.

Chang, H. Fernando, G.D., & Liao, W.. (2009). Sarbanes-Oxley Act, perceived earnings quality and cost of capital. *Review of Accounting and finance , 8* (3), 216-231.

Chen, K.Y., Lin, K., Zhou, J. (2005). Audit quality and earnings management for Taiwan IPO firms. *Managerial Auditing Journal , 20* (1), 86-104.

Chi, W. Lisic, L., & Pevzner, M. (2011). Is enhanced audit quality associated with greater real earnings management? *Accounting Horizons , 25* (2), 315-335.

Cohen, D.A., Dey. A., and Lys. T.Z. (2008). Real and Accrual-based earnings management in the Pre- and Post-Sarbanes-Oxley Perio. *The Accounting Review , 83* (3), 757-787.

Dahlstrom, R. Ingram, R. (2003). Social networks and the adverse selection problem in agency relationships. *Journal of business research , 56*, 767-775.

Darrough, M.N, and Stoughton, N.M. (1986). Moral Hazard and adverse selection: The question of financial structure. *The Journal of Finance , 2*.

Davis, L.R., Soo, B.S., Trompeter, G.M. (2009). Auditor tenure and the ability to meet or beat earnings forecast. *Contemporary Accounting Research Vol. 26 No. 2* , 517-48.

DeAngelo, L.E. (1981). Auditor size and audit quality. *Journal of Accounting and Economics , 3*, 183-199.

Dechow, P & Dichev, I. (2002). The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review , 77*, 35-59.

Dechow, P. M., R. G. Sloan, and A. P. Sweeney (1995). Detecting earnings management. *The Accounting Review , 70*, 193-225.

Dye, R. (1993). Auditing Standards, Legal Liability and Auditor Wealth. *Journal of Political Economy , 101*, 887-914.

Ewert, R. and Wagenhofer., R. (2005). The effects of tightening accounting standards to restrict earnings management. *80* (4), 1101-1124.

Field, A. (2009). Discovering statistics using SPSS third edition. Sage Publications

Francis, J.R., Maydew, E.L., And Sparks, H.C. (1999). The role of Big 6 auditors in the credible reporting of accruals . *Auditing: A Journal of Practice & Theory , 18* (2).

Freeman, R.E. (2004). A stakeholder theory of modern corporation. *Ethical Theory and Business, 7th edition* .

Freeman, R.E. and Evan, W.M. (1990). Corporate Governance: A stakeholder interpretation. *Journal of Behaviour Economics , 19*, 337-359.

Friedman, A.L. and Miles, S. (2006). Stakeholders: Theory and Practice. *Oxford University Press* .

Graham, J., C. Harvey, and S. Rajgopal (2005). The economic implications of corporate financial reporting . *Journal of Accounting and Economics , 40* (1-3), 3-73.

Gunny, K.A., and Zhang, T.C. (2012). PCAOB inspection reports and audit quality. *Journal of Accounting Public Policy , 32*, 136-160.

Healy, P.M. and J.M. Wahlen. (1999). A review of the earnings management literature and its implicatiosn for standard setting. *Accounting Horizons , 13*, 365-383.

Hillary, G. & Lennox, C. (2005). The credibility of self-regulation: Evidence from the accounting profession's peer review program. *Journal of Accounting and Economics , 40*, 211-229.

Jensen. M.C. and W.H. Meckling. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics , 3* (4), 305-360.

Johnson, E., Khurana, I.K., Reynolds, J.K. (2002). Audit-Firm Tenure and the quality of Financial reports. *Contemporary Accounting Research , 19* (4), 637-660.

Eisenhardt, K.M. (1989). Agency Theory: An Assessment and Review. *Academy of Management Review , 14* (1), 57-74.

Kim, B., L.L. Lisic, and M. Pevzner (2010). Debt covenant slacks and real earnings management. *Working Paper George Mason University* .

Kothari, S. P., A. Leone, and C. Wasley (2005). Performance-matched discretionary accruals measures. *Journal of Accounting and Economics , 39*, 163-197.

Lennox, C. & Pittman, J. (2010). Auditing the auditors: Evidence on the recent reforms to the external monitoring of audit firms. *Journal of Accounting and Economics , 49*, 84-103.

Lennox, C.S. (1999). Audit Quality and Auditor Size: An evaluation of reputation and deep pockets hypothesis. *Journal of Business Finance & Accounting , 26* (7).

Leuz, C., Nanda, D., and Wysocki, P. (2003). Earnings management and investor protection: an international comparison . *Journal of Financial Economics , 69* (3), 505-527.

Levitt, A. (1998). Securities and exchange commission the "numbers game".

Miles, M.B., and Huberman, M. (1994). Qualitative Data Analysis: An expanded sourcebook. Sage Publications Inc.

Myers, J.N., Myers, L.A., and Omer, T.C. (2003). Exploring the term of the auditor-client relationship and the quality of earnings: A case for mandatory auditor rotation? *The Accounting Review , 78* (3), 779-799.

Palepu, K.G. Healy, P.M., and Peek. E. (2010). Business Analysis and Valuation IFRS edition. South-Western Cengage Learning.

Pallant, J. (2010). SPSS Survival Manual . McGraw Hill.

Palmrose, Z. (2005). Maintaining the value and viability of independent auditors as gatekeepers under SOx. *Auditing master proposal: University of Southern California* .

PCAOB. (2011). Protecting the Public Interest: Through audit oversight . *Washington: Public Company Accounting Oversight Board* .

Plooij, F. (2008). Onderzoek doen: Een praktische inleiding in onderzoeksvaardigheden . Pearson Prentice Hall Benelux.

Reynolds, J.K., Francis, J.R. (2001). Does size matter? The influence of large clients on office-level auditor reporting decisions. *Journal of Accounting and Economics , 30*, 375-400.

Ronen, J. and V. Yaari (2008). Earnings management, emerging insights in theory, practice and research. *Springer Science Business Media,* .

Roychowdhury, S. (2006). Earnings management through real activities manipulation . *Journal of Accounting and Economics , 42*, 335-370.

Schepers, A. and Willems, E. (2007). De kwaliteit van de financiele verslaggeving gemeten door winstmanipulatie.

Schroeder, Suzanne Sevin and Richard (2005). Earnings management: Evidence from SFAS No. 142 reporting. *Managerial Auditing Journal , 20* (1), 47-54.

Van Tendeloo, B., Vanstraelen, A. (2008). Earnings management and audit quality in Europe: Evidence from the private client segment market. *European Accounting Review , 17* (3), 447-469.

Wang, H. Davidson. W.N., & Wang, X. (2010). The Sarbanes-Oxley Act and CEO turnover, and risk aversion. . *The Quarterly Review of Economics and FInance , 50*, 367-376.

Watts, R. L., & Zimmerman, J.L. (1990). Positive Accounting Theory: a ten-year perspective . *The Accounting Review , 65*, 131-156.

Watts, R.L., and Zimmerman, J.L. (1978). Towards a positive theory of the determination of accounting standards. *The Accounting Review , 53* (1), 112-134.

Xie, B., Davidson, & W.N., DaDalt, P.J. (2003). Earnings management and corporate governance: the role of the board and the audit committee. *Journal of Corporate Finance , 9*, 295-316.

Xu, R.Z., Taylor, G.K. & Dugan, M.T. (2007). Review of real earnings management literature. *Journal of Accounting literature , 26*, 195-228.

Zang, A.Y. (2012). Evidence on the trade-off between real activities manipulation and accrual-based earnings management. *The Accounting Review , 87* (2), 675-703.

