Erasmus School of Economics

Accounting, Auditing and Control

Master Thesis

"In what way did the relation between equity incentives and earnings management change in the United States of America due to the Global Financial Crisis of 2008?"

Author: Ravi Patandin

Student number: 376955

Supervisor: Drs. R. van der Wal RA

Co-reader: Prof. dr. D. Veenman

Rotterdam, April 2016

Abstract

This study investigates the association between equity incentives and earnings management (accrual-based and real activities manipulation) in a pre financial crisis period (2004-2007) and post financial crisis period (2009-2012). By providing evidence of one possible effect of stock-based compensation and ownership, this study should be interesting for boards of directors considering compensation contracts for managers, but also to investors and regulators. This study is executed in order to reveal the use of earnings management due to equity incentives in the United States of America during the global financial crisis of 2008. This research is based on a sample of U.S. companies, whose data are available in both the Standard & Poor's ExecuComp database and the Compustat database for the period 2004 – 2012. The modified Jones model by Kothari et al. (2005) is used in order to measure discretionary accruals. Real activities manipulation is measured using the model by Roychowdhury (2006). The hypothesis of this study are tested using multiple regression models in SPSS. The results of this study show a negative relation between earnings management and total equity incentives. However the relation is not significant. The results also show no significant relationship between share-based incentives and earnings management. The opposite is found for the relation between option-based incentives and earnings management, where the significance of the results are relatively high. Furthermore are the findings showing negative earnings management during the pre-crisis period (2004 – 2007) and positive earnings management during the crisis period (2009 – 2012). Looking at the coefficients the results indicate that the crisis period is associated with more accrual based earnings management than real activities manipulation.

Keywords: Equity incentives, Accrual-based earnings management, Real activities manipulation, Financial Crisis

Preface

In order to complete the master course of Accounting, Auditing & Control at the Erasmus University in Rotterdam, I was looking for a subject of current relevance for my master thesis. Due to the financial crisis of 2008 it was interesting to investigate the executive compensation. This study investigates the association between equity incentives and earnings management in the United States of America for a pre financial crisis period (2004-2007) and post financial crisis period (2009-2012).

I would not have completed this master thesis without the help, patience and guidance of my master thesis supervisor Rob van der Wal R.A. Special thanks to my family and friends for their support, encouragement, advice and criticism. Their feedback was very helpful in order to maintain a logical structure and relevance.

Ravi Patandin
Rotterdam, April 2016

Contents

1. Introduction

1.1 Background

The world is still in the middle of the global financial crisis of 2008. Consequently, the quality of financial reports becomes very important. Especially shareholders demand a true and fair view of the financial condition of the companies they are investing in. However, in time of such a crisis, one cannot be sure that a company's financial report provides a true and fair view. Mainly regulators and investors are worried that certain management incentives may lead to earnings management and therewith decrease the quality of financial reports (Cheng & Warfield, 2005). Management has information that shareholders do not have, which makes it difficult to detect earnings management. The flexibility within the regulations can be used to report misleading financial figures, resulting in a financial report of lower quality. The main objective of a financial statement is to inform its users (e.g. investors, creditors, and government) about a company's financial condition, in order to make rational investment, credit, and other decisions. Financial reports show a company's performance through its earnings. Investors and financial analysts use these earnings to determine whether the share of a certain company is attractive for them. Share prices of companies with higher earnings are more attractive compared to the share prices of the companies with lower earnings. Specifically, there are worries that stock-based compensation and stock ownership could make managers to increase the short-term share price through earnings management. The agency theory of Jensen and Meckling (1976) explains a conflict of interest between managers and shareholders. The interest of the managers and the shareholders are not always aligned. Managers may not always act in favour of shareholders, as they might have incentives to manipulate earnings to maximize the firm's wealth or their personal wealth (Becker et al., 1998). To maximize the firm or their personal wealth managers engage in earnings management.

There is little empirical proof for the relation between equity incentives and earnings management. Cheng and Warfield (2005) examine this relation and provide proof that can be used to confirm or disprove accusations of equity incentives being related to earnings management. The research confirmed the worries of regulators and investors concerning managers' incentives. The authors find that managers with high equity incentives engage more in earnings management, compared to low equity incentive managers. Like Cheng and Warfield (2005), Bergstresser and Philippon (2006) find that companies whose CEO's compensation are highly related with firm's share price, have higher level of earnings management.

These prior studies are executed before the financial crisis. However, since the world is still in the middle of a financial crisis, one cannot be sure that a company's financial report provides a true and fair view. Periods like these are characterized by increasing pressure on the share prices resulting into a higher tendency towards earnings management among managers who's compensation is based

upon these share prices. Therefore this study will investigate the association between equity incentives and earnings management in a pre financial crisis period (2004-2007) and post financial crisis period (2009-2012).

1.2 Research question

The main research question in this study is: *"In what way did the relation between equity incentives and earnings management change in the United States of America due to the Global Financial Crisis of 2008?"*

In order to answer the main research question, the following sub questions need to be answered:

1 *What is the content of the word 'earnings management'?*
2 *What is the content of the word 'equity incentive'?*
3 *What is the recent financial crisis?*
4 *Which prior empirical research exists on the relation between equity incentives, earnings management and financial crisis?*
5 *How can the association between equity incentives and earnings management be investigated in practice?*
6 *What are the results of the empirical part of this study?*

1.3 Methodology

Most of the prior studies on earnings management have been executed following an accrual model, which seems to be the proper way to measure earnings management. However, little research exist, based on a model for measuring the use of real earnings management. For this study both an accrual model and a model for measuring the level of real activities manipulation will be used.
Equity incentives will be measured using the five elements of equity incentives according to Cheng and Warfield (2005): option grants in the current period, unexercisable options excluding option grants, exercisable options, restricted stock grants, and stock ownership.
To examine the influence of the financial crisis, dummy variables will be used, one pre financial crisis (2004 – 2007) and one post financial crisis (2009 – 2012).
This study will be based on a sample of U.S. companies, whose data are available in both the Standard & Poor's ExecuComp database and the Compustat database for the period 2004 – 2012. This makes it possible to compare the results of this study with prior studies.

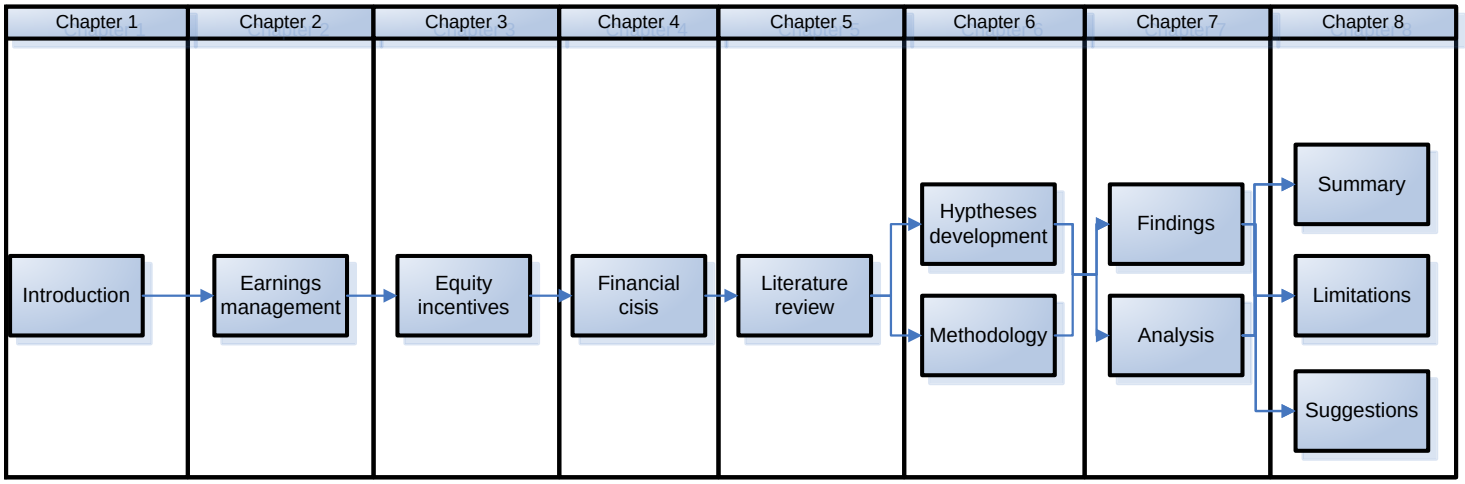
1.4 Relevance

The research question of this paper adds to the compensation literature and extends existing research on compensation-related opportunistic behaviour of managers. By providing evidence of a possible

relationship between stock-based competition and ownership, this thesis might be interesting for boards of directors considering compensation contracts for managers, but also to investors and regulators. This thesis also adds to the earnings management literature, by examining earnings management motives caused by stock-based compensation and ownership. Moreover, there is an association between this research and other researches about the pressure of the capital market on managers due to equity incentives (e.g. Beneish & Vargus, 2002; Cheng & Warfield, 2005; Bergstresser & Philippon, 2006). This paper extends these studies by relating equity incentives to financial reporting characteristics that reflect earnings management (recognizing abnormal accruals and real activities manipulation).

1.5 Structure

The remainder of this study is organized as follows. The second, third, and fourth chapter of this thesis provide respectively more insight into earnings management, equity incentives, and the financial crisis. Chapter five of this thesis will continue with the literature review and summarizes the findings of prior empirical research. This literature review will contain empirical research, related to the three subjects of this study: earnings management, equity incentives, and the financial crisis. These studies provide insight into the relations between the three subjects. This chapter provides elements of prior research, which will be used for the hypotheses development and research design of this thesis. Based on the results and findings of prior research and the research question, the hypotheses are developed in the sixth chapter, this will help to answer the research question of this thesis concerning the three subjects mentioned before. These hypotheses give an indication of the results expected to be found, this can be either a positive or a negative association. Chapter six also contains the methodology, which includes the research method/model and sample being used to investigate the hypotheses. Chapter seven presents the empirical results and the analysis of these results. Finally, chapter eight contains a summary, limitations concerning the main research question, and suggestions for future research.



2. Earnings management

2.1 Introduction

Earnings management receives a lot of attention in accounting literature (Healy & Wahlen, 1999; Jameson, 1988; Schipper, 1989; and Ronen & Yaari, 2008), however, there is still no widely accepted definition. In this chapter, various definitions of earnings management will be provided. Management can have several motives for manipulating financial information. Three of these motives are based on the hypotheses by Watts and Zimmerman (1978). Various methods exist to manage earnings and choosing between these methods depend on the economic situation of the firm. Earnings management is not directly observable by examining the reported information, because it is based on a managerial intent. The use of accrual models is common for detecting earnings management. This paper will use both accrual models as real activities as tools to detect earnings management. This chapter answers sub question one by providing more insight into the term earnings management.

2.2 Definition earnings management

No widely accepted definition for earnings management exists, but merely some commonly used definitions. Some use other concepts rather than earnings management, such as; ‘accounts manipulation’ or ‘creative accounting’.

Healy and Wahlen (1999): earnings management occurs when the management is using its opinion in financial reporting and transaction structuring to manipulate financial statements to either affect contractual results that depend on the reported accounting figures or to mislead certain stakeholders about the underlying performance of the firm.

Jameson (1988) as cited in Chambers (1995), uses the term ‘creative accounting’: creative accounting acts within the letter of either the law and the accounting norms, but is obviously against it. It is a process of using the rules, the failures within them and the flexibility provided, to ensure that the financial statements look slightly different from what was meant by the accounting standards. Compromising loophole searching and rule-bending.

Both these definitions are complementary. The use of manager discretion, as indicated by Healy and Wahlen (1999), is within the boundaries of the regulation and law. The management uses their judgement when presenting financial data. Jameson (1988) points to the flexibility within the accounting regulation (GAAP). While management does not present a true and fair view of the firm, this does not imply a situation of fraud (a violation of the law).

In addition, Schipper (1989) defines earnings management as disclosure management meaning a focused intervention in the financial reporting in order to obtain some personal gains compared to only facilitating the neutral operation.

She stresses that managers have motives to hide the actual firm performance through their discretionary power to manipulate the financial data. They obtain personal gain (a wealth transfer), whether this is for the whole firm or only for the management

All in all earnings management is the result of the flexibility within accounting rules which is used by the management to knowingly misrepresent the company's earnings within the boundaries of the regulations and laws to achieve predetermined goals that correspond to the figures of the financial statement. There is a distinction between flexibility in valuation of liabilities and assets, flexibility in disclosure, flexibility in determining results, and other subjectivity in the process of preparing the financial reports.

Ronen and Yaari (2008) have several definitions of earnings management of various authors, summarized into three different groups; (1) White (beneficial), which means that earnings management improves the transparency of financial statements. (2) Gray, refers to the manipulation of financial statements, within the bounds of compliance with the bright-line standards, that may be efficient or opportunistic. When it is not to maximize the value of the company, earnings management is opportunistic, otherwise it is classified as efficient. At last (3) Black (the pernicious), meaning direct fraud and misrepresentation. Ronen and Yaari (2008) formulated the following definitions of these three groups:

White: earnings management means making use of the flexibility in the choice of the accounting method to signal the managers' personal information regarding future cash flows.

Gray: earnings management is selecting an accounting method that is either economically efficient or opportunistic (maximizing the utility of management).

Black: earnings management is using tricks to reduce transparency of or misrepresent the financial statements.

Also, after taking these three definitions into account, they declare that the definition of Healy and Wahlen (1999) describes earnings management the best. While it is the best definition, it still includes two shortcomings. First, there is no clear distinction between earnings management and normal activities. Second, not all earnings management are misleading. Managers, for example, can separate persistent earnings from one-time shocks in order to allow investors to better distinguish between the two components. Taking these weaknesses into consideration Ronen and Yaari (2008) provide an alternative definition stated as:

"Earnings management is a collection of managerial decisions that result in not reporting the true short-term, value-maximizing earnings as known to management. Earnings management can be Beneficial: it signals long-term value;

Pernicious: it conceals short- or long-term value;
Neutral: it reveals the short-term true performance.
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."

2.3 Agency theory

The opportunistic behaviour of management is explained by the agency theory, which takes as a starting point the argument that people are motivated by their own self-interest. Jensen and Meckling (1976) provide the following definition of the agency relationship: *"an agreement whereby one or more persons (principal(s)) engage another person (agent) to perform certain services on their behalf, meaning that some decision making authority is being delegated to the agent".*

The separation of ownership and control is the basis for the agency theory. The shareholders are the principals and the management is the agent. Where management strives to maximize their bonus payments, shareholders want their part of the profit to be as large as possible. Both are utility maximizers, therefore it might be possible that the agent (management) will not always act in the best interest of the principal (shareholder).
This misalignment of goals and interest is underlying the agency problem. Contracts can help to align the goals and interests of the agents and the principles, enabling both the agent and the principal to maximize their results.
When the principal does not has a clear picture of how the agent fulfilled its job, there is a lack of monitoring by the shareholder and an agency problem exist. It may be argued that an information asymmetry exists on both sides. This information asymmetry and the contradictory interests between the agent and the principal can create incentives to manipulate the financial statement and consequently the use of earnings management. Earnings management may be used both to decrease and increase income. Arthur Levitt (1998) mentioned five different methods the management of a firm can use to manipulate income; (1) big bath accounting, (2) cookie jar reserves, (3) creative acquisition accounting, (4) revenue recognition, and (5) materiality. More information about these five methods will be provided in section 2.6.

2.4 Positive accounting theory

The positive accounting theory focuses on the relationship between individuals. According to Watts and Zimmerman (1978), the behaviour and the interests of managers are disclosed in the positive accounting theory. Managers seek to maximize their private utility, so they will use accounting regulations that realize this maximization. Watts and Zimmerman (1978) have designed three hypotheses, in order to explain the reason why managers make use of a particular reporting method. The first hypothesis is the 'bonus plan hypothesis'. Basing management assessment and remuneration on their performance creates an important motivation for them to manipulate earnings.

Managers, whose compensation is based on the earnings, favour accounting practices that create an increase in current income, so their bonus will increase as well. However, if earnings are below the minimum level required for the payment of a bonus, managers have incentives to reduce earnings in the current year and increase expected bonuses and profits in future years (earnings bath). When managers find themselves above the maximum allowable under the compensation plan, they have no incentive to increase earnings. On the contrary, they may even take certain losses in the current year and add them to future years.

The 'debt/equity hypothesis' is the second hypothesis. Bondholders and other creditors want to ensure repayment of their principal and interest. To protect themselves, they impose restrictions on the borrower as to dividends, share repurchase, and issuance of additional debt (covenants). When the ratio of debt to equity is high (low solvability), management will give preference to accounting methods that increase the earnings in order not to violate the covenants. If a firm can not comply with the conditions of a covenant, creditors could change the terms and increase interest rates.

The 'political cost hypothesis' is the last hypothesis, often presented in the literature as a size hypothesis. The larger a firm, the more political attention exists. This attention could lead to higher political costs, such as higher wage demands, increased taxes and it also catches the attention of environmental organizations. To reduce these costs, management can elect accounting standards that create a reduction of the current income. These three hypotheses make it possible to explain why management make certain accounting choices.

2.5 Earnings management incentives

Shareholders use the information provided in the financial reports as a source for investment and valuation decisions. In certain situations, the management has incentives to manage the earnings and influence the actions of the shareholders.

Depending on their incentives, the management takes accounting decisions that affect the financial statement, either positively or negatively. They can have the incentive to maximize company value (future cash flow) and create shareholder value, but the management could also act in their own interest by maximizing their personal wealth. The benefits of an increased company value are for example, better credit conditions and a higher share price. It is possible that the management wishes to keep the income consistent (consistent growth) by avoiding big differences in the earnings and losses over the years, also known as "income smoothing".