Appendix A: Literature overview

Overview of the literature regarding the effect of auditor size on audit quality		
Becker et al. (1998)	Object of the study	The effect of audit quality on earnings management
	Sample	10,379 Big Six and 2,179 non-Big Six firm years Time period: 1989-1992 Country: U.S. Sample
	Methodology	The cross-sectional version of the Jones 1991 model to measure discretionary accruals. The use of dichotomous variables Big Six or non-Big Six for audit quality.
	Outcome	Non-Big Six auditors report higher discretionary accruals than Big Six auditors. Thus, Big Six auditors are of higher quality than non-Big Six auditors.
Francis et al. (1999)	Object of the study	The role of Big Six auditors in the credibility reporting of accruals
	Sample	75,390 firm years restricted to NASDAQ Time period: 1975-1994 Country: U.S. Sample
	Methodology	The cross-sectional version of the Jones 1991 model
	Outcome	Clients of Big Six auditors have higher levels of total accruals, nevertheless they also have lower amount of discretionary accruals compared to non-Big Six. Thus, Big Six auditors are better capable of constraining accrual earnings management
Chen et al. (2005)	Object of the study	Audit quality and earnings management for Taiwan IPO firms
	Sample	367 IPO issues Time period: 1999-2002 Country: Taiwanese sample
	Methodology	Audit quality is measured by auditor type (size) and industry specialization. The modified Jones model to measure earnings management.
	Outcome	Big Five auditors are related with higher quality, as they are better capable of constraining earnings management of Taiwanese IPO firms.
Tendeloo and Vanstraelen (2008)	Object of the study	Earnings management and audit quality in Europe
	Sample	64,831 private firms Time period: 1998-2002 Country: Six EU countries (Belgium, Finland, France, The Netherlands, Spain, and the UK.
	Methodology	A dichotomous variable for Big 4 auditors or non-Big 4 auditors. The use of an aggregate measure of earnings management behaviour, like Leuz et al. (2003) and Burgstahler et al. (2006).
	Outcome	Private firms audited by Big Four auditors are related with less earnings management in countries with strong legal and tax enforcements.
Conclusion: Big N auditors constrain accrual earnings management (relation is negative)		

Overview of the literature regarding the effect of auditor tenure on audit quality		
Johnson et al. (2002)	Object of the study	The relation between audit tenure and earnings management
	Sample	821 observations Time period: 1986-1995 Country: U.S. Sample
	Methodology	Regression of absolute value of discretionary accruals and the persistence of accruals of earnings on audit firm tenure. Tenure is divided in three groups: short (*three years or less*), medium, and long (nine years or more)
	Outcome	Short audit firm tenure is related to lower audit quality furthermore no evidence is found whether long audit firm tenure impair auditor independence, thus audit quality.
Myers et al. (2003)	Object of the study	Audit firm tenure and the quality of earnings
	Sample	42,302 observations Time period: 1988-2000 Country: U.S. sample
	Methodology	Absolute value of discretionary accruals regressions and abnormal current accruals. Furthermore, the sample is split into tenure deciles in their univariate model and ordinal variables for the multivariate model.
	Outcome	Longer auditor tenure is associated with less extreme income-increasing accruals and less extreme income-decreasing accruals. Suggesting that longer auditor tenure constrains earnings management.
Carcello and Nagy (2004)	Object of the study	Audit firm tenure and fraudulent financial reporting
	Sample	104 firms (matched-pair) Time period: 1990-2001 Country: U.S. Sample
	Methodology	Using the AAER for fraudulent reporting and audit tenure is split in short (*three years or less*) and long (*nine years or more*).
	Outcome	When audit firm tenure is short (*three years or less*) there are more fraud cases, while no evidence is found for long audit firm tenure (*nine years or more*). Thus, short audit firm tenure is related with lower audit quality.
Davis et al. (2009)	Object of the study	Audit tenure and the ability to meet or beat earnings forecast
	Sample	23,748 observations Time period: 1988-2006 Country: U.S. Sample
	Methodology	Cross-sectional Jones model (1991) to measure discretionary accruals. Regression to measure whether discretionary accruals are used to meet or beat earnings forecast and its relation with audit firm tenure.
	Outcome	Both short (*three years or less*) and long (*fifteen years or more*) audit firm tenure are related with increasing discretionary accruals. Thus, audit quality is impaired when audit firm tenure is short and long.
Conclusion: Long audit firm tenure constrain accrual earnings management (relation is negative)		

Overview of the literature regarding the effect of the PCAOB inspections on audit quality		
Carcello et al. (2011)	Object of the study	The effect of PCAOB inspections on Big Four audit quality
	Sample	4,719 auditee-years Time period: 2004-2006 Country: U.S. sample
	Methodology	PCAOB inspections by PCAOB inspections reports or the annual 2005 reports of the AICPA. To measure audit quality, the absolute value of performance-adjusted discretionary accruals.
	Outcome	A significant reduction in abnormal accruals both in the year following the first PCAOB inspection and the year following the second PCAOB inspection. Thus, due to the PCAOB inspections, audit quality improved.
Gunny et al. (2012)	Object of the study	PCAOB inspection reports and audit quality
	Sample	Inspection reports from PCAOB website Time period: 2005-2009 Country: U.S. sample
	Methodology	Cross-sectional regression to estimate abnormal performance-adjusted current accruals.
	Outcome	No concrete results for the annually inspected auditor rather they find conflicting results. Moreover, they find that triennially inspected auditors are related with lower audit quality.
Conclusion: The PCAOB inspections constrain accrual earnings management (relation is negative)		

Overview of the literature regarding the switch between the two strategies of earnings management.		
Ewert and Wagenhofer	Object of the study	Economic effect of tightening accounting standards to restrict earnings management
	Sample	NA
	Methodology	The use of an equilibrium model that the researchers developed.
	Outcome	Tighter accounting standards stimulate the use of real earnings management, as it is more beneficial to adopt this method of earnings management. Likewise, tighter accounting standards leads to improved earnings quality. Furthermore, evidence is found that due to tighter accounting standards firm value decrease. The researchers urge regulators to be aware of potential effect of tighter accounting standards.
Roychowdhury (2006)	Object of the study	The use of earnings management through real activities manipulation
	Sample	21,758 firm year observations Time period: 1987-2001 Country:
	Methodology	Using a cross sectional model by
	Outcome	Real earnings management is adopted to avoid losses
Cohen et al. (2008)	Object of the study	Real and accrual based earnings management in the pre- and post-Sarbanes-Oxley periods
	Sample	81,217 firm-year observations

		Time period: 1987-2005 Country: U.S. sample
	Methodology	To measure accrual earnings management, the modified cross-sectional model by Jones (1991) is adopted. For real earnings management the model by Roychowdhury (2006) is implemented.
	Outcome	Accrual earnings management increased significantly prior the implementation of SOx and declined significantly in the post-SOx period. A switch from accrual earnings management to real earnings management is found.
Chi et al. (2011)	Object of the study	Is enhanced audit quality associated with greater real earnings management
	Sample	104,588 firm year observations
	Methodology	Using the model by Roychowdhury (2006) and Cohen et al. (2008) to measure real earnings management. In addition add industry specialization, auditor size and audit firm tenure as variables.
	Outcome	Higher quality auditing is related with greater real earnings management. Big N auditors are related with higher levels of real earnings management. Long audit firm tenure is related with greater real earnings management. Finally, higher audit fees are related with greater real earnings management.
Zang (2012)	Object of the study	Evidence on the trade-off between real activities manipulation and accrual-based earnings management
	Sample	6500 earnings management suspect firm-years Time period: 1987-2008 Country:
	Methodology	The modified Jones (1991) model is adopted for accrual earnings management. Real earnings management by the model of Roychowdhury (2006).
	Outcome	Accrual earnings management is constrained by high-quality auditors and higher scrutiny by accounting regulators after SOx. Additionally, evidence is found that real earnings management is constrained by firms' competitive status in the industry, financial health, scrutiny from institutional investors and immediate tax consequences in the industry. Finally, evidence is found that there is a trade-off between the two earnings management strategies and that managers adjust managers adjust the accruals based on the results of realized earnings management.
Conclusion: Increased audit quality is related to greater levels or real earnings management (relation is positive)		

Appendix B: Estimation results (SPSS)

The estimation model of abnormal CFO

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	∆Salesi,t/Assetsi,t-1, 1/Assetsit-1, Salesit/Assetsit-1[b]	.	Enter

a. Dependent Variable: CFOit /Assetsit-1

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,546[a]	,299	,298	,282337

a. Predictors: (Constant), ∆Salesi,t/Assetsi,t-1, 1/Assetsit-1, Salesit/Assetsit-1

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	908,205	3	302,735	3797,759	,000[b]
	Residual	2134,185	26773	,080		
	Total	3042,390	26776			

a. Dependent Variable: CFOit /Assetsit-1

b. Predictors: (Constant), ∆Salesi,t/Assetsi,t-1, 1/Assetsit-1, Salesit/Assetsit-1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,065	,003		21,106	,000
	1/Assetsit-1	-2,425	,067	-,187	-36,265	,000
	Salesit/Assetsit-1	,025	,002	,213	12,047	,000
	∆Salesi,t/Assetsi,t-1	,040	,002	,328	18,604	,000

a. Dependent Variable: CFOit /Assetsit-1

The estimation model of abnormal production costs

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	ΔSalesit-1/Assetsit-1, Salesit/Assetsit-1, 1/Assetsit-1, ΔSalesit/Assetsi,t-1[b]	.	Enter

a. Dependent Variable: Prodit / Assetsit-1

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,960[a]	,922	,922	,611956

a. Predictors: (Constant), ΔSalesit-1/Assetsit-1, Salesit/Assetsit-1, 1/Assetsit-1, ΔSalesit/Assetsi,t-1

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	119239,747	4	29809,937	79601,289	,000[b]
	Residual	10025,863	26772	,374		
	Total	129265,610	26776			

a. Dependent Variable: Prodit / Assetsit-1

b. Predictors: (Constant), ΔSalesit-1/Assetsit-1, Salesit/Assetsit-1, 1/Assetsit-1, ΔSalesit/Assetsi,t-1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,237	,007		-35,697	,000
	1/Assetsit-1	-3,161	,145	-,037	-21,774	,000
	Salesit/Assetsit-1	,867	,004	1,137	193,587	,000
	∆Salesit/Assetsi,t-1	-,144	,005	-,182	-30,981	,000
	∆Salesit-1/Assetsit-1	-9,499E-006	,000	,000	-,169	,866

a. Dependent Variable: Prodit / Assetsit-1

The estimation model of abnormal discretionary expenditures

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Salesit/Assetsit-1, 1/Assetsi,t-1[b]	.	Enter

a. Dependent Variable: DiscExpit / Assetsit-1

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,310[a]	,096	,096	,758764

a. Predictors: (Constant), Salesit/Assetsit-1, 1/Assetsi,t-1

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1643,050	2	821,525	1426,943	,000[b]
	Residual	15414,421	26774	,576		
	Total	17057,471	26776			

a. Dependent Variable: DiscExpit / Assetsit-1

b. Predictors: (Constant), Salesit/Assetsit-1, 1/Assetsi,t-1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,262	,008		31,850	,000
	1/Assetsi,t-1	9,320	,179	,303	52,200	,000
	Salesit/Assetsit-1	,058	,006	,060	10,381	,000

a. Dependent Variable: DiscExpit / Assetsit-1

The estimation model of discretionary accruals adapted from Cohen et al. 2008

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	PPEit / Assetsit-1, 1 / Assetsit-1, ∆Salesit / Assetsit-1[b]	.	Enter

a. Dependent Variable: Total accruals/Assets-1

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,437[a]	,191	,191	,464303

a. Predictors: (Constant), PPEit / Assetsit-1, 1 / Assetsit-1, ∆Salesit / Assetsit-1

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1361,967	3	453,989	2105,926	,000[b]
	Residual	5771,639	26773	,216		
	Total	7133,606	26776			

a. Dependent Variable: Total accruals/Assets-1

b. Predictors: (Constant), PPEit / Assetsit-1, 1 / Assetsit-1, ∆Salesit / Assetsit-1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,036	,003		-11,732	,000
	1 / Assetsit-1	-,690	,110	-,035	-6,278	,000
	∆Salesit / Assetsit-1	-,016	,001	-,083	-10,624	,000
	PPEit / Assetsit-1	-,058	,001	-,369	-47,031	,000

a. Dependent Variable: Total accruals/Assets-1

The estimation model of discretionary accruals by Kothari et al. 2005

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	ROA_Kothari, PPEit / Assetsit-1, 1 / Assetsit-1, ((∆Salesit - ∆ARit)/ Assetsit-1)[b]	.	Enter

a. Dependent Variable: Total accruals/Assets-1

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,577[a]	,333	,333	,421526

a. Predictors: (Constant), ROA_Kothari, PPEit / Assetsit-1, 1 / Assetsit-1, ((∆Salesit - ∆ARit)/ Assetsit-1)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2376,648	4	594,162	3343,924	,000[b]
	Residual	4756,958	26772	,178		
	Total	7133,606	26776			

a. Dependent Variable: Total accruals/Assets-1

b. Predictors: (Constant), ROA_Kothari, PPEit / Assetsit-1, 1 / Assetsit-1, ((∆Salesit - ∆ARit)/ Assetsit-1)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,044	,003		-15,676	,000
	1 / Assetsit-1	,711	,102	,036	7,006	,000
	((∆Salesit - ∆ARit)/ Assetsit-1)	-,019	,001	-,103	-14,462	,000
	PPEit / Assetsit-1	-,057	,001	-,364	-51,102	,000
	ROA_Kothari	,583	,008	,383	75,517	,000

a. Dependent Variable: Total accruals/Assets-1

The estimation model of discretionary accruals by Kothari et al. 2005 (ROAt-1)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	ROA, ((ΔSalesit - ΔARit)/ Assetsit-1) , 1 / Assetsit-1, PPEit / Assetsit-1[b]	.	Enter

a. Dependent Variable: Total accruals/Assets-1

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,871[a]	,759	,759	,253500

a. Predictors: (Constant), ROA, ((ΔSalesit - ΔARit)/ Assetsit-1) , 1 / Assetsit-1, PPEit / Assetsit-1

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5413,180	4	1353,295	21058,968	,000[b]
	Residual	1720,427	26772	,064		
	Total	7133,606	26776			

a. Dependent Variable: Total accruals/Assets-1

b. Predictors: (Constant), ROA, ((ΔSalesit - ΔARit)/ Assetsit-1) , 1 / Assetsit-1, PPEit / Assetsit-1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,079	,002		-46,306	,000
	1 / Assetsit-1	1,716	,061	,086	28,223	,000
	((∆Salesit - ∆ARit)/ Assetsit-1)	-,038	,001	-,204	-47,329	,000
	PPEit / Assetsit-1	-,031	,001	-,199	-45,910	,000
	ROA	,772	,003	,773	251,039	,000