The information asymmetry between management and shareholders makes earnings management possible. Management has superior knowledge of the economics of the company compared to the shareholders, who only have access to information presented in the financial reports (Deegan & Unerman, 2006). The existence of imperfect markets makes information asymmetry possible. In a perfect market all information is available for the participants at the same time, the information circulates very fast, and the recipients can interpret the information in a correct way. Under these conditions, earnings management will have no impact unless the timing of the transactions can escape to the attention of the market (Stolowy & Breton, 2004). In an imperfect market, where the

shareholders do not have all the correct information on a timely basis, earnings management can have effects. The information asymmetry is linked to the agency problem (agency theory) discussed earlier. As stated before, the agency theory is based on the separation between control and ownership. The management is the agent and the shareholders are the principals. There is an agency problem if the principal has no clear picture of how the agent performed. Since the agent could be driven by self-interest, he may not act in the best interests of the principal causing an information asymmetry between the two parties. This information asymmetry creates two different agency problems, which are adverse selection and moral hazard. Adverse selection arises if the principal has a false impression of the capability of the agent. Moral hazard sets out the situation where the agent might engage in risk taking and other activities that would hurt the bondholder to the advantage of the equity holder (White et al., 1994). As stated earlier the positive accounting theory addresses the relationship between individuals. This relationship is used to anticipate when and why management of a firm will use specific accounting methods to manage earnings. As mentioned before in section 2.4, the positive accounting theory consists of three hypotheses; (1) bonus plan hypothesis, (2) the debt/equity hypothesis, and (3) the political cost hypothesis. Using these three hypotheses, one can explain why management makes certain accounting decisions. Several other studies also appoint some possible incentives for managing earnings. According Healy and Wahlen (1999), involvement into earnings management could be stimulated by:

1. Capital market valuation and expectation (capital market incentives); this incentive is about meeting earnings benchmarks. In order to meet these benchmarks managers will manage their earnings. Shareholders use this information to value a company's shares. This creates an incentive for managers to manage the earnings and affect the short-term share price.
2. Contracts written in accounting numbers (contracting incentives); financial information helps regulating and monitoring contracts between the firms and their shareholders. Credit and compensation contracts may influence managers to manage their earnings.
3. Antitrust or government regulation (regulatory incentives); within the regulatory incentives, there is a difference between industry legislation and antitrust and other rules. Every industry has to comply with some industry specific rules. Therefore, the industry legislations refer to rules that are linked to accounting information. All these regulations can create motives to manage earnings. Compliance with other rules, like antitrust regulation or adverse political consequences, may create incentives to manage the earnings downward (e.g. when managers want government subsidy or protection).

More recently Palepu et al. (2007) mentioned some other incentives besides the ones mentioned before, such as:

1. Accounting-based debt covenants; to meet contractual commitments in their debt covenants, managers may take certain accounting decisions. For example, they may manipulate ratios in order to meet a certain (ratio) level agreed on with the bank.

2. Management compensation; job security and fees of managers are based on their accomplishments, so they have a strong motive to manage earnings and meet their targets.
3. Corporate control contests; competitive management groups trying to win over the shareholders of the company. They may make decisions to influence investor's (e.g. raise the share price).
4. Tax considerations; to swap between financial reporting and tax considerations, is also a reason why managers can make certain reporting choices. For example, U.S. firms use LIFO inventory accounting, therefore when prices are rising they will have lower earnings (i.e. reduced tax payments).
5. Stakeholder considerations; managers can make accounting decisions to influence the perceptions of the shareholders. For example, managers can present lower profits when they know that high profits will be used as an instrument to obtain wage increases by labour unions

All taken together, managers have a variety of incentives to exercise their accounting discretion to achieve certain objectives. However, it is important not to assign all changes in the principles for financial reporting and accruals to earnings management motives. Palepu et al. (2007) stated that accounting changes might only reflect changes in business conditions. For example, perhaps uncommon increases in accounts receivables could solely be attributable to changes in the sales strategy of a company.

2.6 Methods for earnings management

The "how to" part of earnings management includes many variations. Earnings management might be used both to decrease and increase income. Arthur Levitt (1998) mentioned five different methods which the management of a firm can use to manipulate income.

First, the management can choose for loss maximization, also known as 'big bath accounting'. This method will be used when the company suffers a loss in the current period. When the present earnings are disappointing and specific targets will not be met, the management can choose to maximize the losses during the current period. The reason for this is that making a situation worse when it was not good to begin with will not be a problem. This gives the management the chance to improve future earnings, meet future targets, and receive their bonus. This causes the shareholders to focus more on the future earnings and see the current loss as a one-time event that is not that important.

The second method is "creative acquisition accounting. Because of the increasing number of spin-offs, acquisitions, and consolidations, this method is becoming more popular recently. The author calls it the "merger magic". A merger may be carried out through purchase or pooling accounting. Some firms have no other choice but to use the purchase accounting method resulting in lower future earnings, which is not preferable for managers. So they creatively classify an ever growing share of the acquisition price as research and development allowing the amount to be amortized as a one-off charge, getting rid of future obligations.

A third method used by some companies is “cookie jar reserves”. Using unrealistic assumptions to estimate liabilities such as credit losses, sales returns, or warranty costs, this method reduces earnings during good years and stashes them into cookie jars. When the firm faces difficult times, they will reach into these so-called (cookie) jars.

Another method used by companies to manage their earnings is “materiality”. According to Arens et al. (2011), if awareness of a misstatement will affect the decision of a reasonable user of the financial statements, a misstatement of the statements may be considered as material. Certain items might be so insignificant that they are not worth to measure and to report with accuracy. Companies can misuse the concept of materiality by recording errors within a defined percentage limit. Because the misstatement has a very small impact on the financial statement, managers will use it as an excuse and the misstatement will be seen as immaterial.

The last method used to manipulate earnings is “revenue recognition”. Some companies are recognizing revenue before the product is delivered to a customer, before a sale is complete, or when the customer still can delay, terminate, or void the sale. Ronen and Yaari (2008) categorizes the revenue manipulation into:

- Recording contingent sales with right of return as sales: all risks need to be passed to the buyer before a sale can be recognized. Since this did not happen yet, recognition of contingent sales violates the revenue recognition principle.
- Channel stuffing: to increase current sales, the company offers outrageous discounts to customers resulting in rapid purchases.
- Bill-and-hold transactions: just the bill of the sale is recognized whereas the seller still holds the products and the buyer will not pay for them. Only a virtual sale exists.
- Violating quarter cutoffs rules: revenue is being recorded in another period than that it is actually earned. For instance, the recognition of income before the shipment the products to the customer.

2.7 Detecting earnings management

After defining and explaining the various motives and methods to manage earnings, it is required to understand how earnings management can be detected. Earnings management is not directly observable by examining the reported information. Management can use several accounting policies to influence income. For instance, several accounting decisions (e.g. the presentation of the financial figures, the measurement and the recognition of income, the (voluntary) disclosures in the financial statements, and real transaction decisions). A variety of methods are created to detect earnings management. Accrual models are one of these methods, which is commonly used for the measurement of earnings management. Another, not so often used method, is detecting earnings management by the level of real activities manipulation. Both of these methods are of great importance for this study.

2.7.1 Accrual based model

Prior studies use the Jones model (1991) and the modified Jones by Dechow et al. (1995) to measure earnings management. This paper measures earnings measurement by the model of Kothari et al. (2005) and this model is based on the initial Jones model and modified Jones model. Before the two models are discussed, this section starts with explaining the accrual concept.

An accrual is measured as the difference between earnings and cash flows (earnings = accruals + cash flows from operations) in a given period. So, accruals are the product of the difference between timing of the recognition of a transaction and timing of the cash flows, also known as time lag (Ronen & Yaari, 2008). Accruals could be divided in discretionary and non-discretionary accruals.

Ronen & Yaari (2008) define non-discretionary accruals as accruals deriving from transactions in the current period that are common for the company considering its macro-economic events, industry conventions, strategy and performance level, and other economic factors.

Ronen & Yaari (2008) define discretionary accruals as accruals derived from chosen accounting methods or transactions made to manipulate income.

This distinction is based upon the degree to which management can affect the accruals. Non-discretionary accruals result from normal economic actions (The industry in which the company performs and its size). Discretionary accruals are the outcome of the managers actions (e.g. accounting decisions and transactions), to manipulate income. That is why discretionary accruals can be seen as a signal of earnings management. So to investigate whether a company managed their earnings, it is important to know the level of discretionary accruals used by management. However, it is only possible to derive the total accruals from financial reports. Therefore, it is needed to reduce non-discretionary accruals from total accruals because total accruals minus non-discretionary accruals result into discretionary accruals. In order to measure non-discretionary accruals, a variety of accrual models have been created. For this thesis, the most important models are the Jones model (1991), the modified Jones model by Dechow et al. (1995), and the modified Jones model by Kothari et al. (2005). These models will be discussed in the remainder of this section.

These various accrual models could be used in a cross-sectional or in a time-series approach. The time-series approach is used where disparities within the same firm over a longer time-period (e.g. before and after a certain event occurred) needs to be studied (e.g. company X for the period 2000-2010). To measure the non-discretionary accruals for each year, the regression coefficients (e.g. AR, ROA, REV, and PPE) have to be known and be available. On the basis of the value of these variables, the coefficients will show an estimated (normal) value of the variables in year X. By deducting the non-discretionary accruals of the total accruals, discretionary accruals can be measured.

The cross-sectional approach is not using firm-specific values for those variables, but the industry average is being compared with that of company X. In order to measure non-discretionary accruals for a given firm, first coefficients have to be estimated based on the variables mentioned before (i.e. REV, AR, etc.) of the entire industry. Again, by deducting non-discretionary accruals of total accruals, discretionary accruals can be measured.

The Jones model (1991)

The Jones model is based on three steps: (1) total accruals (the difference between earnings and cash flow) and calculating the coefficients, (2) estimating non-discretionary accruals and (3) calculation of the discretionary accruals by deducting non-discretionary accruals from total accruals.

Jones (1991) stated that earnings management could be measured using an estimation and event period (two-period model). For the estimation period, discretionary accruals are assumed to be zero. The assumption is based on the 'expectation model' of DeAngelo (1986), who states that total accruals of the last period equal the (normal) total accruals. So a change in total accruals reflects a change in discretionary accruals. Because discretionary accruals are supposed to be zero in the estimation period, this assumption means that earnings management does not exist in the estimation period.

Gross property, plant and equipment, and change in revenues are added to control for changes in normal (non-discretionary) accruals. Total accruals contain changes in working capital accounts (accounts receivables, inventory, and accounts payable). In order to offset the differences in firm size, all the variables are scaled by lagged total assets (A_{it-1}). This will prevent large companies with high accruals to bias the results of the study.

This model derives non-discretionary accruals from the total accruals and expects discretionary accruals to be zero. In the second period, the event period, the amount of discretionary accruals is expected to be the difference between total accruals and non-discretionary accruals, and will be used as the measurement of earnings management.

Because of some imperfections in this model, various academics made adjustments to the initial Jones model. A limitation of the Jones model is the possibility of 'type-I error'. Some normal accruals could be identified incorrectly as discretionary accruals. The consequence is that H_0 can be rejected while it is true, resulting in an incorrect conclusion. Jones herself states another disadvantage of her model, which is that all revenues are expected to be non-discretionary. So if earnings are managed through discretionary revenues, then the Jones Model will not detect part of the managed earnings. Dechow et al. (1995) provided a solution for this.

The modified Jones model by Dechow et al. (1995)

To eliminate the error of not measuring discretionary accruals when discretion is exercised over revenues, the variable net 'receivables' is added to the Jones model (Dechow et al., 1995). They suggest that any change in credit sale (non-cash sales) in the event period are results of earnings management. Jones (1991) believes that revenues are all non-discretionary, which is why change in

REC is added to the Jones model. Companies can engage in earnings management by using its discretion to accrue revenues at year-end when the cash has not yet been received and it is questionable whether the revenues have been earned. This will result in increase in revenues and total accruals. Jones (1991) does not correct for this.

The model by Kothari et al. (2005)

To measure earnings management in this study, the cross-sectional performance model by Kothari et al. (2005), will be used. This model is used because if one measures earnings management caused by equity incentives, it is especially important to control for firm performance and that is what the Kothari et al. (2005) model does. This model is based on the initial Jones model and modified Jones model. The goal of earnings management is to enhance firm performance, there is a correlation between firm performance and management compensation (Ronen & Yaari, 2008), therefore controlling for firm performance is important when using earnings management in combination with equity incentives.

2.7.2 Real activities manipulation

The other method for detecting earnings management is by checking the level of real activities manipulation. Like the accrual based method, real activities manipulation can be executed in different ways. Manipulating income through this method could be done using operating, investing, and financing activities.

Operating activities

As stated by Roychowdhury (2006) operating activities create the outflows and inflow of money in a firm, determining the net income. By changing the level of discretionary expenses, these cash flows can be manipulated. The most commonly manipulated expenditures are Selling, General and Administrative (SG&A) and Research & Development (R&D). It is most likely that these expenditures will be used for real activities manipulation when they do not generate income and revenues immediately.

Next to the use of discretionary expenditures, sales and production are used to adjust financial figures. Roychowdhury (2006) defines sales manipulation as: managers' efforts to temporary increase sales throughout the year by offering flexible credit terms or price discounts.

These discounts should lead to more cash inflows. However, this will occur at a lower margin resulting in high production costs to sales ratio. As opposed to the reduced margins by providing discounts, increasing the total production will raise the margin. When there is being produced more, overheads can be spread over a greater amount of units which causes the cost of goods sold (COGS) to decrease, increasing the firms' operating margin. This is not permitted by the accounting standards, because the matching principle is being violated (manufacturing and storage costs of the overproduced products must be taken in period of sale).

Investing activities

Earnings can also be manipulated using income from the sale of long-term assets. Bartov (1993) states that the timing of asset sales is chosen by the management, so the income from these sales smoothens temporary income variations and reduces accounting based constraints in debt contracts. Other investing activities that could be used for manipulation are issuance of convertible debt, leases, equity investments, and business acquisitions. Such activities are carried out in order to improve the leverage ratio and increase reported income (Xu et al., 2007).

Financing activities

For the financing of a company, share may be issued on the stock exchange. These shares can be used as a tool for manipulation by a company. By repurchasing share, the number of common shares outstanding will decrease and may cause the earnings per share to increase (Xu et al., 2007). But this only applies if the ratio of price to earnings is greater than the forgone rate of return on cash paid for the repurchase (Hribar et al., 2006; Guay, 2002).

Xu et al. (2007) also mentioned that share options can be used to manipulate by modifying the grant of share options to retain a trend of growing income and fulfilling the expectations of analysts.

So real activities manipulation is an attempt by management to change reported income by changing scale and timing of underlying business operations (e.g. capital investments, production, R&D expenditures, disposal and sale of long-term assets)

Roychowdhury (2006) defines real activities manipulation as: deviation from regular operational activities, inspired by the managers' desire to deceive at least certain stakeholders to believe that some of the financial reporting objectives are met in the regular course of business.

Zang (2005) defines real activities manipulation as: a focused operation to change reported income in a given direction that is achieved by altering the financing or investment transaction, structuring or timing of an operation, and has suboptimal business implications.

To detect real earnings management, the focus has to be on financing, investing, and operating business activities. These operations will be checked by a comparison of the normal level with their actual level and will be determined using models developed by Roychowdhury (2006) and Gunny (2010). An abnormal difference between the two levels could be an indication of earnings management. The models developed by Roychowdhury (2006) and Gunny (2010) are discussed below.

The Roychowdhury model (2006)

The Roychowdhury model focuses on sales manipulation, reduction of discretionary expenses and overproduction. To examine this, patterns in discretionary expenses, production costs, and cash flow from operations (CFO) for firms close to the zero earnings benchmark have to be examined. Dechow

et al. (1998) examined the association between cash flows and earnings, and created a model to test this relation. Using the model of Dechow et al. (1998) as base model, the normal level of CFO, production costs and discretionary expenses can be inferred.
Following Dechow et al. (1998), cash flow from operations will be expressed as a linear function of change in sales and sales in the current period.

With the use of the coefficients derived from the data, the normal level of CFO can be determined which than can be compared with the actual level of CFO. An abnormal difference between these levels would be an indication of the use of real activities manipulation. This method of determination of the indicative value for real activities manipulation can also be used for COGS, inventory growth and production costs. Both equations for the determination of the normal level of COGS and change in inventory are the basis for the determination of the normal level of production costs.

The last regression is about discretionary expenses such as R&D and SG&A expenditures. These expenses could be used for earnings management when they do not generate revenue and income immediately. The normal level of the discretionary expenses shall be determined by examining the linear function of the simultaneous sales. But Roychowdhury (2006) mentioned that, when this linear function is being used, managers that manage their sales upward to increase their earnings will have an outcome with unusual low residuals even if discretionary expenses are not lowered. Accordingly, the discretionary expenses are expressed as a function of lagged sales (Roychowdhury, 2006).

Using the previously mentioned five regressions, the normal levels of the different variables can be determined. A difference between the actual and normal level of the variables could be an indication of earnings management. Roychowdhury (2006) compared suspicious firm-years with the rest of the sample, to detect earnings management.

2.8 Summary

This chapter answered sub question one by providing more insight into earnings management. Earnings management is defined as: the result of the flexibility within accounting rules that is used by management to knowingly misrepresent the company's earnings within the boundaries of the regulations and laws, to achieve predetermined goals that correspond to the figures of the financial statement. Earnings management is possible due to imperfect markets, causing an information asymmetry between the management and the shareholders. This is also known as the agency problem and the opportunistic behaviour of management is explained by the agency theory. The positive accounting theory by Watts and Zimmerman (1978) explains and predicts why the management uses certain accounting methods to manipulate earnings using three hypothesis (the political cost, debt/equity, and bonus plan hypothesis). Management could have several reasons to engage into earnings management. The management could create shareholder value by maximizing firm value or maximize their private wealth out of personal interest. Earnings can be management to

decrease and increase income. Five methods exist to manage earnings; big bath accounting, creative acquisition, cookie jar reserves, materiality, and revenue recognition.

Earnings management is not directly observable by examining the reported figures. Accrual models are one of the methods commonly used for the measurement of earnings management. An accrual is the difference between earnings and cash flows in a given period. Depending on the degree to which management can affect the accruals, a distinction exists between discretionary accruals and non-discretionary accruals. Non-discretionary accruals result from normal economic actions. Discretionary accruals are the outcome of the manager's actions, to manipulate income. Another, not so often used method is detecting earnings management by the level of real activities manipulation. Several prior studies (Zang, 2012; Cohen et al., 2008; Cohen & Zarowin, 2010) examined the substitutional power of both these methods and find that real activities manipulation is used as a substitute for accrual based earnings management. This is why both methods will be used to detect earnings management in this study. In the following chapter will discuss equity incentives more in-depth.

3. Equity incentives

3.1 Introduction

In the previous chapter incentives for using earnings management are discussed. This chapter will go somewhat further into that subject by specifically discussing managers equity incentives using the agency theory. First, equity incentives will be explained. Second, the reason why equity incentives exists will be the topic of discussion. Next, the manipulative behaviour of managers due to equity incentives will be elaborated. This chapter continues with the way how equity incentives could be measured. At last, regulations related to executive compensation will be elaborated. This chapter will provide information about the content of the term equity incentive and will answer sub question two.

3.2 What are equity incentives

Equity incentives are motives resulting from stock-based compensation and ownership stimulating managers to increase the company's share price. Companies do this to align managers' incentives with that of the company's shareholders. Murphy (1999) stated that managers' compensation packages include four base items: salary, bonus, stocks, and option plans. Nowadays, stock and option compensations represent the largest portion of the executive package. Share remuneration are provided in several ways, for example restricted stock grants that cannot be sold unless the company reaches a certain performance target (Ronen & Yaari, 2008). Stocks make it possible for managers to be part of the company's ownership.

Options are contracts that entitles the owner to buy a certain portion of share at a pre-determined exercise price. The option will only be beneficial when the exercise price is lower than the share price, which is also known as the option being in the money. Murphy (1999) documented that options do not create the same incentives as share ownership because (1) managers owning options have incentives to circumvent dividends and therefore they rather have share repurchases, (2) options encourage managers to take riskier strategies in order to increase company value, and (3) options create no incentives when the exercise price is lower than the share price.

3.3 Why do equity incentives exists

The objective of equity incentives is to align managers' incentives with that of the company's shareholders and to make risk-averse managers use riskier strategies in order to increase company value. Jensen and Murphy (1990) found that between 1974 and 1986, CEOs only had a $3 gain in their share and option value for each $1,000 increase in shareholder wealth. They believe that CEOs, at that time, had little motives to increase shareholder value. So equity based compensation could be used to encourage managers to act in the best interests of shareholders. Unfortunately, this could also cause higher levels of earnings management being committed as managers engage in activities that

will improve their own compensation. In a company with a distinction between ownership and control, it is necessary to match the interest of the management with those of the shareholders. As mentioned before, the agency theory believes that managers are motivated by self-interest and show opportunistic behaviour. Managers with a control function within a company can withdraw private advantages of control to the detriment of the shareholders. This may result into a lower company value and is referred to as agency costs (Jensen & Meckling, 1976). Since the manager runs the company and not the shareholders, the manager will have more knowledge about the company. This information asymmetry could cause a loss of efficiency and lead to agency costs, because the manager can use his knowledge about the company to seek his own interest to the detriment of the shareholders. So, the self-interest and information asymmetry could cause managers with equity incentives to engage into opportunistic behaviour and increase their own wealth to the detriment of shareholders' wealth.

However, the agency theory also assumes that the shareholders expect their agents to show opportunistic behaviour and decrease the company value (Deegan & Unerman, 2006). Therefore, shareholders will pay their agent a reduced salary in order to compensate for the expected loss when a control mechanism is missing. However, the manager might be more delighted from extra salary than from the benefits that they are predicted to have. In that case, the management can sign a compensation contract and agree not to misuse the resources of the company. Consequently, shareholders can reduce agency costs. To make sure that the management complies with its contractual obligations, monitoring is necessary. These monitoring activities create bonding and monitoring costs. However, a residual loss will always remain because monitoring and bonding activities cannot mitigate the agency cost entirely (Jensen & Meckling, 1976).
So, the objective of compensation contracts is to motivate the management to increase company value. When the compensation package only would consists of a fixed salary, the self-interested manager would not take any big risks because a potential gain is not shared with them. Also, shareholder and manager do not share the same risks. The manager has no risk at all, so this restricts the motives of the manager to use strategies that enhance the company value. Therefore, share and options are important components of a compensation package. It links the managers' remuneration to the performance of the company and motivating managers to raise the share price. A high share price is beneficial for both the manager and shareholders.

3.4 Equity incentives and earnings manipulation

Goldman and Slezak (2006) stated that stock-based compensation is as a double-edged sword. At one side, linking managers' compensation to share price volatility causes profitable activities to increase the value of the company and company performance. On the other, it causes managers to misuse company resources and misrepresent performance. Kedia (2003) discovered that the increasing portion of manager compensation, including shares and options, causes managers' personal wealth to be more dependent on share price. This dependency can create opportunistic

motivations, for managers to raise the share price despite of the effect on company value. Earnings management is a method that managers could use to increase their compensation. Share prices are increased by reporting accounting figures that do not reflect the company's underlying value.

According to Ronen and Yaari (2008) equity-based compensation creates contradictory motives to engage in earnings management. The value of share and option portfolios will be enhanced with a higher share price, resulting in short-term earnings management in which increasing income is optimal. Nevertheless, it becomes more difficult to increase income later on when the market price is higher. So, this motivates the management to use long-term earnings management focussed on decreasing or smoothing the earnings. However, since it is found that a typical firm tenure of a CEO is approximately 4 years, it is expected that managers aim to increase short-term share prices (O'Connell, 2004, as cited in Ronen & Yaari, 2008).

Cheng and Warfield (2005) stated that managers owning options and shares are subject to the idiosyncratic risk of the company managers selling their shares in order to reduce this risk. Later on, when share prices increases, this exposure to the idiosyncratic risk will become more because a large part of the managers' wealth has become sensitive to short-term share prices and option ownership. Managers who want to sell their shares in the future may engage in earnings management to spread this increased risk when the following two situations occurs; (1) reported earnings are being used by the capital market to predict earnings in the future, creating the incentive to manipulate share prices through earnings management, and (2) when managers gain advantages from higher share prices. Assuming that both situations are true, selling shares will be more beneficial when earnings management is used to inflate share prices then when it is not used. In addition, Cheng et al. (2009) stated that, when the management exercises their options or sell their shares, the advantage of having these equity-based holdings will reduce and the reason for matching interest and increasing the value of the company will be offset.

3.5 Measuring equity incentives

Prior studies (Bergstresser & Philippon 2006; Cheng & Warfield, 2005) found a relation between the level of executives equity incentives and earnings management using different models. Bergstresser and Philippon (2006) use the Core-Guay technique of ONEPCT to measure executive incentives and the modified Jones model to measure the use of earnings management. Cheng and Warfield (2005) use their own measure: five elements of equity incentives and test whether they miss, meet or just beat analysts' forecast to investigate for earnings management. In this study, equity incentives will be measured following the model by Cheng and Warfield (2005). This model will be used, because it is a more thorough model compared to that of Bergstresser and Philippon (2006) since it involves different elements of equity incentives. The five elements of equity incentives according to Cheng and Warfield (2005) are: "exercisable options, option grants, unexercisable options excluding option grants, stock ownership, and restricted stock grants".

Cheng and Warfield (2005) assume that if managers increase short-term share prices, the benefit, if any, is enjoyed by all shareholders. Therefore, the five measures of equity incentives should be deflated as the benefit (shared) by executives is proportional to the portion of equity incentive measured in shares to the overall shares outstanding.

3.6 Regulation

The adoption of the Sarbanes-Oxley Act (SOX) in 2002 has changed managements' reporting obligations. In sections 302 and 404 of the Act, the increased reporting obligation granted to management can be found.

Section 302(a), demands that each quarterly or annual report is certified by the CEO and the CFO (or persons performing similar functions). This certification shows that (1) the report is reviewed by individuals, (2) the reviewed report does not include any misleading statements of material fact or fail to mention one essential fact, and (3) the financial statements and other financial information, fairly show, in all material respects, the business performance and financial healthiness of the issuing company for the period belonging to the report.

Section 404, demands issuers to reveal information in the financial statement regarding the scope and sufficiency of the internal controls and procedures for financial reporting. The effectiveness of the internal control procedures should also be appraised in the statement.

But, how do we know that the individual in question, has adequate knowledge to certify the statement? Section 302(a) of the Act requires that certifying officers are responsible for setting up and maintaining the internal controls. In addition they must impose specific requirements for reviewing and bringing internal control weaknesses (including methods to correct this) to the attention of the audit committee and auditor. Failure to follow section 404 of the Act will lead to the manager not being permitted to certify the financial statement. The cost of non-compliance with fair disclosure and reporting have became considerably more serious, often with both penalties and imprisonment. Thus it appears that the adoption of SOX has increased the charges the management has to bear for managing earnings.

When the objectives of management would be matched, or mechanisms would have been able to align these, with the objectives of the shareholders, the implementation of SOX would not have been necessary. One of these mechanisms is the board of directors, who are responsible for monitoring management on behalf of the shareholders. The board has the power to hire and fire management, set managements compensation, supervise their actions, provide advice, and stop poor decisions. However, in the U.S. management has influence on the boards' decisions. Since stock ownership is spread too much, to have enough voting rights, the board is often chosen by the management. Furthermore, the management is also often the chairman of the board giving them much power. To balance this power, external directors are added to the board. But, management also has influence in

selecting external directors, so the objectivity of these external directors can be questioned. Because the board sets managements compensation agreements and management has influence on them, it is possible that the management is being paid more than would be optimal. It provides management the ability to take actions that increase the value of their equity-based holdings, by enhancing the volatility of the firms performance or reduce their risk by smoothing earnings (Ronen & Yaari, 2008).

Through the years manager compensation has changed but disclosure regulations are still the same. The failure to obtain detailed information on manager compensation packages has been heavily criticized. That is the reason why investors imposed the Security and Exchange Commission (SEC) to oblige companies to disclose more detailed information, clear and in readable English information on management compensation packages and the process of setting it. Consequently, in 2006, the SEC made major adjustments to the regulation of management compensation disclosure. The Compensation Discussion & Analysis (CD&A) is an important addition of these changes, this addition provides an insight why a specific degree of compensation is chosen and how it is approved. Also, the CD&A clarifies and provides analysis of the firms' compensation objectives, decisions, and activities (Bal & Wong, 2007).

3.7 Summary

This chapter answered sub question two, by providing more insight into the content of the term equity incentives. Equity incentives are motivations resulting from equity-based compensation and share/option holdings, stimulating managers to increase the company's share price. Equity incentives, such as options and stocks, should reduce the agency problems. Options motivate managers to take riskier strategies in order to increase the company's value and shares give them the possibility to become owners and reduce agency costs. It also creates an incentive for the management to maximize the share value and improve the alignment with shareholders' interest. Prior studies (Bergstresser & Philippon 2006; Cheng & Warfield, 2005) found a relation between the level of executives equity incentives and earnings management using different models. To measure equity incentives, in this study, the five elements of Cheng and Warfield (2005) will be used: "exercisable options, option grants, unexercisable options excluding option grants, stock ownership, and restricted stock grants". To reduce earnings management practices due to equity incentives, SOX has redefined managements' reporting obligations in sections 302 and 404 of the Act. However, as mentioned before, the board is accountable for the hiring and firing, supervision, advising, preventing bad decisions, and setting the compensation contract of the management. The compensation contract is used to align the managers incentives with shareholders' interest. But high equity incentives could result to misleading short-term share prices through earnings management. The following chapter will discuss the financial crisis and economic environment around the crisis.

4. The financial crisis

4.1 Introduction

A crisis in the financial world is not common and therefore something exceptional. One of the best known crises is *the beurskracht* of 1929, which started in New York and resulted in global catastrophic consequences. This was the start of the great depression. The whole financial sector collapsed because the share prices decreased very extremely. This development meant that investors wanted to sell their shares, causing the prices to collapse completely. Because of the crisis many loans could not be repaid, which consequently resulted in the bankruptcy of many large banks. The current financial crisis has some similarities with the great depression of 1929. Both periods threatened a total collapse of the financial system. There was an increasing distrust in the banking sector in both 1929 as in 2008. This chapter will provide an outline of the financial crisis and economic environment during the crisis. What does the financial crisis mean? How does a financial crisis arise? Which elements play a role? What actions could be taken to stop the crisis? What were the events causing the crisis of 2008? These are all questions that will be answered in this chapter, therewith also answering sub question three.

4.2 What is a financial crisis

What is a financial crisis and how does it occur? According to Kindleberger and Aliber (2005) similar patterns and trends can be observed for several crises. The model designed by Minsky describes the emergence of a financial crisis. In the model of the credit cycle, stages or phases are mentioned that play a role in the creation of a crisis. These phases are “shift (or change), economic boom (or expansion), euphoria, financial adversity/emergency, panic and crisis” (Kindleberger & Aliber, 2005).

Shift/change

The first part that is important in the development of a financial crisis is a shift or a change that will change the economy. For example, a political event, a development of a new technology, institutional change or perhaps even a war. It must change the economic or financial situation. The shift creates new impulses which ensure that parts of the economy fall into an upward motion (Kindleberger & Aliber, 2005).

Economic boom/expansion

The change should result in a period of economic growth. This period will attract more investments and production, also known as "expansion". Financial institutions like banks play an obvious role in the economy. Banks are commercial businesses that focus on making profit, so competition between banks is a logical consequence. Because of the competition, banks will innovate and develop new credit instruments to generate additional supply of credit. When people want to invest, in most cases, they borrow money from the bank resulting in a growing demand for credit. When more people start

investing it causes the price of the shares to rise. Hyman Minsky argues that from this phase, a shift occurs from borrowing against a relatively low risk to lending against a very high risk (Whalen, 2007).

Euphoria

Due to the ever increasing demand, prices of shares and products increase. This will also increase the income of investors. Consequently, investors will invest even more. The ability to invest more means an increasing income growth. This phase is called "euphoria". During this period, more and more transactions take place. But in these transactions, the risks are not always properly considered. People are going to trade and speculate with borrowed money to benefit from the price increases. When people see others making money it creates a kind of desire to do this too. They feel that they cannot lack behind. From this moment on, only a few rational decisions are taken in relation to the investments. The trading process happens too rushed and too impulsive (Kindleberger & Aliber, 2005).

Financial adversity/emergency

At one point, some players will sell their shares as they would like to get paid in order to make a profit. Reasons for this might be that a financial institution is faced with setbacks or it might go bankrupt. If several players cash their money, it creates a kind of dichotomy between people who withdraw and those who continue to speculate on the market. When the hesitation persists, this causes the prices not to rise but rather to stagnate. If speculators and traders start to realize that the market will not grow, they will want to sell their shares as well (Kindleberger & Aliber, 2005).

Panic and crisis

At the moment the prices continue to decline, investors will realize that it is very difficult to pay back borrowed money. This means that banks have lent more money than they will get back, eventually the banks will go bankrupt, resulting in “panic”. People want to sell their shares as soon as possible to see some of their money. The supply exceeds the demand and the economy comes in a downward spiral. At this time there is a “crisis” (Kindleberger & Aliber, 2005).

There are some aspects that could cause panic, but especially the crisis can be prevented. First, the prices might have dropped so that it becomes interesting for investors again. It is also possible to close scholarships by setting certain limits on price declines. Another solution may lie in the fact that institutions such as the government decide to perform capital injections to institutions which do not have enough cash, with the intention to somewhat restore the confidence in the economy (Kindleberger & Aliber, 2005).

In general, these are the characteristics which can be recognized with a financial crisis, which is similar for almost every country. Nowadays there are some major economic players. One of the major economies is the United States. Europe and the rapidly emerging Asia are also considered important economic markets. All of these economies are connected to each other. A good example of this connections is visible in the import and export of goods and services. If a country ends up in the early

stages of a crisis, the other countries will respond almost immediately. They will act more cautious (Kindleberger & Aliber, 2005).

4.3 The financial crisis 2008

Since the end of 2007, the global economy fell into problems. The first sign of this was the collapse of the housing market in the United States. Many U.S. citizens no longer paid their mortgage, causing a number of influential mortgage banks to become in distress. Merrill Lynch and Lehman Brothers are financial institutions in the United States who were in serious trouble in September 2008. Lehman Brothers even went bankrupt and Merrill Lynch was acquired by the Bank of America. These developments meant that other banks did not just lent money anymore, because they feared that the same fate would be assigned to them.

Also in Europe there were several large financial institutions that fell into trouble. Because of the fear on the international capital market, banks worldwide were very careful with their spending. This meant that there was little to no loans to consumers, but also none to each other. The problems at the banks had a major impact on the business as well. Companies could not borrow anymore which resulted in a declining confidence in the economy.

4.4 Summary

This chapter answered sub question three by providing more insight into the financial crisis. The financial crisis is a sort of a cycle. It exists of different phases and leads to having global catastrophic consequences. In the model of the credit cycle, stages or phases are mentioned that play a role in the creation of a crisis. These phases are “shift (or change), economic boom (or expansion), euphoria, financial adversity/emergency, panic and crisis” (Kindleberger & Aliber, 2005). Several measures could be taken to prevent the financial crisis of becoming catastrophic. For example, dropping the prices, close scholarships, and perform capital injections (Kindleberger & Aliber, 2005). The first sign of the recent financial crisis was the collapse of the housing market in the United States. Many U.S. citizens no longer paid their mortgage, causing a number of influential (mortgage) banks to fell into distress. Fear of bankruptcy made banks hesitant of lending money. Companies could not borrow anymore which caused the confidence in the economy to decline. The next chapter will provide information about prior research performed on the main subjects of this thesis.

5. Prior literature

5.1 Introduction

In this chapter, prior empirical research about the relation between equity incentives, earnings management, and the financial crisis are elaborated. This will provide an answer on sub question 4. After this introduction, the second part contains the manipulation of bonus income studies. These studies examine earnings management caused by bonus schemes. The third section includes studies examining the effect of earnings management on management wealth. This chapter then continues with studies that examine the association between earnings management and equity incentive. The fifth section elaborates on studies that examine the effect of governance on earnings management due to equity incentives. Furthermore, studies on the financial crisis and its impact on earnings management are also discussed. Studies on the use of real activities manipulation as a substitute for accrual based earnings management are included as well. Finally, this chapter ends with a summary.

The literature table in Appendix 1 presents an overview of the studies commented in this chapter. It describes briefly the research question, the research methodology, the sample population, and the results.

5.2 Manipulation of bonus income

One of the papers that investigate the manipulation of accruals due to bonus plans is the paper by Healy (1985). Using a sample of the 94 largest U.S. listed industrial firms from the period 1930 – 1980, the author tested the association between managers' accrual and accounting decisions and their income reporting incentives because of these plans. He assigns the observations of earnings to bonus contracts and expects managers to maximize their bonuses (bonus maximizing hypothesis). He expects that managers, manage their earnings downwards when it is under the lower boundary of bonus plans, also known as “taking a bath”. Above the upper boundary of the bonus plans, managers are expected to manage earnings downwards, because more earnings do not increase their bonus. Healy (1985) therefore expects negative accruals under the lower bound of the bonus contract, negative accruals above the upper boundaries of the bonus contracts, and positive accruals in between the boundaries of the bonus scheme. Measuring total accruals (earnings management) as the estimated difference between reported accounting earnings and cash flow from operations, Healy (1985) provides evidence for his bonus maximizing hypothesis. His findings suggest that managers manage earnings downward under the lower bound of the bonus plan and downward above the lower bounds of the bonus plans. He also finds evidence for earnings management around the upper boundaries of bonus plans.