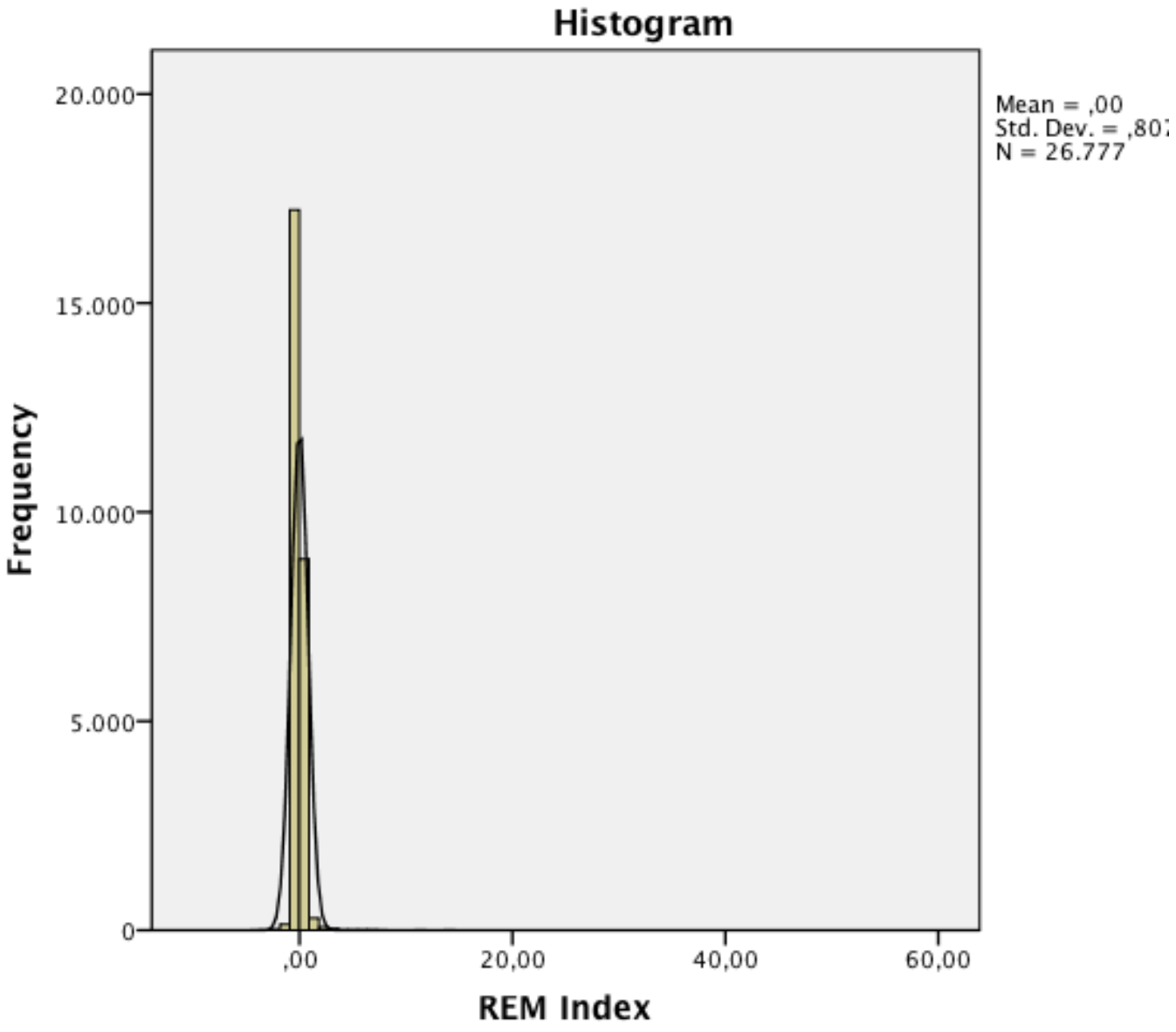
a. Dependent Variable: Total accruals/Assets-1

Appendix C: Normal distribution

REM Index

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
REM Index	26777	100,0%	0	0,0%	26777	100,0%
DA Cohen et al.	26777	100,0%	0	0,0%	26777	100,0%
DA Kothari et al.	26777	100,0%	0	0,0%	26777	100,0%
DA Kothari et al. 2	26777	100,0%	0	0,0%	26777	100,0%



Descriptives

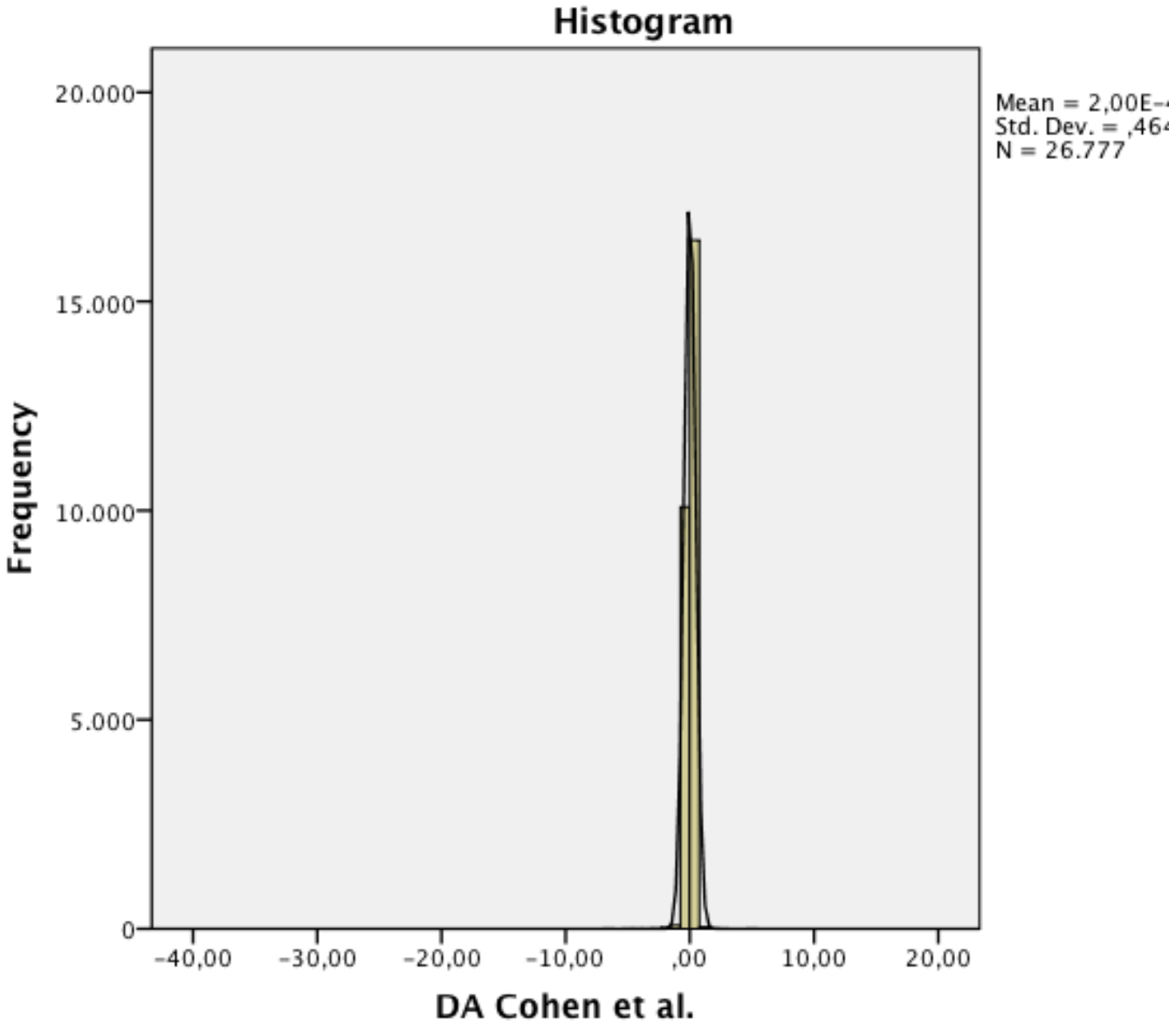
			Statistic	Std. Error
REM Index	Mean		,0011	,00493
	95% Confidence Interval for Mean	Lower Bound	-,0085	
		Upper Bound	,0108	
	5% Trimmed Mean		-,0418	
	Median		-,0621	
	Variance		,651	
	Std. Deviation		,80674	
	Minimum		-9,54	
	Maximum		51,38	
	Range		60,93	
	Interquartile Range		,21	
	Skewness		29,984	,015
	Kurtosis		1492,903	,030