However, Dechow et al. (1995) show that the methods used by Healy (1985) assigns the earnings to the parts of the bonus contract that biases the model. They show that if one takes a random sample of 1000 firm-years from firms with low earnings, one would find negative accruals.

Another paper that investigated the relation between earnings management and bonus plans, is the paper by Holthausen, Lacker, and Sloan (1995). They investigated the extent to which executives manipulate earnings to maximize the present value of bonus plan payments between 1982 – 1984 and 1987 – 1991. Their study examines the validity of the results by Healy (1985), using the Jones and modified Jones model to measure accruals and insider information about the bonus schemes. This gives them the opportunity to use the real boundaries of the bonus plans and assign the observations more precise, where Healy (1985) had to estimate this. Like Healy (1985), the results of Holthausen et al. (1995) provide support for the proposition that executives manipulate accounting earnings to maximize their compensation, but only in certain regions of the contract. In particular, they find that discretionary accruals are more negative when the CEO is at the upper bound than when the CEO is between the lower and upper bounds. However, unlike Healy (1985), the authors do not find evidence that CEOs take more negative discretionary accruals when they are below the lower bound than when they are between the lower and upper bounds. They also find no consistent evidence that investment decisions (e.g., advertising, capital investment, or research and development) are influenced by the annual bonus compensation, which is contractually designed, faced by the executive. The authors state that some of the results of Healy (1985) on manipulation may have been induced by the used method used of assigning observations to the three different categories.

5.3 Earnings management affecting management wealth

A few examples of papers that investigate the effects of earnings management on management wealth are Beneish and Vargus (2002), Bergstresser, Desai, and Rauh (2006), and Burns and Kedia (2006).

Using a sample of 3906 firms over the period 1985 – 1996, Beneish and Vargus (2002) investigated whether insider trading is informative regarding the quality of earnings and the valuation implications of accruals. They investigate (1) if firm-years, where the direction of the accruals are inconsistent with the direction of insider trading, have a lower quality of earnings, (2) if firm-years, where the direction of the accruals confirms the direction of insider trading, have a higher quality of earnings, and (3) if the market differently misprices low versus high quality accruals. Their results show that increasing earnings accruals are significantly less persistent for companies with abnormal insider selling and significantly more persistent for companies with abnormal insider buying, compared to companies with no abnormal insider trading. On the contrary, they find that insider trading offers little indication of the persistency of earnings decreasing accruals. The pricing tests indicates that (1) accrual mispricing is caused by earnings increasing accruals mispricing, (2) when management engages in abnormal buying, earnings increasing accruals seem to be priced rationally and when management engages in abnormal selling, overpriced, (3) when top management of a company is not trading, market participants also overprice earnings increasing accruals, however overpricing is less serious than when management engages in abnormal selling, and (4) market participants seem to price all earnings increasing accruals as if they are of high quality. Their finding of accrual mispricing suggests that

investors are not understanding the lower persistency of some earnings increasing accruals. The authors also find indications that the lower persistence of earnings increasing accruals together with abnormal insider selling is at least partially due to opportunistic earnings management.

Using a sample 3350 firms over the period 1991 – 2002, Bergstresser et al. (2006) identify in their study a straightforward mechanism for manipulation of income. They investigated how manipulation through that channel is associated with CEO motives and shows that management changes investment decisions in order to capitalize, and justify this type of earnings management. Particularly, management opportunistically choose presumed long-term rates of return on defined benefit pension plan assets. In order to identify the motive to use earnings management, various measures of the sensitivity of a company's earnings to the assumed return on pension assets are created. Bergstresser et al. (2006) find that managers opportunistically use the assumed returns, and that this opportunism significantly interacts with investment decisions, firm financial, and major individual. In addition, the authors also find that these opportunistic modifications in assumed returns also seem to affect asset allocations in companies' pension plans. To justify aggressive return assumptions, managers could raise equity allocations. To investigate this possibility, equity allocations are regressed on assumed return using acquisition variables as a tool for the presumed return. The findings indicate that changes to the assumed return result in changes in asset allocation decisions. Inconsistent with the findings of Beneish and Vargus (2002), the evidence suggests that manipulation of the income is unlikely to reflect the interests of the shareholders. The reason for this difference could be caused by the pension assumptions most likely being independent of other aspects of firm performance, which is not the case for insider trading.

Burns and Kedia (2006) examined if and how management motives, from their compensation contracts, influence the probability of using uncommon accounting practices that lead to a restatement of the financial reports. They compare S&P 1500 firms that announce a restatement of their financial statements over the period 1995 to 2002 with those firms that do not restate. The authors measure the sensitivity of all components of CEO compensation to firm performance and examine the effect of this sensitivity on the incentives to adopt aggressive accounting practices that result in a restatement. Burns and Kedia (2006) find that option sensitivity is positively associated with misreporting. The greater the sensitivity of the CEO's wealth is to share price arising from the CEO's option holdings, the greater the propensity is to misreport. Further, they find significant evidence that the greater the convexity of the CEO's wealth is to share the price, the greater is the propensity to misreport. Like stock options, equity and restricted stock also tie the CEO's wealth to share price. However, the authors do not find evidence that incentives from equity and restricted stock are associated with misreporting. Long-term incentive plans make the CEO's wealth a function of longer-term firm value. This reduces the incentives of CEOs to misreport and boost short-term share prices. The results are consistent with this expectation since it shows no evidence that long-term incentive pay-outs are associated with a propensity to misreport. Increased bonus payments associated with higher earnings are also likely to encourage CEOs to misreport. However, there is no significant evidence that an increase in salary plus bonus is a motivation for misreporting. These findings are consistent with the

finding of Beneish and Vargus (2002) concerning earnings increasing accruals being overpriced when management engages in abnormal selling.

5.4 Equity incentives and earnings management

One may wonder what the magnitude of earnings management is when managers' wealth is closely related to the value of the company's share price. Cheng and Warfield (2005), Bergstresser and Philippon (2006), Gao and Shrieves (2002), and Cohen, Dey, and Lys (2005), and Jiang, Petroni, and Wang (2010) all examine this relation.

Cheng and Warfield (2005) tested two relations for the period 1993–2000. The main focus of their study is to investigate whether high equity incentive managers are more likely to manage earnings. The secondary focus tested whether high equity incentive managers sell more shares in the future. As a measure for equity incentives, Cheng and Warfield (2005) use a ratio of five equity elements (e.g. exercisable options, unexercisable options, option grants, stock ownership, and restricted stock grants), divided by the total outstanding shares of the firm. Earnings management is measured with the cross-sectional model of Jones (1991) as described in section 2.7.1 of this study. To investigate whether managers with high equity incentives would be more likely to engage in earnings management, Cheng and Warfield (2005) tested whether the company's earnings surprise per share miss analysts' forecast, meet or just beat analysts' forecasts. The authors first document the existence of the positive relation between equity incentives and managers' future sales of their own firms' share. The results indicate that managers with high equity incentives have significantly higher levels of net sales in the year after earnings announcements. Next, the authors investigate the association between earnings management and equity incentives. They find a significantly higher occurrence of meeting or just beating analysts' forecasts for firms with higher managerial equity incentives. The authors then examined whether managers, who predictably engage in earnings management, sell more shares after actual earnings management. Their results indicate that managers with high equity incentives sell more after meeting or beating analysts' forecasts than after missing analysts' forecasts. Using the accruals measure, Cheng and Warfield (2005) find that managers who have high equity incentives use more income increasing abnormal accruals than managers with low equity incentives. So the incentive to increase earnings is stronger than the incentive to reserve earnings for the future. The authors find that these results are mainly caused by managers who have less persistent equity incentives. These managers have less incentives to reserve earnings for the future and are less sensitive to accrual reversals.

The study by Bergstresser and Philippon (2006) is another study that investigates the association between earnings management and equity incentives. Unlike Cheng and Warfield (2005), Bergstresser and Philippon (2006) use a different approach by studying total CEO incentives instead of only equity incentives and they have used different methods. CEO equity incentive is measured using the dollar change in the value of CEO's option and stock ownerships resulting from a 1% increase of the company's share price and deflated by total CEO compensation (i.e. salary and bonus

are included), resulting in an incentive ratio. To measure earnings management (cash flow method and balance sheet method) the authors use the Jones and the modified Jones accrual model, as described in section 2.7.1 of this study, and detect discretionary accruals. Consistent with Cheng and Warfield (2005), Bergstresser and Philippon (2006) find that in companies where CEO's compensation is related to share price, discretionary accruals are more actively used to manage earnings. The result is not influenced by higher volatility of firms operation environment, as shown by tests of control variables, unlike what is expected from firms that implement stock-based compensation. The second finding of this study is that there are periods of uncommonly large insider share sales when accruals are high and the reported earnings and share returns are predominantly low subsequent to those periods. CEO's with stronger equity incentives are found to show higher affinity to exercise options during the time phase when accruals are high. Furthermore, there is significant evidence that when accruals are used to increase earnings, the level of insider sales is considerably higher.

Gao and Shrieves (2002) also investigate how the elements of compensation affect earnings management behaviour. They examine earnings management in relation to the entire CEO compensation package, consisting of options, bonuses, salaries, restricted stocks, and long-term incentive plans. Their evidence is based on a sample of 1200 firms over the period 1992 – 2000.

Assuming that discretionary accruals provide managers a valuable timing possibility, resulting into strategies that maximize their compensation, the results indicate that earnings management intensity is related to managerial compensation contract design. Gao and Shrieves (2002) find that the incentive intensity of stock options, amount of bonuses and stock options, are positively associated with earnings management intensity, while salaries are negatively associated with this intensity. Their findings do not reliably support, positive or negative influence of long-term incentive plans or restricted stock compensation on earnings management intensity, except for the incentive intensity effect of restricted stock. These findings are consistent with the studies by Cheng and Warfield (2005) and Bergstresser and Philippon (2006).

Using a sample of 2078 firms over the period 1992 – 2003, Cohen et al. (2005) focus on two research questions. First, they investigate the trends in and potential determinants of corporate earnings management activities in the periods preceding and following the passage of SOX. They have analysed whether managerial opportunism or external events (such as changes in economic conditions) contributed to changes in earnings management. Second, the authors examine investors' reactions to earnings announcements before and after the passage of SOX. Cohen et al. (2005) start by examining earnings management over time, using six earnings management metrics. The authors find that the pre-SOX period was characterized by rapidly increasing earnings management that reached a peak during the SCA (scandal) period and is concentrated in poorly performing industries. However, following the passage of SOX earnings management reversed. When examining whether the incentives derived from bonus and option compensation were associated to the level of earnings management during this period, their results are partially consistent with the hypothesis that high earnings management activity during the pre-SOX period was driven by managers' opportunistic behaviours. The fraction of compensation derived from options was significantly associated with the level of earnings management in the pre-SOX period. No association was found between the fraction

of compensation derived from bonus contracts and earnings management. These findings are also consistent with the study by Cheng and Warfield (2005) as well as the study by Bergstresser and Philippon (2006).

Inconsistent with the previous literature, Jing et al. (2010) expected that the Sarbanes Oxley act weakened the relation between earnings management and equity incentives, that's why they measured this relation before and after the adoption of the Sarbanes Oxley act. The authors examined the relation between CFO and CEO equity incentives and earnings management pre and post-Sarbanes Oxley for the period 1993 – 2006. As expected, they find a negative relation between equity incentives and earnings management for the post-Sarbanes Oxley period.

5.5 Influence of governance on equity incentives and earnings management

Cornett, Marcus, and Tehranian (2008) investigate how governance structure and incentive-based compensation influence firm performance when measured performance is adjusted for the impact of earnings management over the period 1994 – 2003. Their result suggests that earnings management through discretionary accruals respond dramatically to management incentives. However, manipulation of income is lower if there is more monitoring of management discretion. The main result showed that adjusting for the impact of earnings management substantially increases the measured importance of governance variables and substantially decreases the importance of incentive-based compensation for corporate performance. The authors find a strong relation between incentive-based compensation and conventionally reported measures of firm performance, however, profitability measures that are adjusted for the impact of discretionary accruals show a far weaker relation with such compensation. In contrast, the estimated impact of corporate governance variables on firm performance is far greater when discretionary accruals are removed from measured profitability. They conclude that governance may be more important and the impact of incentive-based compensation less important to true performance than indicated by past studies.

Like Cornett et al. (2008), Duellman, Ahmed, and Abdel-Meguid (2008) investigated what the influence of monitoring (governance and involvement of auditors) mechanisms is on the association between earnings management and equity incentives for the period 2001 – 2007. The monitoring mechanisms is measured using three monitoring mechanisms that are most directly involved in monitoring managers' financial reporting decisions: (1) board characteristics, (2) auditor dependence on clients, and (3) institutional ownership characteristics. Using the accrual-based measures of earnings management, the authors find that equity incentives are positively related to earnings management only when there is a low level of monitoring. However, they do not find evidence of a relation between earnings management and equity incentives for firms with moderate or high monitoring using the accrual based measure of earnings management. Using the real earnings management based measures, their results show a negative relation between equity incentives and real earnings management for high/moderate monitoring firms, but high real earnings management for firms with low monitoring irrespective of the level of equity incentives. Using the meet/beat analyst forecast model, their findings show that equity incentives are positively related to meeting or beating analyst forecasts

only when monitoring is low. In conclusion their findings, consistent with Cornett et al. (2008), suggest that low monitoring mitigates the incentive alignment effect of equity incentives.

5.6 Impact of the financial crisis on earnings management

In view of the recent financial crisis, one may wonder what the impact is of various economic circumstances on the use of earnings management. Chia, Lapsley, and Lee (2007), Gilson and Vetsuypens (1993), and Gorgan, Gorgan, Dumitru, and Pitulice (2012) determined these effects.

Chia et al. (2007) investigated the presence of negative earnings management activities in service-oriented public-listed companies in Singapore during the Asian financial crisis. They have used a sample of 383 firm-observations from 125 service-oriented companies listed at the SES for the fiscal years of 1995 – 1998. Chia et al. (2007) used the cross-sectional modified Jones model (1991) in order to detect earnings management. The authors found evidence that service-oriented firms use income decreasing earnings management in times of crisis. In times of financial crisis, management temporary expects income to be poor. When confronted with such a situation, the managements' incentive would be to save their firms and retain their jobs instead of trying to maximize their bonuses. The results also show that only Big 6 companies are able to significantly reduce earnings management of the managers of these firms.

Gilson and Vetsuypens (1993) examined management compensation policy in 77 publicly traded firms that filed for bankruptcy or privately restructured their debt to avoid bankruptcy for the period 1981 – 1987. By looking at the median changes, Gilson and Vetsuypens (1993) show that members of the senior management team incur significant personal losses when their firms are financially distressed. Almost one-third of the CEO's in their sample are replaced in a given year around default, and those who remain, often take substantial cuts in their salary and bonus. Newly appointed CEO's with ties to previous management are paid 35% less (at the median) than the outgoing CEO. In contrast, the median CEO hired from outside the firm earns 36% more than his or her predecessor. Outside replacement, CEO's also receive large grants of stock options as part of their compensation. They also find that compensation policy is often an important part of the firms' overall strategy for dealing with financial distress through provisions that change managers' incentives or facilitate negotiations with creditors. Almost a third of their firms lower the exercise price of outstanding executive stock options which have fallen out of the money. Sometimes senior managers' compensation is tied to the successful resolution of the firms' bankruptcy or debt restructuring, or based on the value of payoffs to creditors. These findings are consistent with Chia et al. (2007) suggesting that when confronted with financial distress, managements' incentive would be to save their firms and retain their jobs instead of trying to maximize their bonuses or salary.

Gorgan et al. (2012) examine the degree to which financial reporting is involved in the financial crisis and outline the changes introduced by the crisis in the quality of financial information provided by firms for the period 2007 – 2009. The authors expected a decline of earnings management during the latest economic crisis compared to previous period. In their research, earnings management was measured

through discretionary accruals by the modified version of the Jones model (1991) before and during the recent economic crisis.
Gorgan et al. (2012) indeed reveal that there is a decline of earnings management during the economic crisis compared to previous period. However, the authors also mentioned that there are other factors that could have had an influence on this decline. For example, the increased vigilance of investors, new regulation from professional bodies, and investigations of governmental institutions.

5.7 Real activities and accrual based earnings management as substitutes

Discretionary accruals are used in many prior researches to measure for accrual-based earnings management. However, what about real activities manipulation? Could it be possible for a firm to use real activities manipulation as a substitute for accrual based earnings management, making it much more difficult to detect earnings management? Several prior studies, such as Zang (2012), Cohen, Dey, and Lys (2008), and Cohen and Zarowin (2010) investigated this problem.

Zang (2012) studied whether managers use real and accrual based earnings management as substitutes to manage earnings. They have used a sample of 6680 earnings management suspect firm-years over the period 1987–2008. By analysing the implications for managers' trade-off decisions due to the different costs and timing of the two earnings management strategies, the author found that firms trade off real activities manipulation versus accrual-based earnings management based on their relative costliness. Thus, when real activities manipulation is more costly because the firm is experiencing more monitoring from institutional investors, being in a less healthy financial situation, incurring larger tax expenditure for the current period, and have a less competitive status in the industry, companies use more accrual based earnings management and less real activities manipulation. It also shows that real activities manipulation has to occur during the fiscal year and is realized by the fiscal year-end, after which managers still have the chance to adjust the level of accrual-based earnings management. So, if real activities manipulation turns out to be unexpectedly high (low), then managers will decrease (increase) the amount of accrual-based earnings management they carry out. The results also revealed that, if accrual based earnings management is restricted by a limited accounting flexibility because of shorter operating cycles and accrual manipulation in previous years and more scrutiny of accounting practices post-SOX, companies use real activities manipulation (accrual based earnings management) to a greater (lesser) degree.
This is consistent with the findings of Cohen et al. (2008) who document that, after the passage of SOX, the level of accrual-based earnings management declines while the level of real activities manipulation increases. They investigate real and accrual-based earnings management in the pre-SOX period and in the post-SOX period. Like Zang (2012), Cohen et al. (2008) find an increasing accrual-based earnings management in the pre-SOX period and an even larger increase in the SCA period, but declining real earnings management. Their results also revealed that this increase in the SCA period was associated with an increase in option based compensation. While new options grants are negatively associated with income-increasing discretionary accruals, they find that unexercised

options are positively associated with income-increasing discretionary accruals. Inconsistent with Cheng and Warfield (2005), the authors do not find an association between accrual-based earnings management and acquired exercisable options. For the post-SOX period there is a declining association between income-increasing discretionary accruals and unexercised options (excluding new option grants). Although the authors find that accrual-based earnings management declined in the post-SOX period, they find real earnings management to increase. However, option based compensation decreased. In addition, Cohen et al. (2008) investigated either the post-SOX and pre-SOX real and accrual-based earnings management for firms that are suspected of engaging into earnings management activities. They find that both during pre- and post-SOX, suspected firms have higher discretionary accruals compared to non-suspect firms. However, these suspected firms use less income-increasing accrual-management in the post-SOX period. This analysis also shows that there is an increase of real earnings management activities after SOX.