Tests of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
REM Index	,285	26777	,000

a. Lilliefors Significance Correction

Discretionary Accruals adapted from Cohen et al. 2008



Descriptives

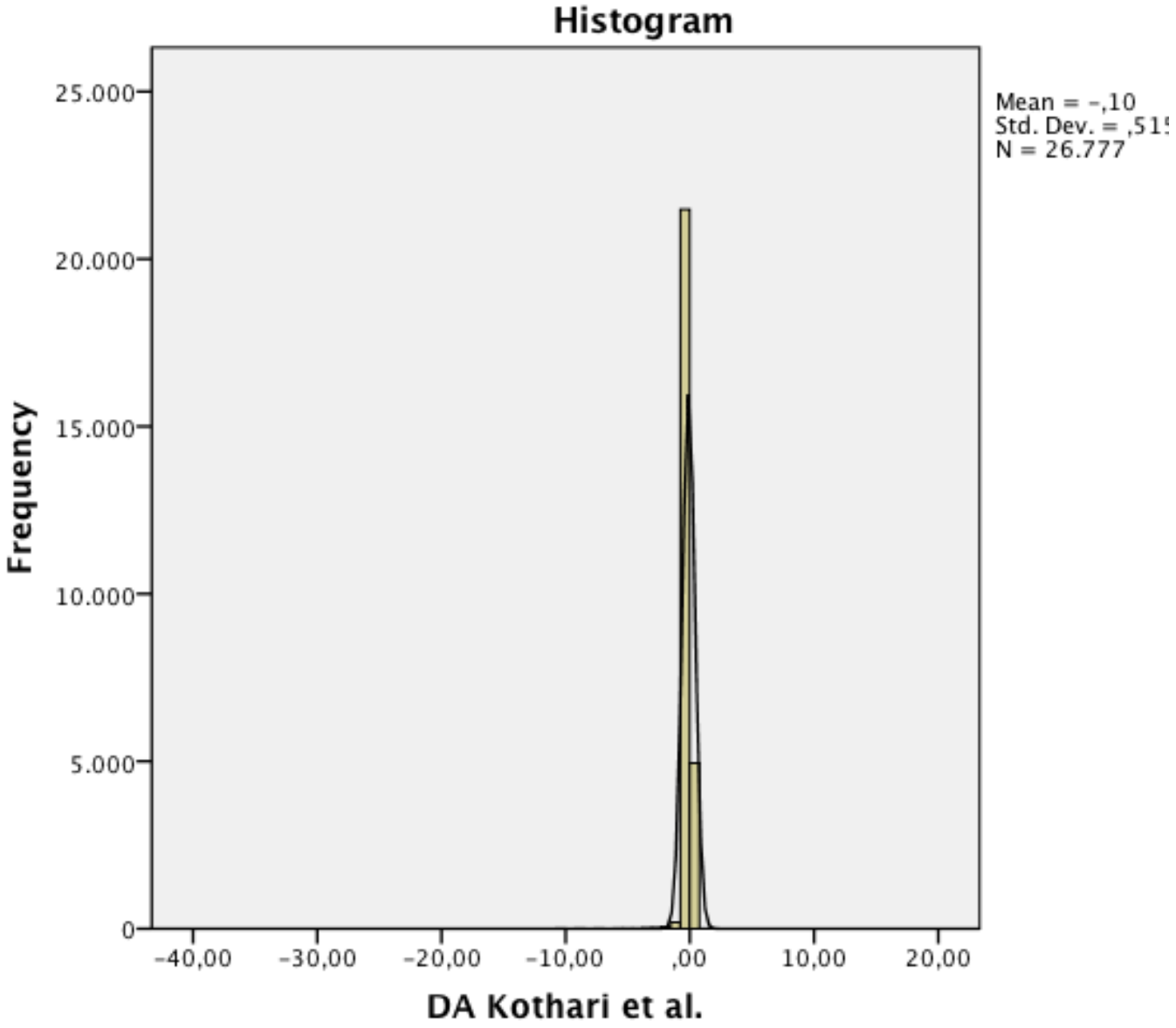
			Statistic	Std. Error
DA Cohen et al.	Mean		,0002	,00284
	95% Confidence Interval for Mean	Lower Bound	-,0054	
		Upper Bound	,0058	
	5% Trimmed Mean		,0125	
	Median		,0186	
	Variance		,216	
	Std. Deviation		,46422	
	Minimum		-37,50	
	Maximum		12,14	
	Range		49,63	
	Interquartile Range		,09	
	Skewness		-47,492	,015
	Kurtosis		3592,366	,030

Tests of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
DA Cohen et al.	,313	26777	,000

a. Lilliefors Significance Correction

Discretionary accruals by Kothari et al. 2005



Descriptives

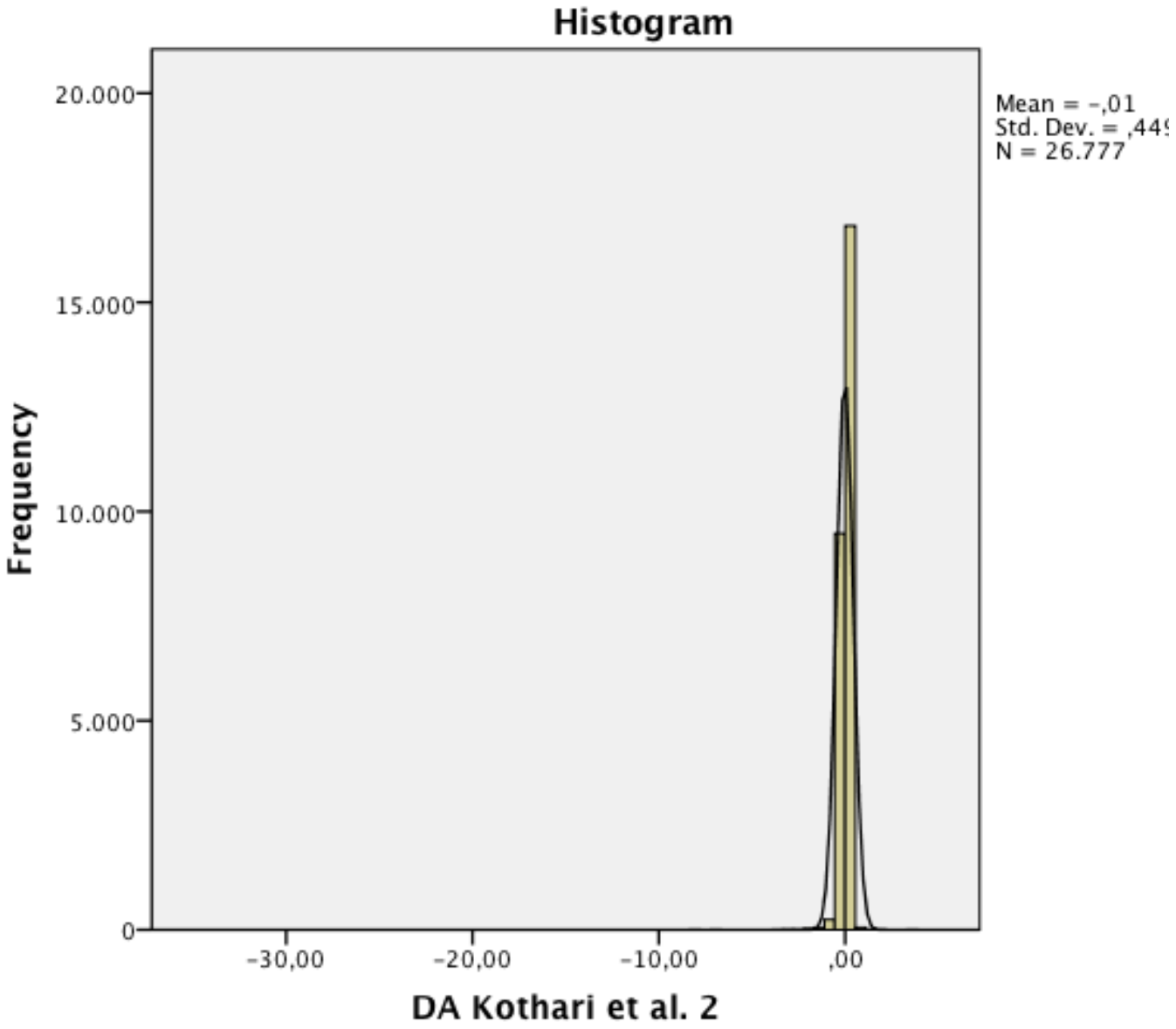
			Statistic	Std. Error
DA Kothari et al.	Mean		-,0971	,00315
	95% Confidence Interval for Mean	Lower Bound	-,1033	
		Upper Bound	-,0910	
	5% Trimmed Mean		-,0604	
	Median		-,0471	
	Variance		,265	
	Std. Deviation		,51465	
	Minimum		-37,67	
	Maximum		12,66	
	Range		50,34	
	Interquartile Range		,09	
	Skewness		-37,252	,015
	Kurtosis		2254,387	,030