Cohen and Zarowin (2010) examine real and accrual-based earnings management activities associated with seasoned equity offerings (SEOs), using a sample of 1511 completed U.S. offers over the period 1987 – 2006. First, the authors state that companies use accrual-based earnings management around SEOs. Secondly, consistent with the findings of Zang (2012) and Cohen et al. (2008) they show that firms use both accrual-based and real earnings management around SEOs, and that this varies cross-sectionally. As Zang (2012) also suggested the capability of the company to use accrual-based earnings management and the costs thereof, is causing these differences. Their results show that the level of net operating assets, the presence of a Big 8 auditor, being in a high-litigation industry, and longer auditor tenure are all positively related with the propensity to use real earnings manipulation around SEOs. At last, Cohen and Zarowin (2010) state that real earnings manipulation is more probable than discretionary accruals to be related with earnings declines.

5.8 Reversal of earnings

Little research exists on the reversal of earning accruals. Many studies show that these accruals and earnings are positively correlated (i.e. DeAngelo, 1986; Healy, 1985; Dechow et al., 1995; Jones, 1991). However, there is relatively limited research that provides evidence on reversal of accruals. A few important exceptions are the studies by Dechow, Hutton, Kim, and Sloan (2012), Gerakos (2012), and Allen, Larson, and Sloan (2013).

Dechow et al. (2012) provide a model to measure accrual based earnings management. They assume that accrual based earnings management in one period will reverse in the future. The authors suggest that adding reversals to the model, enhances the power of testing accrual based earnings management. Before adding these reversals to the model, one condition needs to be met. It should be possible to separate the sample into a period where earnings are supposed to be managed through accruals and a period where this is expected to reverse. By using a sample of companies appointed by SEC as having managed earnings, the authors were able to make a distinction between these two periods. Comparing the p-value of their study (ρ = 0,003) with those of some highly valued earnings

management studies (i.e. Defond and Jiambalvo's, 1994; Defond and Subramanyam's, 1998; Ball and Shivakumar's, 2008) shows that adding reversals to the model increases the power of testing accrual based earnings management.

Gerakos (2012) reviews the model to measure accrual based earnings management provided by Dechow et al. (2012). The author states that the model introduced by Dechow et al. (2012) improves the measurement of discretionary accruals by taking into account that accruals are volatile and will reverse in the future. Another positive point of the study by Dechow et al. (2012) is that it provides opportunities for further research. For example, research about the relation between the stochastic process and unmanaged earnings or about the statistical properties of nondiscretionary and discretionary accruals.

Allen et al. (2013) is another study that examines the relation between accrual reversals and their effects on earnings returns. The authors state that accruals reverse when the managements' anticipated future earnings are realized or when there are indications that these earnings will not be realized. Consistent with Dechow et al. (2012) their findings show that reversals are a pervasive factor of accruals. They also suggest that accrual reversals are more related to accruals that correctly anticipate future earnings.

5.9 Summary

Early studies on strategic accruals management focused on the manipulation of bonus income (Healy, 1985 and Holthausen et al., 1995). These studies find evidence of bonus income creating incentives to manage earnings. More recent work addresses the use of earnings management to affect share prices, and in turn, managers' wealth. For example, Beneish and Vargus (2002) find that periods of abnormally high accruals (which temporarily inflate earnings) are associated with increases in insider sales of shares, and that after the ''event period'' share returns tend to be poor. Option and restricted stock compensation is a particularly direct route by which management can potentially increase its wealth by inflating share prices in periods surrounding share sales or option exercises. Bergstresser et al. (2006) find that firms make more aggressive assumptions about returns on defined benefit pension plans during periods in which executives are exercising options. Burns and Kedia (2006) show that firms whose CEOs have large options positions are more likely to file earnings restatements. Cheng and Warfield (2005), Bergstresser and Philippon (2006), Gao and Shrieves (2002), and Cohen et al. (2005) all find that the magnitude of discretionary accruals is greater and earnings management is more prevalent at firms in which managers' wealth is more closely related to the value of share, most notably via stock options. The results of Cornett et al. (2008) and Duellman et al. (2008) revealed that governance could decrease the level of earnings management due to equity incentives. Furthermore, studies on the financial crisis and its impact on earnings management (Chia et al., 2007; Gilson and Vetsuypens, 1993; and Gorgan et al., 2012) showed that companies use income decreasing earnings management in times of crises. Gorgan et al. (2012) even found a decline of earnings management during the financial crisis. At last, Zang (2012); Cohen et al. (2008); and Cohen and Zarowin (2010) look whether companies use real activities manipulation as a substitute for accrual based earnings

management, making it much more difficult to detect earnings management. They indeed find that real activities manipulation is used as a substitute for accrual based earnings management.

6. Research design

6.1 Introduction

This chapter will discuss this papers' investigation of the relation between option grants in the current period, unexercisable options excluding option grants, exercisable options, restricted stock grants and stock ownership (equity incentive proxies) and earnings management in the U.S. This thesis will assess the effects that these equity incentive proxies may have on earnings management. So this chapter will answer sub question five, about how the relation between equity incentives and earnings management can be investigated. The remainder of this chapter is organized into two parts. In the first part, the hypotheses will be developed. These hypotheses give an indication of the results expected to be found, this can be either a positive or a negative association. The second part contains the research methodology, which includes the research models used to identify a potential relation between equity incentives and earnings management, the sample selection method, and dataset to test the hypotheses. Also Libby boxes will be provided in this section in order to assess the validity of this research.

6.2 Hypotheses development

CEOs with high equity incentives, does mean that the compensation of those CEOs are related or highly tied with the performance of the company's shares and options. These CEOs are being paid in shares and options and may engage in activities that are meant to raise share prices in order to increase their compensations. Prior research show that there is a positive relations between the level of equity incentives and earnings management (Cheng & Warfield, 2005; Bergstresser & Philippon, 2006; Gao & shrieves, 2002; and Cohen et al., 2005). Just like these prior studies, a positive relation between earnings management and equity incentives is expected to be found for this research. When the compensation of an executive is more sensitive to the stock price he uses earnings management to increase the performance of the company. This leads to the following hypothesis:

H1: There is a positive association between earnings management and equity incentives.

Based on prior research (e.g. Burns & Kedia, 2006; Gao & shrieves, 2002; Cohen et al., 2005 Cohen et al., 2008) it expected that there is a stronger relation for option-based incentives than for share-based incentives. This is due to the character of options as short-time incentive. It is easy for management to make quick gains with options in years where many options can be exercised. Due to the reversing character of accruals they are well suited to use in combination with short-term incentives. When using accruals, earnings can only be managed upwards for a limited amount of time, after this accruals will reverse. This suits the character of options, as earnings only have to be managed upwards for a short period of time to be able to exercise the options at a good price. Cheng and Warfield (2005) find that managers with less persistent equity incentives are more likely to present

surprisingly high earnings than managers with more persistent equity incentives. As option incentives are less persistent than share-based equity incentives this leads to the expectation that option-based equity incentives are short time incentives and lead to management managing earnings up in periods when there are many option-based incentives available. This supports the expectation for a stronger relation between option-based equity incentives and earnings management than between share-based equity incentives and earnings management. This leads to the second hypothesis:

H2: The association between equity incentives and earnings management is stronger for option-based incentives than for share-based incentives.

However, studies about the financial crisis and its impact on earnings management (Chia et al., 2007; Gilson and Vetsuypens, 1993; and Gorgan et al., 2012) show that companies engage in income decreasing earnings management during the crisis period. Gorgan et al. (2012) even find a decline of earnings management during the economic crisis compared to previous periods. During the financial crisis, managers have expectations of temporary poor earnings. When faced with such a situation, the managers' incentives would be to save their companies and preserve their jobs instead of attempting to maximize their accounting-based bonuses. This makes the next hypothesis to be formulated as follows:

H3: There is a negative association between the financial crisis and earnings management due to equity incentives.

Furthermore, Zang (2012); Cohen et al. (2008); and Cohen and Zarowin (2010) look whether companies use real activities manipulation as a substitute for accrual based earnings management, making it much more difficult to detect earnings management. They find that real activities manipulation is used as a substitute for accrual based earnings management and vice versa. When real activities manipulation is more costly, due to having a less competitive status in the industry, being in a less healthy financial condition, experiencing higher levels of monitoring from institutional investors, and incurring greater tax expenses in the current period, firms use more accrual-based earnings management and less real activities manipulation (Zang, 2012). Especially firms in a unhealthy financial situation, for example the financial crisis, are supposed to use more accrual bases earnings management. This creates the following hypothesis

H4: The financial crisis period is associated with a higher level of accrual based earnings management due to equity incentives.

The research methodology, including the research models, sample selection, Libby boxes, and the necessary dataset to test the hypotheses will be commented in the next section.

6.3 Research methodology

6.3.1 Research models

The research model builds on Cheng and Warfield (2005) and Bergstresser and Philippon (2006). In this section the choices for earnings management proxies, equity incentive measures, and the empirical model and control variables will be explained.

6.3.1.1 Detecting earnings management

In order to improve internal validity of this study, this study is based on two different measures of earnings management commonly used in the literature: absolute abnormal accruals (Kothari et al., 2005) and real activities manipulation (Roychowdhury, 2006).

Abnormal accruals

A majority of studies (e.g. Cheng & Warfield, 2005; Bergstresser & Philippon 2006; and Gao & Shrieves, 2002) use the total accruals (TA) approach based on the (modified) Jones model. Using an accrual model to measure earnings management appears to be an effective way. The approaches can be divided in a time-series approach and a cross-sectional approach. Bartov et al. (2001) provide evidence that the cross-sectional approach is more powerful in detecting earnings management. To measure earnings management in this study, the cross-sectional performance model by Kothari et al. (2005), will be used. This model is used because if one measures earnings management caused by equity incentives, it is especially important to control for firm performance and that is what the Kothari et al. (2005) model does. The goal of earnings management is to enhance firm performance, there is a correlation between firm performance and management compensation (Ronen & Yaari, 2008), therefore controlling for firm performance is important when using earnings management in combination with equity incentives.

Accruals are considered to be the difference between earnings and cash flows (earnings = actual cash flows + accruals) in a certain period. The limitation of this consideration is that cash flow information, to measure total accruals, is not always available or reliable, which places restrictions on the sample. Accruals could be divided in discretionary and nondiscretionary accruals. This distinction is based on the extent to which the management can influence a certain accrual. When agency problem exists and managers are motivated to perform well, managers would make opportunistic decisions to alter the measurements of firm performance as observed by investors. Significantly, positive or negative discretionary accruals are a signal of earnings management.

When using an accrual model, first total accruals need to be determined. According to Dechow et al. (1995), total accruals can be determined as follows:

$$TA_t = (\Delta CA_t - \Delta CL_t - \Delta Cash_t + \Delta STD_t - Dep_t)/(A_{t-1}) \quad (1)$$

Where:

TA = total accruals

∆CA = change in current assets (COMPUSTAT data item 4)

∆CL = change in current liabilities (COMPUSTAT data item 5)

∆Cash = change in cash and cash equivalents (COMPUSTAT data item 1)

∆STD = change in debt included in current liabilities (COMPUSTAT data item 34)

Dep = depreciation and amortization expense (COMPUSTAT data item 14)

A = total assets (COMPUSTAT data item 6)

As mentioned before, distinction can be made between discretionary accruals (DA) and nondiscretionary accruals (NDA), whereby significantly positive or negative discretionary accruals are an indication of earnings management. The relation between these variables can be determined as follows:

DA = TA – NDA or TA = NDA + DA (2)

Where:

DA = Discretionary accruals

TA = Total accruals

NDA = Nondiscretionary accruals

If the total accruals can be determined, nondiscretionary accruals need to become known to determine the level of earnings management (DA). The determination of the nondiscretionary accruals is possible with an accrual model, the method to estimate nondiscretionary accrual differs per model.

Concerning this empirical research, the cross-sectional modified Jones model by Kothari et al. (2005) will be used. Normally the cross-sectional approach is performed, by comparing firm X of industry Z with firm Y of industry Z. This procedure is repeated for all firms in industry Z, so firm X has to be compared with firm A, B, C, etc. of industry Z. It is mentionable that this procedure is labour-intensive and not efficient. Due to efficiency, in this study, firm X is being compared with the average of industry Z, this approach captures all firms in that industry.

The equation of the modified Jones model by Kothari et al. (2005) is determined as follows (Ronen and Yaari, 2008):

$$\frac{TA_{it}}{A_{it-1}} = \alpha_0 + \alpha_i \frac{1}{A_{it-1}} + \beta_{1i} \frac{\Delta REV_{it} - \Delta AR_{it}}{A_{it-1}} + \beta_{2i} \frac{PPE_{it}}{A_{it-1}} + \delta_1 ROA_{it-1} \quad (3)$$

Where:

TA = total accruals

A = total assets (COMPUSTAT data item **6**)

∆REV = change in revenues (COMPUSTAT data item **12**)

∆AR = change in accounts receivable (REC in the Dechow et al. 1995) (COMPUSTAT data item **2**)

PPE = gross property, plant and equipment (COMPUSTAT data item **7**)

ROA = Return on Assets measured using net income (COMPUSTAT data item **18**)

i = index for firm, i = 1,2,…,N

t = index for period (year) in the estimation period, t = 1,2,…,T

∆ = change in a given variable

α_{00} = intercept (a constant)

α β δ = regression coefficients

According to Jones (1991), the variable for change in revenues (∆REV) can control for changes in nondiscretionary accruals not caused by earnings management but caused by the changing economic conditions. To control for the portion of total accruals related to nondiscretionary depreciation expenses, the variable for gross property, plant, and equipment (PPE) is added into the model (Jones, 1991). Instead of the assumption by Jones (1991) that all revenues are nondiscretionary, Dechow et al. (1995) assume that all changes in credit sales in the event stage result from earnings management, and that is why they added the variable for the change in net receivables (∆REC). To control for different company sizes, Dechow et al. (1995), scaled all variables in the accrual model by lagged total assets. This should prevent for heteroskedasticity in the results. However, heteroskedasticity (bias towards bigger companies) was still present according to Kothari et al. (2005), so they decided to add an intercept (α_0) to reduce this heteroskedasticity. They conclude that this also improves the effectiveness of the tests and reduces the likelihood of type-I errors, which was a limitation in the Jones model (Roonen and Yari, 2008). Kothari et al. (2005) also argue that company performance could have an effect on discretionary (abnormal) accruals and could cause type-I errors to occur. To control for the effects of company performances on discretionary accruals, they added an extra (control) variable into the regression, lagged Return on Assets (ROA). The ROA variable reduces the likelihood that normal (nondiscretionary) accruals will be incorrectly identified as discretionary accruals.

There are two stages that can be distinguished in an accrual model: the estimation stage and the event stage. In the estimation stage, discretionary accruals are supposed to be zero (Jones, 1991). The total accruals in the estimation stage equal the nondiscretionary accruals.

$$\frac{NDA_{it}}{A_{it-1}} = \frac{TA_{it}}{A_{it-1}} = \alpha_0 + \alpha_i \frac{1}{A_{it-1}} + \beta_{1i} \frac{\Delta REV_{it} - \Delta AR_{it}}{A_{it-1}} + \beta_{2i} \frac{PPE_{it}}{A_{it-1}} + \delta_1 ROA_{it-1} \qquad (4)$$

The assumption that total accruals equal the nondiscretionary accruals in the estimation stage causes a need for a sufficient number of observations for the estimation stage and that these observations have to correspond to the observations in the event stage. This correspondence can be obtained in a time-series approach and in a cross-sectional approach. Concerning this empirical research, the cross-sectional approach will be used. An advantage of the cross-sectional approach is that the data

from the estimation stage and the event stage are obtained from the same period (year). This in contrast to the time-series approach, in which an estimation stage contains several periods. McNichols (2000) concludes that most studies require firms to have at least ten years of data available, when adopting a time-series approach. This approach also implies that firm specific coefficients are stable across these years, which is not always the case. However, an advantage of the time-series approach is that the discretionary accruals are measured based on estimates from the same company over a longer period. With the cross-sectional approach, a company's discretionary accruals are measured based on the industry estimates. So the estimation stage will only contain data of a specific industry in year X. If the coefficients are determined, the nondiscretionary accruals for a specific company can be derived by filling in the company specific variables and the estimated industry specific coefficients. Strictly, in the estimation stage, the specific company (for which the nondiscretionary accruals need to be measured) has to be excluded from the population. However, this implies that every company should have its own sample in the estimation stage, containing the whole industry except their selves. The influence of one specific company is negligible, if the research sample is sufficient large enough, the coefficients only have to be measured ones per year per industry. Another potential limitation of a cross-sectional study is pointed out by McNichols (2000), he refers to studies which find that firms are more likely to manage earnings if they expect competitor firms to manage earnings. The estimations of the industry-specific coefficients are obtained by performing a multiple linear regression using the data of the companies within these industries. After the estimation stage, the estimated coefficients have to be filled in the accrual model for the event stage:

$$\frac{TA_{it}}{A_{it-1}} = \hat{\alpha}_0 + \hat{\alpha}_i \frac{1}{A_{it-1}} + \hat{\beta}_{1i} \frac{\Delta REV_{it} - \Delta AR_{it}}{A_{it-1}} + \hat{\beta}_{2i} \frac{PPE_{it}}{A_{it-1}} + \hat{\delta}_1 ROA_{it-1} + \varepsilon_{it} \qquad (5)$$

Where:

$\hat{\alpha}$ $\hat{\beta}$ $\hat{\delta}$ = estimated coefficients, per year per industry

ε = error term (or residuals) for firm *i* in year *t*.

The error term represents the amount of discretionary accruals. The error term reflects the reliability of the estimated regression coefficients. By filling in the company specific variables in this equation, the nondiscretionary accruals could be determined. As mentioned before after this the discretionary accruals are the result of deducting the nondiscretionary accruals from the total accruals. Therefore, the error term is equal to the discretionary accruals.

Real activities manipulation

The second measure of earnings management focuses on operational activities undertaken by management that deviate from normal business practices. Consistent with Roychowdhury (2006), who based his work on the models developed by Dechow et.al (1998), there will be focussed on abnormal levels of: (1) cash flow from operations (CFO), (2) production costs, and (3) discretionary expenses.

In order to estimate the abnormal CFO, first the normal CFO is estimated. As stated in section 2.7.2 of this thesis this is expressed as a linear function of sales (S_{it}) and the change in sales (ΔS_{it}). With this equation, the coefficients are estimated. All the variables in the model are scaled by lagged total assets (A_{it-1}) so that heteroskedasticity is reduced.

$$\frac{CFO_{it}}{A_{it-1}} = \alpha_0 + \alpha_i \frac{1}{A_{it-1}} + \beta_{1i} \frac{S_{it}}{A_{it-1}} + \beta_{2i} \frac{\Delta S_{it}}{A_{it-1}} + \varepsilon_{it} \quad (6)$$

Where:

CFO_{it} = cash flow from operations in year *t* for firm *i*;

S_{it} = sales in year *t* for firm *i*;

ΔS_{it} = sales in year *t* less sales in year *t* – 1 for firm *i*;

ε = error term.

By using the estimated coefficients from equation (6), the normal cash flow from operations ($NCFO_{it}$) can be calculated, by excluding the error term in the equation. After calculating the $NCFO_{it}$, the abnormal CFO (ABN_CFO_{it}) can be calculated. The ABN_CFO_{it} is the difference between CFO_{it} and $NCFO_{it}$.

The next step is to determine the abnormal level of production cost. Roychowdhury (2006) defines production costs ($PROD_{it}$) as the sum of costs of goods sold ($COGS_{it}$) and the change in inventory (ΔINV_{it}). As could be seen in section 2.7.2, Roychowdhury (2006) estimates these as follow:

$$\frac{COGS_{it}}{A_{it-1}} = \alpha_0 + \alpha_i \frac{1}{A_{it-1}} + \beta_{1i} \frac{S_{it}}{A_{it-1}} + \varepsilon_{it} \quad (7)$$

Where:

$COGS_{it}$ = costs of goods sold in year *t* for firm *i*.

$$\frac{\Delta INV_{it}}{A_{it-1}} = \alpha_0 + \alpha_i \frac{1}{A_{it-1}} + \beta_{1i} \frac{\Delta S_{it}}{A_{it-1}} + \beta_{2i} \frac{\Delta S_{it-1}}{A_{it-1}} + \varepsilon_{it} \quad (8)$$

Where:

ΔINV_{it} = inventory in year t less inventory in year t – 1 for firm i.

Based on the sum of equation (7) and (8), the equation for determining the level of production costs is defined as:

$$\frac{PROD_{it}}{A_{it-1}} = \alpha_0 + \alpha_i \frac{1}{A_{it-1}} + \beta_{1i} \frac{S_{it}}{A_{it-1}} + \beta_{2i} \frac{\Delta S_{it}}{A_{it-1}} + \beta_{3i} \frac{\Delta S_{it-1}}{A_{it-1}} + \varepsilon_{it} \quad (9)$$

Where:

$PROD_{it}$ = production costs in year t for firm i.

So, the normal $PROD_{it}$ can be calculated by using the estimated coefficients from equation (9) and excluding the error term in this equation. The abnormal production costs (ABN_PROD_{it}) can now be estimated as the difference between $PROD_{it}$ and $NPROD_{it}$.

At last the abnormal of discretionary expense have to be determined. As mentioned in section 2.7.2, these are also modelled as a linear function of sales:

$$\frac{DISEXP_{it}}{A_{it-1}} = \alpha_0 + \alpha_i \frac{1}{A_{it-1}} + \beta_{1i} \frac{S_{it-1}}{A_{it-1}} + \varepsilon_{it} \quad (10)$$

Where:

$DISEXP_{it}$ = discretionary expenditures (R&D, SG&A and Advertising) in year *t* for firm *i*.

Consequently, the estimated coefficients in equation (10) are used to estimate the normal discretionary expense ($NDISEXP_{it}$), by excluding the error term again. Finally, the abnormal discretionary expense (ABN_EXP_{it}) can be measured as the difference between $DISEXP_{it}$ and $NDISEXP_{it}$.

6.3.1.2 Measurement of equity incentives

Equity incentives (EI_{it}) is a ratio and is measured, following Cheng and Warfield (2005), as the number of: options grants in the current period , unexercisable options excluding option grants, exercisable options, restricted stocks grants, and stock ownership, divided by the number of outstanding shares. An option is taken as a share's equivalent and is measured in shares. Total equity incentives are the sum of the stock and option compensation package:

$$TOT\_EI_{it} = EI\_OPTGR_{it} + EI\_UNEXOPT_{it} + EI\_EXOPT_{it} + EI\_RESST_{it} + EI\_STOWN_{it} \quad (11)$$

Where:

TOT_EI_{it} = total equity incentives in year t for firm i;

EI_OPTGR_{it} = option grants / common shares outstanding;

$EI\_UNEXOPT_{it}$ = unexercisable options / common shares outstanding;

EI_EXOPT_{it} = exercisable options / common shares outstanding;

EI_RESST_{it} = restricted stock grants / common shares outstanding;

EI_STOWN_{it} = share ownership / common shares outstanding.

6.3.1.3 Empirical models and control variables

To investigate the relationship between equity incentives, earnings management, and the financial crisis, the following multivariate regression model is being used:

$$EM_{it} = \alpha_0 + \alpha_i TOT\_EI_{it} + \beta_{1i} Crisis_{it} + \beta_{2i} Size_{it} + \beta_{3i} Bonus_{it} + \beta_{4i} Leverage_{it} + \beta_{5i} \sigma CFO_{it} + \beta_{6i} \sigma \mathrm{Re}v_{it} + \beta_{7i} MtB_{it} + \beta_{8i} Loss_{it} + \varepsilon_{it} \quad (12)$$

Where, EM_{it} is either absolute abnormal accruals following Kothari et al. (2005) or the real activities manipulation proxies following Roychowdhury (2006). TOT_EI_{it} is the sum of the stock and option compensation package. $Crisis_{it}$ is a dummy variable 1 for fiscal year 2009 - 2012, 0 for fiscal year 2004 - 2007.

Furthermore, to control for the possibility that the measured earnings management could be driven by other factors, we have added several control variables. With their political cost hypothesis, Watts and Zimmerman (1978) show that management of large companies can have the intention to manage their earnings downwards. So a control for firm size using the natural log of total assets is added. Prior studies (e.g. Healy, 1985 and Holthausen et al., 1995) find evidence of bonus income creating incentives to manage earnings, so a dummy variable 1 for firm-years whose CEOs have nonzero bonus, and 0 otherwise, is added to the regression. Next, a control variable for leverage is included, because due to debt covenant restrictions firms with high leverage have incentives to bias earnings upwards. Consistent with Hribar and Nichols (2007) the standard deviation of cash flows from operations over the current and past two years (σCFO_{it}) and the standard deviation of revenues over the current and past two years (σREV_{it}), are included as control variables. Hribar and Nichols (2007) find that not controlling for firm characteristics may lead to incorrect inferences regarding earnings management. Following Roychowdhury (2006), MtB_{it} is included to control for the growth level of a company. This is a ratio which is measured by dividing the market value of equity with the book value of the equity. At last, firms that suffer a loss are more likely to manage earnings upward in order to show a small profit. To control for the chance that earnings management incentives are different amongst firms incurring losses and firms incurring profits, a dummy variable 1 for a firm suffering a loss, and 0 otherwise is included.

6.4 Sample selection and data collection

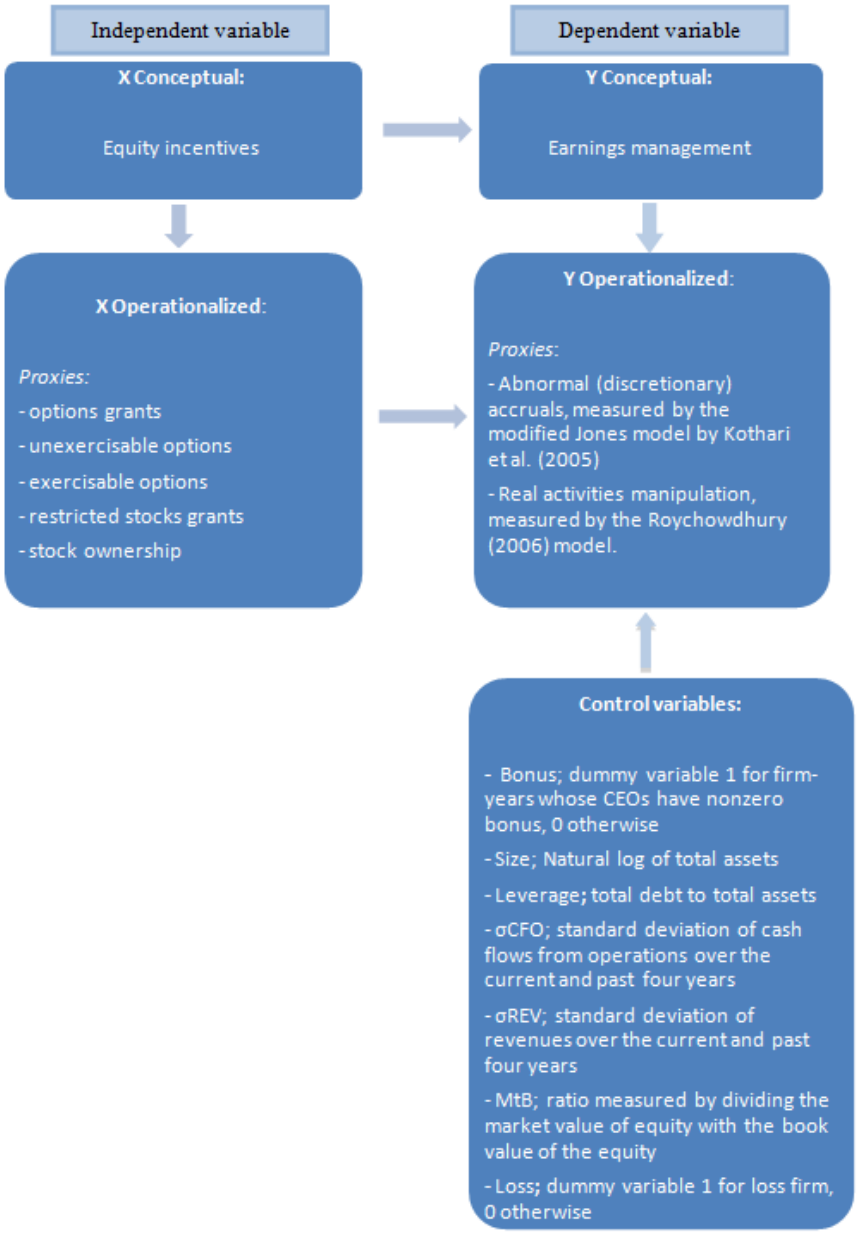
In this section the sample selection of this thesis will be discussed. The sample consists of firms listed in the United States that are part of the S&P 1500 index. The sample period is from 2004 - 2012, this period is being used because it covers both, years before the global financial crisis of 2008 and the years during this financial crisis. However, the year 2008 itself is excluded from the sample, because

this year's data is diluted. It is known that the financial crisis started somewhere in 2008, but when it exactly started cannot be determined. Financial institutions with Standard Industrial Classifications (SICs) between 6000 and 6999 are excluded because financial institutions could make other accounting decisions to manage their earnings. Utility companies (SICs between 4000 and 4999) are excluded because regulation may cause the incentives to manage earnings, different from the incentives in unregulated industries. Non-classifiable establishments (SICs between 9000 and 9999) are excluded because accrual estimation is problematic for these industry sectors. Observations with missing values required for the variables are also excluded. Two different databases will be used, both Compustat and ExecuComp, data from these databases should be able to be merged. Data on CEOs' stock-based compensation and ownership will be collected from the Standard & Poor's ExecuComp database. Data on earnings management will be collected from the Compustat North America database. Table 1 shows that a total of 9608 useable firm-years are left in the sample, after excluding the data mentioned above.

Table 1
Sample selection

U.S. listed, S&P 1500 index firm-year observations between 2004 and 2012	17792
- Observation year 2008	1973
- Financial institutions SICs between 6000 and 6999 (- 1583)	2880
- Utility companies SICs between 4000 and 4999	1531
- Non-classifiable establishments SICs between 9000 and 9999	61
- Observations with missing values required for the variables	1151
- Outliers	588
Useable firm-year observations	**9608**

6.5 Libby boxes



Validity

This study is based on a sample of S&P 1500 U.S. firms for the period 2004 to 2012. The data sample with all its adjustments due to improvements in internal validity (e.g. restriction to firms with complete datasets, mergeable data, etc.) provides a relatively high degree of external validity, because it includes firms from several industries. However, only using U.S. firms decreases external validity, the results provided in this study might not be applicable to, for example European companies. Additionally, by using S&P 1500, the data sample does not include small firms, which is another shortfall for external validity. This exclusion could have positive effects on outlier problems, increasing internal validity. Also, using a large sample and much control variables help to improve the internal validity. Using proxies for earnings management and equity incentives that have proven to be right in prior literature, increases construct validity.

6.6 Summary

In this chapter, the empirical part of this research is elaborated on, discussing this papers' investigation of the relation between equity incentive and earnings management. Firstly, based on prior literature, four hypotheses for this research are developed, based on this the research question will be answered. With the first hypotheses, a positive association between earnings management and equity incentives, is expected to be found. With the second hypotheses, it is expected that the association between equity incentives and earnings management is stronger for option-based incentives than for share-based incentives. The third hypotheses expects a negative association between the financial crisis and earnings management. The last hypotheses expects that the financial crisis period is associated with a higher level of accrual based earnings management.

Secondly, the empirical part of this study is based on both an accrual model and by measuring the level of real activities manipulation. An accrual is the difference between earnings and cash flows in a certain period. A distinction exists between discretionary and non-discretionary accruals. Discretionary accruals are an indicator of the use of earnings management. The determination of the non-discretionary accruals is possible with an accrual model. In this study, the cross-sectional modified Jones accrual model by Kothari et al. (2005) is being used. Real activities manipulation focuses on operational activities undertaken by management that deviate from normal business practices. Following Roychowdhury (2006), this is measured by focussing on abnormal levels of; cash flow from operations (CFO), production costs, and discretionary expenses. Consistent with Cheng and Warfield (2005), equity incentives are measured as the number of: options grants in the current period, unexercisable options excluding option grants, exercisable options, restricted stocks grants, and stock ownership, divided by the number of outstanding shares.

This empirical research is based on firms listed in the United States that are part of the S&P 500 index between 2004 – 2012. To collect all the necessary data, two different databases are used, both Compustat and ExecuComp.

At last, Libby boxes and information about the validity of this study are provided. Overall, due to the large sample size, control variables, restrictions to the sample, reliable models, etc., the validity of this study seems to be acceptable.

7. Results

7.1 Introduction

In the previous chapter, the research design was discussed. This chapter will discuss the results of the empirical part of this study. So this chapter will answer sub question six, about the results of this paper. The remainder of this chapter is organized into three parts. First the descriptive statistics of the research data will be discussed. Secondly the regression conditions will be addressed followed by the correlation matrix. At last the hypothesis developed in chapter six will be tested using regression analysis.

7.2 Descriptive statistics

In this section the descriptive statistics concerning equity incentives, earnings management and the control variables will be addressed. The minimum, maximum, mean, median and standard deviation for all the groups will be shown and explained. For each of these groups (equity incentives, earnings management and the control variables), three tables are included in this section, these tables show the descriptive statistics of three different samples: the total sample period from 2004 to 2012, the pre-crisis period from 2004 until 2007 and the crisis period from 2009 until 2012.

The sample consists of firms listed in the United States that are part of the S&P 1500 index. Two different databases will be used, both Compustat and ExecuComp. Data on CEOs' stock-based compensation and ownership will be collected from the Standard & Poor's ExecuComp database. Data on earnings management will be collected from the Compustat North America database. The variables used for this study are described in appendix 2.
For tests over the total research period running from 2004 - 2012 a total of 9608 firm years are included in the sample. For the period prior to the financial crisis 5247 firm years are included in the sample. In the period from 2009 - 2012 4361 firms years are included in the sample.

7.2.1 Descriptive statistics of the equity incentives

Table 2 gives an overview of the descriptive statistics of the equity incentive variables during the research period of eight years. The information in the table shows that the exercisable options are the most represented in the sample, both the mean and median are the highest for this variable compared to the other four equity incentive variables. The average exercisable options are about 50% of the average total equity incentives. After exercisable options, restricted stock grants are most represented in the sample, both the mean and median are the second highest. The table also shows that option related incentives are considerably higher than stock based incentives. The average option based incentives are about two times as high as the average stock based incentives, the difference in median options and stock shows the same pattern. Noticeable about the overview in table 2 is that the

minimum of all the variables equals zero, the reason is that managers without equity incentives like options are also included in the sample.

Table 2
Descriptive statistics equity incentives for the total sample period 2004 - 2012

Model: $EM_{it} = \alpha_0 + \boldsymbol{\alpha_1 TOT\_EI_{it}} + \beta_{1i}Crisis_{it} + \beta_{2i}Size_{it} + \beta_{3i}Bonus_{it} + \beta_{4i}Leverage_{it} + \beta_{5i}\sigma CFO_{it} + \beta_{6i}\sigma Rev_{it} + \beta 7iMtBit + \beta 8iLossit + \varepsilon it$

Variables	N	Mean	Median	Std. Dev.	Min	Max
EI_OPTGR(it)	9608	3319,126	1250,524	7548,412	0,000	237109,400
EI_UNEXOPT(it)	9608	5196,035	922,531	16445,928	0,000	662864,250
EI_EXOPT(it)	9608	15347,109	3346,721	41452,731	0,000	1183543,062
EI_RESST(it)	9608	6882,324	1704,894	23690,382	0,000	1423453,973
EI_STOWN(it)	9608	3056,813	512,478	30721,351	0,000	1216621,640

Variables are explained in appendix 2

Table 3 gives an overview of the descriptive statistics of the equity incentive variables during the pre-crisis period (2004 - 2007). The information in the table shows that the mean and median of exercisable options, during the pre-crisis period, are just like in table 2 (total research period) most represented compared to the other four equity incentive variables. Different compared to the total research period is that after exercisable options, unexercisable options are most represented in the sample, based on the mean.

The table shows that option related incentives are still considerably higher than stock based incentives. An interesting trend that can be seen is, that while the average option based incentives are higher in the pre-crisis period compared to the total research period, the average stock based incentives decreased. The same pattern can also be seen for the median. Because managers without equity incentives like options are also included in the sample, the minimum of all the variables equal zero again.