Tests of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
DA Kothari et al.	,342	26777	,000

a. Lilliefors Significance Correction

Discretionary accruals by Kothari et al. 2005 (ROAt-1)



Descriptives

			Statistic	Std. Error
DA Kothari et al. 2	Mean		-,0145	,00274
	95% Confidence Interval for Mean	Lower Bound	-,0199	
		Upper Bound	-,0091	
	5% Trimmed Mean		,0100	
	Median		,0193	
	Variance		,201	
	Std. Deviation		,44880	
	Minimum		-30,34	
	Maximum		3,68	
	Range		34,02	
	Interquartile Range		,08	
	Skewness		-40,486	,015
	Kurtosis		2277,439	,030

Tests of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
DA Kothari et al. 2	,311	26777	,000

a. Lilliefors Significance Correction

Appendix D: Multicollinearity and Durbin-Watson

REM index

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-,249	,018		-13,951	,000		
	BigN	,177	,015	,077	11,835	,000	,763	1,311
	Tenure	-,022	,002	-,093	-12,374	,000	,570	1,754
	PCAOB	,045	,017	,028	2,581	,010	,278	3,595
	SOx	,041	,015	,025	2,813	,005	,409	2,444
	CRISIS	,032	,015	,019	2,144	,032	,419	2,388
	SIZE_Client	,025	,003	,059	8,873	,000	,738	1,354
	Distress	-5,381E-005	,000	-,004	-,631	,528	,990	1,011
	MTB	,000	,000	,003	,527	,598	,999	1,001
	Net_Income	-,519	,008	-,352	-61,210	,000	,981	1,020
	LEV	-,047	,019	-,014	-2,453	,014	,968	1,033

a. Dependent Variable: REM Index

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,363[a]	,132	,132	,75170	1,982

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

b. Dependent Variable: REM Index

Discretionary accruals adapted from Cohen et al. 2008

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	,127	,007		18,624	,000		
	BigN	-,005	,006	-,004	-,812	,417	,763	1,311
	Tenure	,003	,001	,020	3,947	,000	,570	1,754
	PCAOB	,008	,007	,008	1,170	,242	,278	3,595
	SOx	-,001	,006	-,001	-,176	,861	,409	2,444
	CRISIS	-,020	,006	-,020	-3,452	,001	,419	2,388
	SIZE_Client	-,024	,001	-,096	-21,983	,000	,738	1,354
	Distress	,000	,000	-,036	-9,560	,000	,990	1,011
	MTB	7,493E-005	,000	,002	,648	,517	,999	1,001
	Net_Income	,673	,003	,794	208,865	,000	,981	1,020
	LEV	,074	,007	,039	10,061	,000	,968	1,033

a. Dependent Variable: DA Cohen et al.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,788[a]	,620	,620	,28611	2,003

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

b. Dependent Variable: DA Cohen et al.

Discretionary accruals by Kothari et al. 2005

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-,059	,012		-5,057	,000		
	BigN	-,040	,010	-,027	-4,081	,000	,763	1,311
	Tenure	,014	,001	,095	12,277	,000	,570	1,754
	PCAOB	-,015	,011	-,015	-1,349	,177	,278	3,595
	SOx	-,024	,010	-,023	-2,466	,014	,409	2,444
	CRISIS	-,021	,010	-,019	-2,099	,036	,419	2,388
	SIZE_Client	-,002	,002	-,009	-1,316	,188	,738	1,354
	Distress	9,777E-005	,000	,010	1,746	,081	,990	1,011
	MTB	,000	,000	,004	,707	,479	,999	1,001
	Net_Income	,244	,006	,259	43,757	,000	,981	1,020
	LEV	-,119	,013	-,056	-9,421	,000	,968	1,033

a. Dependent Variable: DA Kothari et al.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,281[a]	,079	,078	,49407	1,987

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

b. Dependent Variable: DA Kothari et al.

Discretionary accruals by Kothari et al. 2005 (ROAt-1)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	,089	,006		15,995	,000		
	BigN	-,023	,005	-,018	-4,992	,000	,763	1,311
	Tenure	,006	,001	,049	11,549	,000	,570	1,754
	PCAOB	-,009	,005	-,010	-1,732	,083	,278	3,595
	SOx	-,013	,005	-,014	-2,739	,006	,409	2,444
	CRISIS	-,006	,005	-,006	-1,242	,214	,419	2,388
	SIZE_Client	-,016	,001	-,067	-17,915	,000	,738	1,354
	Distress	2,301E-005	,000	,003	,865	,387	,990	1,011
	MTB	,000	,000	,006	1,964	,050	,999	1,001
	Net_Income	,701	,003	,855	265,164	,000	,981	1,020
	LEV	-,009	,006	-,005	-1,464	,143	,968	1,033

a. Dependent Variable: DA Kothari et al. 2

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,853[a]	,727	,727	,23462	1,997

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

b. Dependent Variable: DA Kothari et al. 2

Appendix E: Regression results

Regression results of the REM Index

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB[b]	.	Enter

a. Dependent Variable: REM Index
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,363[a]	,132	,132	,75170

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2302,172	10	230,217	407,421	,000[b]
	Residual	15124,393	26766	,565		
	Total	17426,565	26776			

a. Dependent Variable: REM Index
b. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,249	,018		-13,951	,000
	BigN	,177	,015	,077	11,835	,000
	Tenure	-,022	,002	-,093	-12,374	,000
	PCAOB	,045	,017	,028	2,581	,010
	SOx	,041	,015	,025	2,813	,005
	CRISIS	,032	,015	,019	2,144	,032
	SIZE_Client	,025	,003	,059	8,873	,000
	Distress	-5,381E-005	,000	-,004	-,631	,528
	MTB	,000	,000	,003	,527	,598
	Net_Income	-,519	,008	-,352	-61,210	,000
	LEV	-,047	,019	-,014	-2,453	,014

a. Dependent Variable: REM Index

Regression results of Abn CFO

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB[b]	.	Enter

a. Dependent Variable: Abnormal CFO

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,334[a]	,112	,111	,26617

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	237,976	10	23,798	335,915	,000[b]
	Residual	1896,215	26766	,071		
	Total	2134,191	26776			

a. Dependent Variable: Abnormal CFO

b. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,017	,006		-2,716	,007
	BigN	-,039	,005	-,049	-7,369	,000
	Tenure	-1,781E-005	,001	,000	-,029	,977
	PCAOB	-,017	,006	-,030	-2,753	,006
	SOx	,006	,005	,010	1,064	,287
	CRISIS	,009	,005	,015	1,722	,085
	SIZE_Client	,009	,001	,062	9,189	,000
	Distress	,000	,000	,065	11,280	,000
	MTB	,000	,000	,006	,965	,334
	Net_Income	,160	,003	,310	53,301	,000
	LEV	-,034	,007	-,029	-4,929	,000

a. Dependent Variable: Abnormal CFO

Regression results of Abn PROD

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB[b]	.	Enter

a. Dependent Variable: Abnormal Prod

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,199[a]	,040	,039	,59976

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	397,700	10	39,770	110,559	,000[b]
	Residual	9628,201	26766	,360		
	Total	10025,901	26776			

a. Dependent Variable: Abnormal Prod

b. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,001	,014		,072	,943
	BigN	-,075	,012	-,043	-6,326	,000
	Tenure	,005	,001	,027	3,463	,001
	PCAOB	-,016	,014	-,013	-1,155	,248
	SOx	,006	,012	,005	,509	,611
	CRISIS	-,020	,012	-,016	-1,703	,089
	SIZE_Client	,006	,002	,019	2,751	,006
	Distress	,000	,000	-,025	-4,121	,000
	MTB	-,001	,000	-,017	-2,865	,004
	Net_Income	-,212	,007	-,189	-31,303	,000
	LEV	,067	,015	,027	4,366	,000

a. Dependent Variable: Abnormal Prod

Regression results of Abn Discexp

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB[b]	.	Enter

a. Dependent Variable: Abnormal Discexp

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,198[a]	,039	,039	,74379

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	606,742	10	60,674	109,673	,000[b]
	Residual	14807,681	26766	,553		
	Total	15414,423	26776			

a. Dependent Variable: Abnormal Discexp

b. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,186	,018		-10,541	,000
	BigN	,220	,015	,102	14,885	,000
	Tenure	-,021	,002	-,097	-12,279	,000
	PCAOB	,055	,017	,036	3,176	,001
	SOx	,024	,015	,015	1,645	,100
	CRISIS	,043	,015	,026	2,852	,004
	SIZE_Client	,010	,003	,026	3,703	,000
	Distress	,000	,000	,011	1,754	,079
	MTB	,001	,000	,016	2,622	,009
	Net_Income	-,225	,008	-,162	-26,824	,000
	LEV	-,094	,019	-,030	-4,928	,000

a. Dependent Variable: Abnormal Discexp

Regression results of discretionary accruals as adapted from Cohen et al. 2008

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB[b]	.	Enter

a. Dependent Variable: DA Cohen et al.

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,788[a]	,620	,620	,28611

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3579,298	10	357,930	4372,661	,000[b]
	Residual	2190,965	26766	,082		
	Total	5770,263	26776			

a. Dependent Variable: DA Cohen et al.

b. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,127	,007		18,624	,000
	BigN	-,005	,006	-,004	-,812	,417
	Tenure	,003	,001	,020	3,947	,000
	PCAOB	,008	,007	,008	1,170	,242
	SOx	-,001	,006	-,001	-,176	,861
	CRISIS	-,020	,006	-,020	-3,452	,001
	SIZE_Client	-,024	,001	-,096	-21,983	,000
	Distress	,000	,000	-,036	-9,560	,000
	MTB	7,493E-005	,000	,002	,648	,517
	Net_Income	,673	,003	,794	208,865	,000
	LEV	,074	,007	,039	10,061	,000

a. Dependent Variable: DA Cohen et al.

Regression results of discretionary accruals by Kothari et al. 2005

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB[b]	.	Enter

a. Dependent Variable: DA Kothari et al.

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,281[a]	,079	,078	,49407

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	558,304	10	55,830	228,718	,000[b]
	Residual	6533,607	26766	,244		
	Total	7091,910	26776			

a. Dependent Variable: DA Kothari et al.

b. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,059	,012		-5,057	,000
	BigN	-,040	,010	-,027	-4,081	,000
	Tenure	,014	,001	,095	12,277	,000
	PCAOB	-,015	,011	-,015	-1,349	,177
	SOx	-,024	,010	-,023	-2,466	,014
	CRISIS	-,021	,010	-,019	-2,099	,036
	SIZE_Client	-,002	,002	-,009	-1,316	,188
	Distress	9,777E-005	,000	,010	1,746	,081
	MTB	,000	,000	,004	,707	,479
	Net_Income	,244	,006	,259	43,757	,000
	LEV	-,119	,013	-,056	-9,421	,000

a. Dependent Variable: DA Kothari et al.

Regression results of discretionary accruals by Kothari et al. 2005 (ROAt-1)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB[b]	.	Enter

a. Dependent Variable: DA Kothari et al. 2

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,853[a]	,727	,727	,23462

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3919,952	10	391,995	7121,216	,000[b]
	Residual	1473,364	26766	,055		
	Total	5393,316	26776			

a. Dependent Variable: DA Kothari et al. 2

b. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , SIZE_Client, SOx, Tenure, PCAOB

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,089	,006		15,995	,000
	BigN	-,023	,005	-,018	-4,992	,000
	Tenure	,006	,001	,049	11,549	,000
	PCAOB	-,009	,005	-,010	-1,732	,083
	SOx	-,013	,005	-,014	-2,739	,006
	CRISIS	-,006	,005	-,006	-1,242	,214
	SIZE_Client	-,016	,001	-,067	-17,915	,000
	Distress	2,301E-005	,000	,003	,865	,387
	MTB	,000	,000	,006	1,964	,050
	Net_Income	,701	,003	,855	265,164	,000
	LEV	-,009	,006	-,005	-1,464	,143

a. Dependent Variable: DA Kothari et al. 2

Appendix F: Additional tenure analysis

Additional tenure analysis on REM Index by Zang (2012)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV, CRISIS, MTB, Net_Income, Distress, BigN , Zang_Long, SIZE_Client, SOx, PCAOB, Zang_Short[b]	.	Enter

a. Dependent Variable: REM Index
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,361[a]	,130	,130	,75261

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , Zang_Long, SIZE_Client, SOx, PCAOB, Zang_Short

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2266,196	11	206,018	363,716	,000[b]
	Residual	15160,369	26765	,566		
	Total	17426,565	26776			

a. Dependent Variable: REM Index
b. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , Zang_Long, SIZE_Client, SOx, PCAOB, Zang_Short

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,326	,029		-11,411	,000
	BigN	,165	,015	,072	11,064	,000
	Zang_Short	,052	,019	,031	2,776	,006
	Zang_Long	-,068	,017	-,042	-3,933	,000
	PCAOB	,030	,017	,018	1,700	,089
	SOx	,052	,016	,031	3,359	,001
	CRISIS	,005	,015	,003	,345	,730
	SIZE_Client	,023	,003	,054	8,129	,000
	Distress	-5,329E-005	,000	-,004	-,625	,532
	MTB	,000	,000	,003	,589	,556
	Net_Income	-,519	,008	-,352	-61,155	,000
	LEV	-,043	,019	-,013	-2,239	,025

a. Dependent Variable: REM Index

Additional tenure analysis on REM Index by Johnson et al. 2002

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV, CRISIS, MTB, Net_Income, Distress, BigN , Short_Johnson, SIZE_Client, Long_Johnson, SOx, PCAOB[b]	.	Enter

a. Dependent Variable: REM Index

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,359[a]	,129	,128	,75320

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , Short_Johnson, SIZE_Client, Long_Johnson, SOx, PCAOB

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2242,366	11	203,851	359,326	,000[b]
	Residual	15184,199	26765	,567		
	Total	17426,565	26776			

a. Dependent Variable: REM Index

b. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , Short_Johnson, SIZE_Client, Long_Johnson, SOx, PCAOB

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,248	,019		-12,920	,000
	BigN	,154	,015	,067	10,337	,000
	Short_Johnson	-,030	,011	-,017	-2,720	,007
	Long_Johnson	-,101	,015	-,047	-6,670	,000
	PCAOB	,039	,018	,024	2,216	,027
	SOx	-,007	,014	-,004	-,516	,606
	CRISIS	,017	,015	,010	1,101	,271
	SIZE_Client	,021	,003	,050	7,506	,000
	Distress	-5,405E-005	,000	-,004	-,633	,527
	MTB	,000	,000	,003	,608	,543
	Net_Income	-,519	,008	-,353	-61,181	,000
	LEV	-,039	,019	-,012	-2,041	,041

a. Dependent Variable: REM Index

Additional tenure analysis on discretionary accruals (Cohen et al. 2008) by Zang (2012)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV, CRISIS, MTB, Net_Income, Distress, BigN , Zang_Long, SIZE_Client, SOx, PCAOB, Zang_Short[b]	.	Enter

a. Dependent Variable: DA Cohen et al.
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,788[a]	,620	,620	,28614

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , Zang_Long, SIZE_Client, SOx, PCAOB, Zang_Short

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3578,814	11	325,347	3973,584	,000[b]
	Residual	2191,449	26765	,082		
	Total	5770,263	26776			

a. Dependent Variable: DA Cohen et al.
b. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , Zang_Long, SIZE_Client, SOx, PCAOB, Zang_Short

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,139	,011		12,773	,000
	BigN	-,003	,006	-,003	-,595	,552
	Zang_Short	-,009	,007	-,009	-1,206	,228
	Zang_Long	,007	,007	,007	1,006	,315
	PCAOB	,010	,007	,010	1,458	,145
	SOx	-,003	,006	-,003	-,442	,659
	CRISIS	-,017	,006	-,017	-2,953	,003
	SIZE_Client	-,024	,001	-,095	-21,847	,000
	Distress	,000	,000	-,036	-9,559	,000
	MTB	7,206E-005	,000	,002	,623	,533
	Net_Income	,674	,003	,794	208,839	,000
	LEV	,073	,007	,038	9,998	,000

a. Dependent Variable: DA Cohen et al.