Table 3
Descriptive statistics equity incentives for the Pre-Crisis period 2004 - 2007

Model: $EM_{it} = \alpha_0 + \boldsymbol{\alpha_1 TOT\_EI_{it}} + \beta_{1i}Crisis_{it} + \beta_{2i}Size_{it} + \beta_{3i}Bonus_{it} + \beta_{4i}Leverage_{it} + \beta_{5i}\sigma CFO_{it} + \beta_{6i}\sigma Rev_{it} + \beta 7iMtBit + \beta 8iLossit + \varepsilon it$

Variables	N	Mean	Median	Std. Dev.	Min	Max
EI_OPTGR(it)	5247	3779,153	1358,143	7988,380	0,000	135053,100
EI_UNEXOPT(it)	5247	5476,448	930,044	15857,036	0,000	539203,536
EI_EXOPT(it)	5247	18154,585	4484,889	43984,351	0,000	728879,130
EI_RESST(it)	5247	5005,153	324,827	14864,555	0,000	332508,926
EI_STOWN(it)	5247	3037,200	442,122	30127,025	0,000	1216621,640

Variables are explained in appendix 2

Table 4 gives an overview of the descriptive statistics of the equity incentive variables during the crisis period (2009 - 2012). The information in the table shows that the mean and median of exercisable options, during the crisis period, are just like in table 2 (total research period) most represented compared to the other four equity incentive variables. After exercisable options, restricted stock grants are most represented in the sample, both the mean and median are the second highest again.
Table 4 also shows that option related incentives are still higher than stock based incentives although, the difference between both is decreased. An interesting trend that can be seen is, that while the average option based incentives are decreased in the crisis period, the average stock based incentives increased. For the same reason as above, the minimum of all the variables equal zero.

Table 4
Descriptive statistics equity incentives for the Crisis period 2009 - 2012

Model: $EM_{it} = \alpha_0 + \boldsymbol{\alpha_1 TOT\_EI_{it}} + \beta_{1i}Crisis_{it} + \beta_{2i}Size_{it} + \beta_{3i}Bonus_{it} + \beta_{4i}Leverage_{it} + \beta_{5i}\sigma CFO_{it} + \beta_{6i}\sigma Rev_{it} + \beta 7iMtBit + \beta 8iLossit + \varepsilon it$

Variables	N	Mean	Median	Std. Dev.	Min	Max
EI_OPTGR(it)	4361	2765,639	1133,880	6943,033	0,000	237109,400
EI_UNEXOPT(it)	4361	4858,651	914,468	17123,398	0,000	662864,250
EI_EXOPT(it)	4361	11969,251	2449,171	37915,397	0,000	1183543,062
EI_RESST(it)	4361	9140,869	3660,707	31007,222	0,000	1423453,973
EI_STOWN(it)	4361	3080,411	596,826	31424,981	0,000	1147477,302

Variables are explained in appendix 2

7.2.2 Descriptive statistics of the earnings management

Table 5 reports the descriptive statistics regarding earnings management over the period 2004 - 2012. The average accrual based earnings management during the research period is 0,046 and the median is 0,040. This indicates that the median and the average does not differ much from each other. This also applies to the median (0,370) and mean (0,459) of the level of real activities manipulation. This gives an indication of a non-skewed distribution. Because when the average is higher than the median the distribution is said to be right skewed. This observation is also shown in the table below. Consistent with Kothari et al. (2005) the regressions are estimated on the bases of absolute values, this is the reason why the minimum of all the variables equal zero.

Table 5
Descriptive statistics earnings management for the total sample period 2004 - 2012

Model: $\mathbf{EM_{it}} = \alpha_0 + \alpha_1 TOT\_EI_{it} + \beta_{1i} Crisis_{it} + \beta_{2i} Size_{it} + \beta_{3i} Bonus_{it} + \beta_{4i} Leverage_{it} + \beta_{5i} \sigma CFO_{it} + \beta_{6i} \sigma Rev_{it} + \beta 7iMtBit + \beta 8iLossit + \varepsilon it$

Variables	N	Mean	Median	Std. Dev.	Min	Max
Accrual_EM(it)	9608	0,046	0,040	0,038	0,000	0,170
Real_EM(it)	9608	0,459	0,370	0,440	0,000	9,460

Variables are explained in appendix 2

Table 6 gives an overview of the descriptive statistics of the earnings management variables during the pre-crisis period (2004 - 2007). The information in the table shows that the mean and median of both the earnings management variables are slightly higher compared to table 5 (total research period). This means that there is still a non-skewed distribution. Again, the minimum of all the variables equal zero.

Table 6
Descriptive statistics earnings management for the Pre-Crisis period 2004 - 2007

Model: $\mathbf{EM_{it}} = \alpha_0 + \alpha_1 TOT\_EI_{it} + \beta_{1i} Crisis_{it} + \beta_{2i} Size_{it} + \beta_{3i} Bonus_{it} + \beta_{4i} Leverage_{it} + \beta_{5i} \sigma CFO_{it} + \beta_{6i} \sigma Rev_{it} + \beta 7iMtBit + \beta 8iLossit + \varepsilon it$

Variables	N	Mean	Median	Std. Dev.	Min	Max
Accrual_EM(it)	5247	0,048	0,040	0,039	0,000	0,170
Real_EM(it)	5247	0,476	0,380	0,466	0,000	9,460

Variables are explained in appendix 2

Table 7 gives an overview of the descriptive statistics of the earnings management variables during the crisis period (2009 - 2012). Compared to table 5 (total research period) the information in this table shows that the mean and median of both the earnings management variables are slightly lower. A more interesting comparison is that between table 6 (pre-crisis period) and table 7 (crisis period). Comparing both tables shows that that the mean and median of both the earnings management variables are higher for the pre-crisis period compared to the crisis period. This indicates that during the crisis period, less earnings management is being applied. As mentioned before consistent with Kothari et al. (2005) the regressions are estimated on the bases of absolute values, this is the reason why the minimum of all the variables equal zero.

Table 7
Descriptive statistics earnings management for the Crisis period 2009 - 2012

Model: $\mathbf{EM_{it}} = \alpha_0 + \alpha_1 TOT\_EI_{it} + \beta_{1i} Crisis_{it} + \beta_{2i} Size_{it} + \beta_{3i} Bonus_{it} + \beta_{4i} Leverage_{it} + \beta_{5i} \sigma CFO_{it} + \beta_{6i} \sigma Rev_{it} + \beta 7iMtBit + \beta 8iLossit + \varepsilon it$

Variables	N	Mean	Median	Std. Dev.	Min	Max
Accrual_EM(it)	4361	0,044	0,030	0,037	0,000	0,170
Real_EM(it)	4361	0,439	0,360	0,407	0,010	7,850

Variables are explained in appendix 2

7.2.3 Descriptive statistics of the control variables

The table below demonstrates the descriptive statistics of the control variables over the period 2004 - 2012. The table is showing that the average size of the firms in the sample based on their natural log of total assets is 7,202. It also shows that the mean of salary for the research period is 2303,877. Furthermore the average leverage is 0,270 as mentioned, firms with high leverage have incentives to bias earnings upwards. The standard deviation of cash flows from operations and the standard deviation of revenues have respectively an average of 144,930 and 659,020. At last market to book value, controlling for the growth level of a company, has a mean of 3,325.

Table 8
Descriptive statistics control variables for the total sample period 2004 - 2012

Model: $EM_{it} = \alpha_0 + \alpha_1 TOT\_EI_{it} + \mathbf{\beta_{1i} Crisis_{it} + \beta_{2i} Size_{it} + \beta_{3i} Bonus_{it} + \beta_{4i} Leverage_{it} + \beta_{5i} \sigma CFO_{it} + \beta_{6i} \sigma Rev_{it} + \beta 7iMtBit + \beta 8iLossit} + \varepsilon it$

Variables	N	Mean	Median	Std. Dev.	Min	Max
Crisis(it)	9608	0,454	0,000	0,498	0,000	1,000
Size(it)	9608	7,202	7,065	1,581	-2,430	12,718
Salary(it)	9608	2303,877	2174,772	1241,773	0,000	14508,901
Bonus(it)	9608	0,538	1,000	0,499	0,000	1,000
Leverage(it)	9608	0,270	0,237	24,593	-1904,976	439,515
STD_CFO(it)	9608	144,930	35,440	536,246	0,267	16298,176
STD_REV(it)	9608	659,020	125,538	2914,831	0,000	88319,242
MtB(it)	9608	3,325	2,373	24,250	-704,186	827,940
Loss(it)	9608	0,006	0,000	0,076	0,000	1,000

Variables are explained in appendix 2

Crisis, bonus and loss are dummy variables, that's why bonus and loss are shown in the figures below. Figure 1 shows that the comparison between the number of CEOs who received a bonus and CEOs that have not, changed for the crisis period.

Figure 1
Dummy variable Bonus(it)

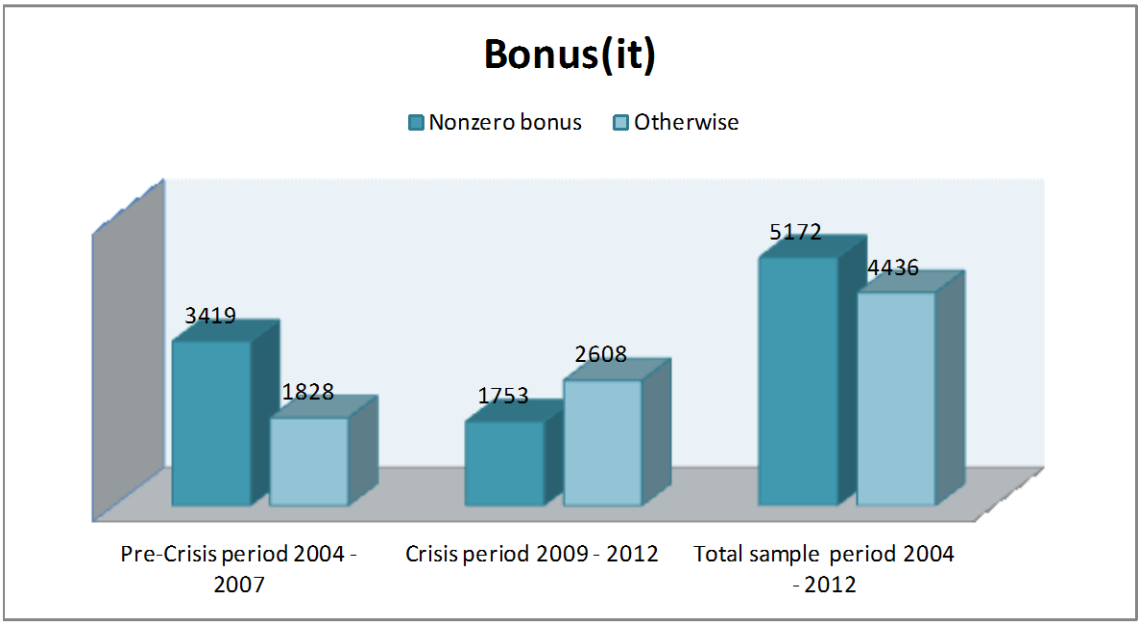
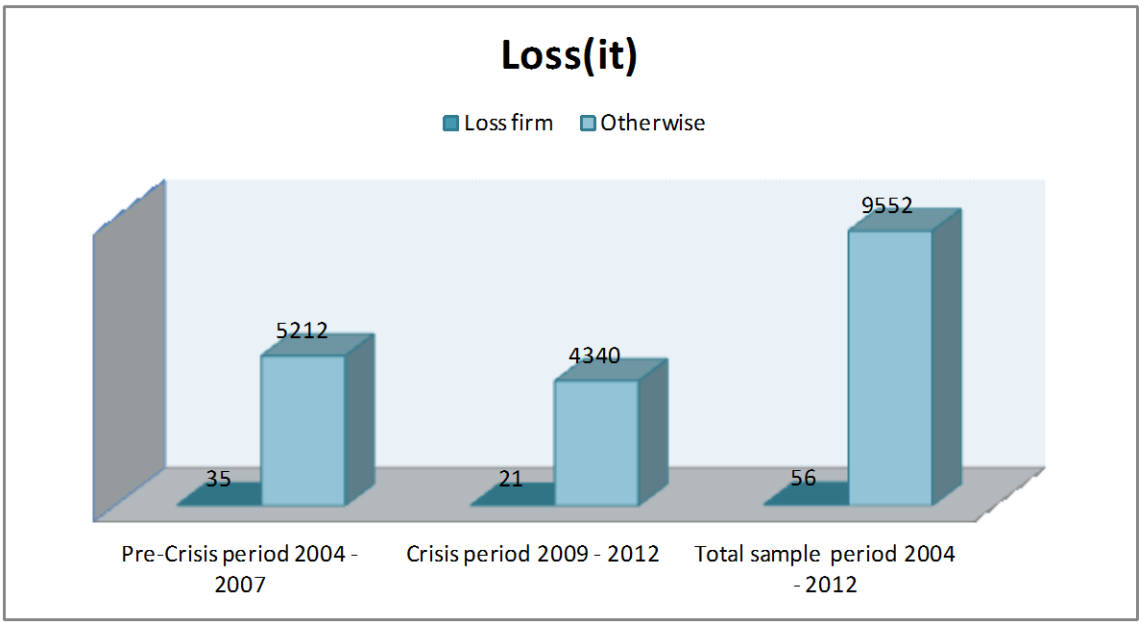


Figure 2 shows that the number of firms that reported a loss did not change for the crisis period. The number of firms that reported a loss is almost the same for the pre-crisis period as for the crisis period.

Figure 2
Dummy variable Loss(it)



Comparison of table 9 (pre-crisis period) with table 10 (crisis period) shows that the mean for all the control variables are higher for the crisis period than for the pre-crisis period, except for the control variable market to book value.

Table 9

Descriptive statistics control variables for the Pre-Crisis period 2004 - 2007

Model: $EM_{it} = \alpha_0 + \alpha_1 TOT\_EI_{it} + \beta_{1i}Crisis_{it} + \beta_{2i}Size_{it} + \beta_{3i}Bonus_{it} + \beta_{4i}Leverage_{it} + \beta_{5i}\sigma CFO_{it} + \beta_{6i}\sigma Rev_{it} + \beta 7iMtBit + \beta 8iLossit + \varepsilon it$

Variables	N	Mean	Median	Std. Dev.	Min	Max
Crisis(it)	5247	0,000	0,000	0,000	0,000	0,000
Size(it)	5247	7,033	6,900	1,555	0,067	12,397
Salary(it)	5247	2099,105	2000,000	1302,393	0,000	14508,901
Bonus(it)	5247	0,652	1,000	0.477	0,000	1,000
Leverage(it)	5247	-0,0612	0,221	30,091	-1904,976	223,600
STD_CFO(it)	5247	115,551	28,552	359,183	0,267	9904,267
STD_REV(it)	5247	547,792	113,679	2137,106	0,000	57637,613
MtB(it)	5247	3,552	2,612	20,338	-704,186	827,940
Loss(it)	5247	0,007	0,000	0,0814	0,000	1,000

Variables are explained in appendix 2

Table 10

Descriptive statistics control variables for the Crisis period 2009 - 2012

Model: $EM_{it} = \alpha_0 + \alpha_1 TOT\_EI_{it} + \beta_{1i}Crisis_{it} + \beta_{2i}Size_{it} + \beta_{3i}Bonus_{it} + \beta_{4i}Leverage_{it} + \beta_{5i}\sigma CFO_{it} + \beta_{6i}\sigma Rev_{it} + \beta 7iMtBit + \beta 8iLossit + \varepsilon it$

Variables	N	Mean	Median	Std. Dev.	Min	Max
Crisis(it)	4361	1,000	1, 000	0,000	1,000	1,000
Size(it)	4361	7,406	7,289	1,587	-2,430	12,718
Salary(it)	4361	2550,251	2361,250	1116,070	0,000	9472,494
Bonus(it)	4361	0,402	0,000	0,490	0,000	1,000
Leverage(it)	4361	0,668	0,255	15,585	-456,500	439,515
STD_CFO(it)	4361	180,278	45,374	690,003	0,438	16298,176
STD_REV(it)	4361	792,846	143,428	3632,193	0,278	88319,242
MtB(it)	4361	3,053	2,123	28,248	-688,456	759,618
Loss(it)	4361	0,005	0,000	0,069	0,000	1,000

Variables are explained in appendix 2

7.3 Multicollinearity

Table 11 and 12 respectively are showing the Pearson and Spearman correlation between accrual based and real activities earnings management and the other variables of the regression model. The correlations in both tables are at the 10%, 5% and 1% significance levels.

Both Pearson as the Spearman correlation are showing a weak correlation between accrual based and real activities earnings management, respectively 0,333 and 0,149 both at the 5% significance level. This could mean that accrual based and real activities earnings management are used as substitutes (i.e. Zang, 2012; Cohen et al., 2008; Cohen and Zarowin, 2010).

Table 11 and 12 are respectively showing a positive (0,002) and a negative (-0,011) weak correlation between equity incentives and accrual based earnings management . The same pattern is shown for real activities earnings management (Pearson 0,002 and Spearman -0,017). Both the correlations are not significant and as mentioned before weak, no assumptions can be made based on these values.

The control variable for crisis is significantly negative correlated with accrual based earnings management when both Pearson and Spearman correlation are applied (-0,086 and -0,056). This is also the case for real activities earnings management. Although the correlations are weak, the negative correlation could be explained as the crisis period being related with lesser earnings management compared to a non-crisis period. The variables size and salary are also significantly negative correlated with accrual based and real activities earnings management when both Pearson and Spearman correlation are applied. The Pearson and Spearman correlation for bonus are reporting positive but weak correlations with accrual based earnings management (0,000 and 0,009). On the contrary, Pearson (-0,009) and Spearman (-0,003) are reporting a negative correlation between bonus and real activities earnings management. While both correlations are weak and not significant, this could indicate that bonus is more related with accrual based earnings management than with real activities earnings management. Leverage is reported as being negatively correlated with both accrual based and real activities earnings management under the Pearson (-0,008 and -0,012) and Spearman (-0,173 and -0,101) correlation. However, the Spearman correlation is showing a stronger and significant correlation. The Pearson correlation for market to book value is reporting a weak negative correlation with accrual based earnings management and a weak positive correlation with real activities earnings management, however only the latter is showing significant values. The Spearman correlation is showing for both accrual based and real activity earnings management positive significant but weak correlations. The variable loss is significantly positive correlated with accrual based and real activities earnings management when both Pearson (0,148 and 0,153) and Spearman (0,051 and 0,109) correlation are applied. However, the correlation with loss is stronger in both cases. This suggest that loss firms engage more in real activities manipulation than accrual based earnings management. The variable standard deviation of cash flows from operations is reported as being significantly negative correlated with accrual based earnings management for both the Pearson (-0,034) as Spearman (-0,068) correlation. The correlation between standard deviation of cash flows from operations and real activities manipulations is showing a different pattern, not significant negative correlation under the Pearson correlation (-0,007) and not significant positive

correlation under the Spearman correlation (0,005). However, all these values are weak. The variable standard deviation of revenues is negatively correlated with the accrual based earnings management (-0,019) and significantly positive correlated with real activities manipulations (0,032), under the Pearson correlation. However, the Spearman correlation is showing that standard deviation of revenues is significantly negative correlated with the accrual based earnings management (-0,121) and weak but positive correlated with real activities manipulations (0,016).