Additional tenure analysis on discretionary accruals (Cohen et al. 2008) by Johnson et al. (2002)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV, CRISIS, MTB, Net_Income, Distress, BigN , Short_Johnson, SIZE_Client, Long_Johnson, SOx, PCAOB[b]	.	Enter

a. Dependent Variable: DA Cohen et al.
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,788[a]	,620	,620	,28611

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , Short_Johnson, SIZE_Client, Long_Johnson, SOx, PCAOB

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3579,233	11	325,385	3974,809	,000[b]
	Residual	2191,030	26765	,082		
	Total	5770,263	26776			

a. Dependent Variable: DA Cohen et al.
b. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , Short_Johnson, SIZE_Client, Long_Johnson, SOx, PCAOB

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,126	,007		17,353	,000
	BigN	-,003	,006	-,002	-,500	,617
	Short_Johnson	,008	,004	,007	1,854	,064
	Long_Johnson	,021	,006	,017	3,634	,000
	PCAOB	,007	,007	,008	1,103	,270
	SOx	,006	,005	,006	1,027	,304
	CRISIS	-,020	,006	-,020	-3,464	,001
	SIZE_Client	-,023	,001	-,095	-21,802	,000
	Distress	,000	,000	-,036	-9,557	,000
	MTB	7,178E-005	,000	,002	,621	,535
	Net_Income	,674	,003	,795	208,887	,000
	LEV	,073	,007	,038	9,967	,000

a. Dependent Variable: DA Cohen et al.

Additional tenure analysis on discretionary accruals (Kothari et al. 2005) by Zang (2012)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV, CRISIS, MTB, Net_Income, Distress, BigN , Zang_Long, SIZE_Client, SOx, PCAOB, Zang_Short[b]	.	Enter

a. Dependent Variable: DA Kothari et al.
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,277[a]	,077	,076	,49458

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , Zang_Long, SIZE_Client, SOx, PCAOB, Zang_Short

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	544,983	11	49,544	202,544	,000[b]
	Residual	6546,927	26765	,245		
	Total	7091,910	26776			

a. Dependent Variable: DA Kothari et al.
b. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , Zang_Long, SIZE_Client, SOx, PCAOB, Zang_Short

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,015	,019		-,797	,426
	BigN	-,033	,010	-,022	-3,343	,001
	Zang_Short	-,028	,012	-,026	-2,312	,021
	Zang_Long	,052	,011	,050	4,605	,000
	PCAOB	-,006	,011	-,005	-,488	,625
	SOx	-,032	,010	-,030	-3,122	,002
	CRISIS	-,003	,010	-,003	-,324	,746
	SIZE_Client	-,001	,002	-,004	-,603	,546
	Distress	9,724E-005	,000	,010	1,734	,083
	MTB	,000	,000	,004	,654	,513
	Net_Income	,244	,006	,259	43,730	,000
	LEV	-,122	,013	-,057	-9,609	,000

a. Dependent Variable: DA Kothari et al.

Additional tenure analysis on discretionary accruals (Kothari et al. 2005) by Johnson et al. 2002

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV, CRISIS, MTB, Net_Income, Distress, BigN , Short_Johnson, SIZE_Client, Long_Johnson, SOx, PCAOB[b]	.	Enter

a. Dependent Variable: DA Kothari et al.
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,274[a]	,075	,075	,49508

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , Short_Johnson, SIZE_Client, Long_Johnson, SOx, PCAOB

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	531,701	11	48,336	197,208	,000[b]
	Residual	6560,210	26765	,245		
	Total	7091,910	26776			

a. Dependent Variable: DA Kothari et al.
b. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , Short_Johnson, SIZE_Client, Long_Johnson, SOx, PCAOB

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,062	,013		-4,900	,000
	BigN	-,024	,010	-,017	-2,495	,013
	Short_Johnson	,020	,007	,017	2,732	,006
	Long_Johnson	,062	,010	,045	6,218	,000
	PCAOB	-,011	,012	-,010	-,935	,350
	SOx	,008	,009	,008	,846	,397
	CRISIS	-,010	,010	-,009	-,962	,336
	SIZE_Client	,000	,002	,001	,123	,902
	Distress	9,790E-005	,000	,010	1,744	,081
	MTB	,000	,000	,004	,626	,531
	Net_Income	,244	,006	,260	43,762	,000
	LEV	-,125	,013	-,059	-9,826	,000

a. Dependent Variable: DA Kothari et al.

Additional tenure analysis on discretionary accruals (Kothari et al. 2005 ROAt-1) by Zang (2012)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV, CRISIS, MTB, Net_Income, Distress, BigN , Zang_Long, SIZE_Client, SOx, PCAOB, Zang_Short[b]	.	Enter

a. Dependent Variable: DA Kothari et al. 2

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,852[a]	,726	,726	,23481

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , Zang_Long, SIZE_Client, SOx, PCAOB, Zang_Short

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3917,555	11	356,141	6459,124	,000[b]
	Residual	1475,761	26765	,055		
	Total	5393,316	26776			

a. Dependent Variable: DA Kothari et al. 2

b. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , Zang_Long, SIZE_Client, SOx, PCAOB, Zang_Short

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,106	,009		11,904	,000
	BigN	-,020	,005	-,016	-4,303	,000
	Zang_Short	-,010	,006	-,010	-1,685	,092
	Zang_Long	,027	,005	,029	4,941	,000
	PCAOB	-,005	,005	-,006	-,935	,350
	SOx	-,016	,005	-,018	-3,361	,001
	CRISIS	,002	,005	,002	,450	,653
	SIZE_Client	-,015	,001	-,064	-17,333	,000
	Distress	2,269E-005	,000	,003	,852	,394
	MTB	,000	,000	,006	1,922	,055
	Net_Income	,701	,003	,856	264,958	,000
	LEV	-,010	,006	-,005	-1,637	,102

a. Dependent Variable: DA Kothari et al. 2

Additional tenure analysis on discretionary accruals (Kothari et al. 2005 ROAt-1) by Johnson et al. (2002)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LEV, CRISIS, MTB, Net_Income, Distress, BigN , Short_Johnson, SIZE_Client, Long_Johnson, SOx, PCAOB[b]	.	Enter

a. Dependent Variable: DA Kothari et al. 2

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,852[a]	,726	,726	,23502

a. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , Short_Johnson, SIZE_Client, Long_Johnson, SOx, PCAOB

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3914,972	11	355,907	6443,590	,000[b]
	Residual	1478,344	26765	,055		
	Total	5393,316	26776			

a. Dependent Variable: DA Kothari et al. 2

b. Predictors: (Constant), LEV, CRISIS, MTB, Net_Income, Distress, BigN , Short_Johnson, SIZE_Client, Long_Johnson, SOx, PCAOB

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,089	,006		14,810	,000
	BigN	-,017	,005	-,013	-3,576	,000
	Short_Johnson	,009	,003	,009	2,685	,007
	Long_Johnson	,030	,005	,025	6,333	,000
	PCAOB	-,008	,005	-,009	-1,405	,160
	SOx	,002	,005	,002	,384	,701
	CRISIS	-,001	,005	-,002	-,301	,763
	SIZE_Client	-,015	,001	-,062	-16,694	,000
	Distress	2,309E-005	,000	,003	,867	,386
	MTB	,000	,000	,006	1,885	,059
	Net_Income	,701	,003	,856	264,798	,000
	LEV	-,011	,006	-,006	-1,842	,065

a. Dependent Variable: DA Kothari et al. 2