Table 11 and 12 are demonstrating the correlation table regarding the variables under the Pearson and Spearman correlation. These correlation tables provide evidence for the assumption that multicollinearity appears when the correlation coefficient between two independent variables is equal or higher than 0,9. The correlation between the variables standard deviation of cash flows from operations and standard deviation of revenues are showing the highest correlation in both Pearson and Spearman correlation, respectively 0,779 and 0,772. So the assumption is not violated, the variables are not highly correlated.

Multicollinearity is also tested using the variance inflation factor (VIF) and tolerance value. A VIF value lower than 10 and tolerance higher than 0,1 (calculated as 1/VIF) are acceptable. A tolerance higher than 0,2 is more preferable (Field, 2013). It is impossible to make any estimation when the level of Multicollinearity is too high. It causes the population being less reprehensive, because the b-values are higher. Furthermore it makes the relevance of the predictive variable questionable, because it lowers the size of R (Field, 2013). The multicollinearity for the regression models in this study are showing VIF values that are lower than 10, the highest value is reported for the variable standard deviation of cash flows from operations with 3,188. The tolerance is showing values higher than 0,2. This means that the regression models used in this study do not show multicollinearity and are acceptable. The tests for multicollinearity are included in appendix 3.

Table 11

Pearson correlation

Multicollinearity analyses the relation between the different independent variables. Multicollinearity is checked to avoid biased results of the regression model. The literature states that multicollinearity occurs when the correlation coefficient between two independent variables is equal or higher than 0,9.

The 10%, 5% and 1% significance levels are indicated by respectively *,**,***. The variables are defined in appendix 2.

Variables	Accrual_EM(it)	Real_EM(it)	TOT_EI(it)	Crisis(it)	Size(it)	Salary(it)	Bonus(it)	Leverage(it)	MtB(it)	Loss(it)	STD_CFO(it)	STD_REV(it)
Accrual_EM(it)		0,333**	0,002	-0,086**	-0,229**	-0,179**	0,000	-0,008	-0,007	0,148**	-0,034**	-0,019
Real_EM(it)	0,333**		0,002	-0,042**	-0,213**	-0,102**	-0,009	-0,012	0,032**	0,153**	-0,007	0,032**
TOT_EI(it)	0,002	0,002		-0,032**	-0,056**	0,069**	0,126**	0,012	0,020	-0,029**	-0,071**	-0,056**
Crisis(it)	-0,086**	-0,042**	-0,032**		0,117**	0,181**	-0,249**	0,015	-0,010	-0,012	0,060**	0,042**
Size(it)	-0,229**	-0,213**	-0,056**	0,117**		0,739**	0,038**	0,030**	0,018	-0,107**	0,429**	0,386**
Salary(it)	-0,179**	-0,102**	0,069**	0,181**	0,739**		0,105**	0,019	0,030**	-0,056**	0,354**	0,311**
Bonus(it)	0,000	-0,009	0,126**	-0,249**	0,038**	0,105**		-0,009	-0,012	-0,022*	0,010	0,024*
Leverage(it)	-0,008	-0,012	0,012	0,015	0,030**	0,019	-0,009		0,621**	-0,057**	0,007	0,003
MtB(it)	-0,007	0,032**	0,020	-0,010	0,018	0,030**	-0,012	0,621**		-0,046**	0,021*	0,001
Loss(it)	0,148**	0,153**	-0,029**	-0,012	-0,107**	-0,056**	-0,022*	-0,057**	-0,046**		-0,012	-0,013
STD_CFO(it)	-0,034**	-0,007	-0,071**	0,060**	0,429**	0,354**	0,010	0,007	0,021*	-0,012		0,779**
STD_REV(it)	-0,019	0,032**	-0,056**	0,042**	0,386**	0,311**	0,024*	0,003	0,001	-0,013	0,779**	
N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608

Variables are explained in appendix 2

Table 12

Spearman correlation

Multicollinearity analyses the relation between the different independent variables. Multicollinearity is checked to avoid biased results of the regression model. The literature states that multicollinearity occurs when the correlation coefficient between two independent variables is equal or higher than 0,9.

The 10%, 5% and 1% significance levels are indicated by respectively *,**,***. The variables are defined in appendix 2.

Variables	Accrual_EM(it)	Real_EM(it)	TOT_EI(it)	Crisis(it)	Size(it)	Salary(it)	Bonus(it)	Leverage(it)	MtB(it)	Loss(it)	STD_CFO(it)	STD_REV(it)
Accrual_EM(it)		0,149**	-0,011	-0,056**	-0,213**	-0,183**	0,009	-0,173**	0,048**	0,051**	-0,068**	-0,121**
Real_EM(it)	0,149**		-0,017	-0,036**	-0,136**	-0,075**	-0,003	-0,101**	0,053**	0,109**	0,005	0,016
TOT_EI(it)	-0,011	-0,017		0,002	-0,020*	0,119**	0,160**	-0,011	0,235**	-0,038**	-0,057**	0,010
Crisis(it)	-0,056**	-0,036**	0,002		0,116**	0,189**	-0,249**	0,027**	-0,152**	-0,012	0,136**	0,075**
Size(it)	-0,213**	-0,136**	-0,020*	0,116**		0,779**	0,030**	0,441**	0,033**	-0,081**	0,822**	0,832**
Salary(it)	-0,183**	-0,075**	0,119**	0,189**	0,779**		0,067**	0,334**	0,035**	-0,059**	0,669**	0,664**
Bonus(it)	0,009	-0,003	0,160**	-0,249**	0,030**	0,067**		0,004	0,004	-0,022*	0,030**	0,029**
Leverage(it)	-0,173**	-0,101**	-0,011	0,027**	0,441**	0,334**	0,004		0,079**	-0,045**	0,309**	0,331**
MtB(it)	0,048**	0,053**	0,235**	-0,152**	0,033**	0,035**	0,004	0,079**		-0,017	0,030**	0,064**
Loss(it)	0,051**	0,109**	-0,038**	-0,012	-0,081**	-0,059**	-0,022*	-0,045**	-0,017		-0,037**	-0,085**
STD_CFO(it)	-0,068**	0,005	-0,057**	0,136**	0,822**	0,669**	0,030**	0,309**	0,030**	-0,037**		0,772**
STD_REV(it)	-0,121**	0,016	0,010	0,075**	0,832**	0,664**	0,029**	0,331**	0,064**	-0,085**	0,772**	
N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608

Variables are explained in appendix 2

7.4 Assumptions regression analysis

As mentioned in the introduction, the hypothesis will be tested in this chapter using regression analysis. But first the residuals of the data will be analyzed in this section, using the four conditions of linear regressions, these are: linearity, homoscedasticity, normality and multicollinearity. These conditions will be tested with the aid of a scatterplot, histogram, and a correlation matrix.

7.4.1 Linearity and homoscedasticity

Figure 3 shows a scatterplot which is being used to examine the linearity and homoscedasticity assumption of the variables equity incentives and accrual based earnings management. Although there might be a pattern in the upper right corner, the scatterplot does not show a clear pattern. This means that there is linearity, because the points are distributed randomly in the scatterplot.
The residuals also show a equal variance, since the residuals are not showing a fanning shape. The scatterplot in figure 3 shows that both the linearity and homoscedasticity conditions are met.

Figure 3
Scatterplot TOT_EI(it) and Accrual_EM(it)

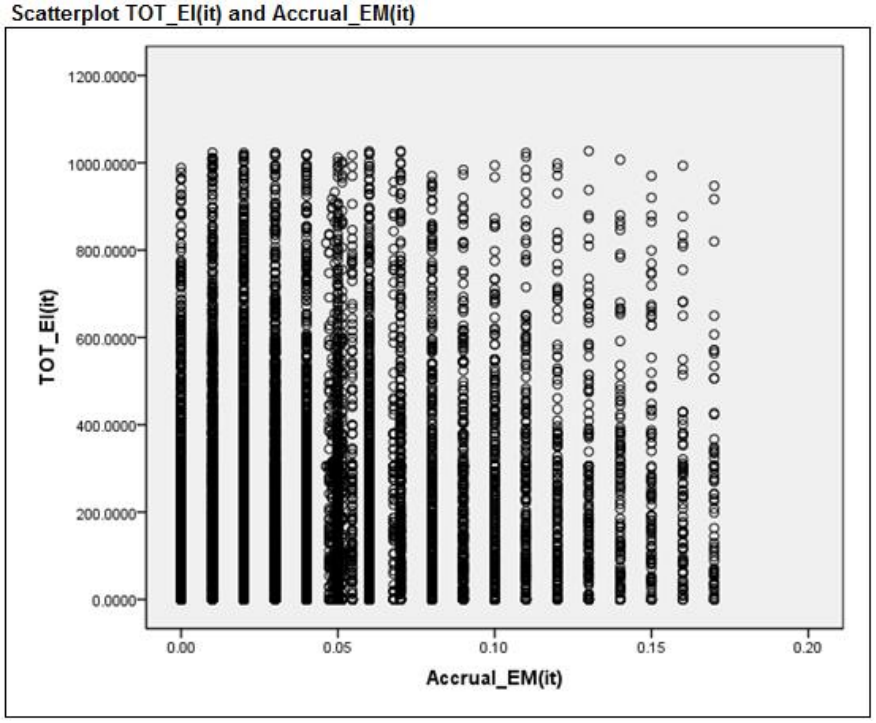
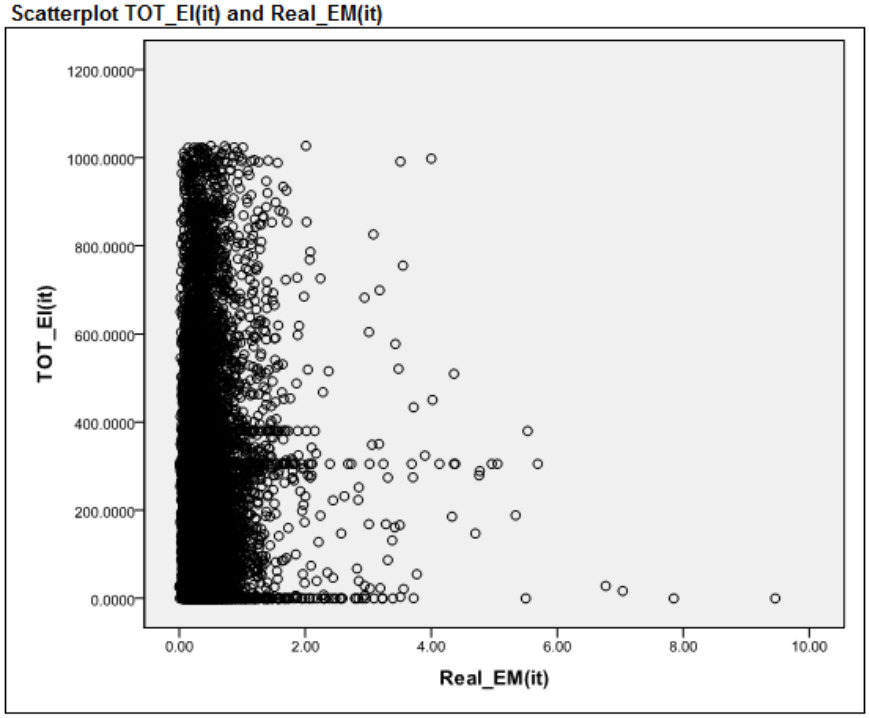


Figure 4 shows a scatterplot used to analyze the linearity and homoscedasticity assumption of the variables equity incentives and real activities manipulation. This scatterplot does not show a clear pattern. The points are also distributed randomly, so this indicates linearity. Since the residuals do not show a fanning shape, this indicate that there is a equal variance. Like figure 3, the scatterplot in figure 4 also shows that both the linearity and homoscedasticity conditions have been met.

Figure 4
Scatterplot TOT_EI(it) and Real_EM(it)



7.4.2 Normality

The condition of normality is being examined with a histogram for the variables equity incentives (figure 5), accrual based earnings management (figure 6) and real activities manipulation (figure 7). All three figures show that the residuals are normally distributed, but it is not showing a perfect distribution. Although the residuals are not perfectly normal distributed, the sample size is large enough (about 10.000 firm-years) to be assumed as normally distributed.

Figure 5
Histogram TOT_EI(it)

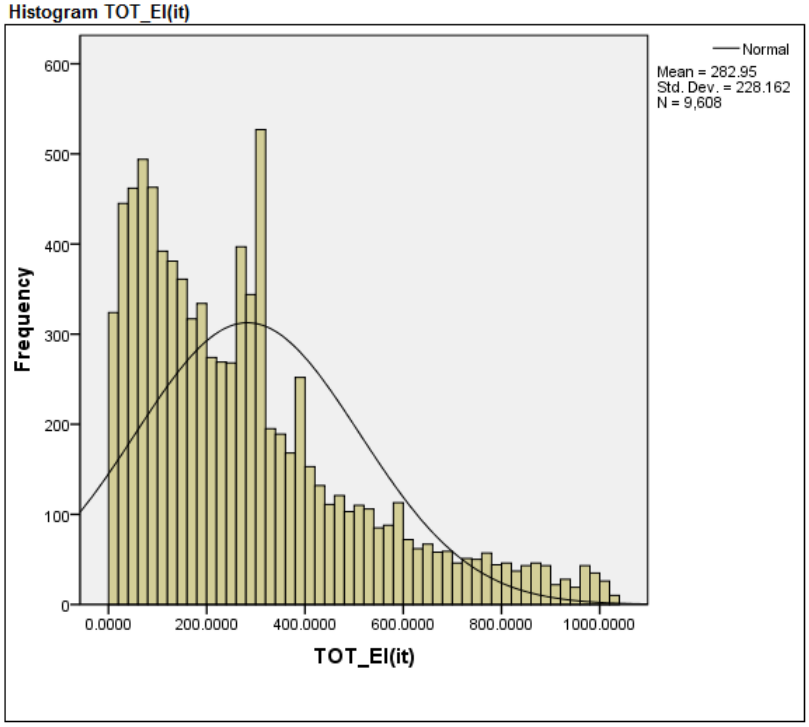


Figure 6
Histogram Accrual_EM(it)

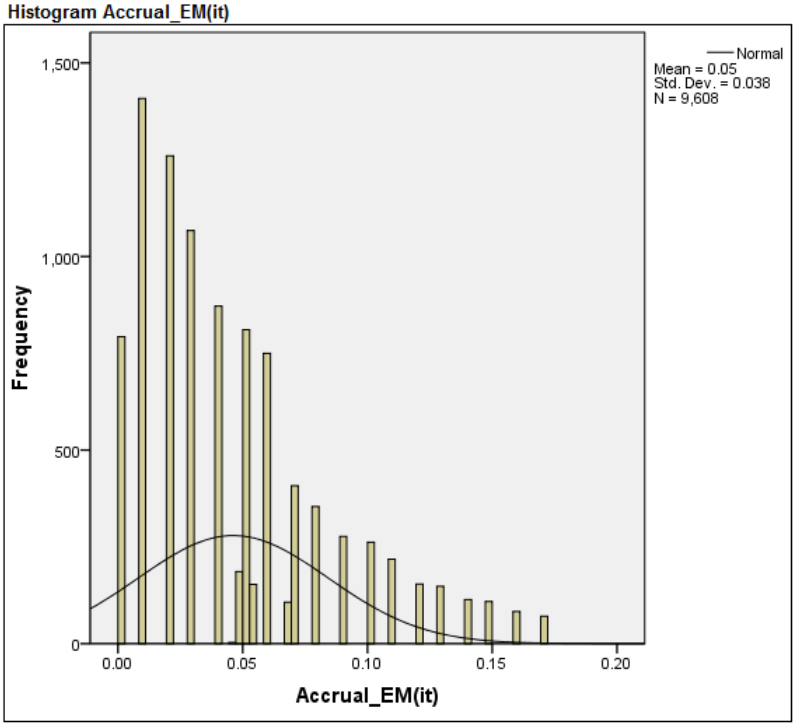
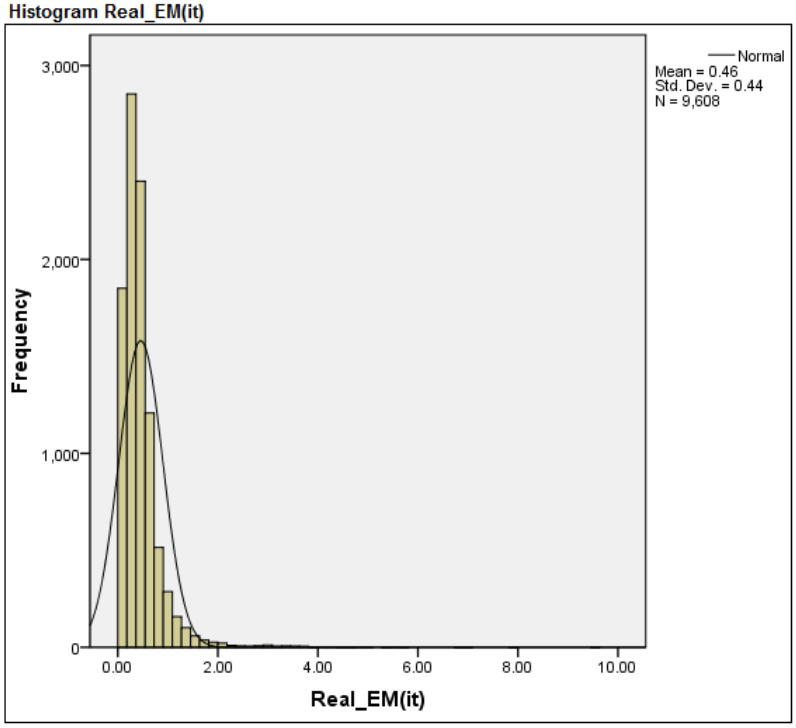


Figure 7
Histogram Real_EM(it)



7.5 Findings

In this section the findings of the empirical research described in chapter 6.3 will be discussed and the hypothesis developed in chapter 6.2 will be tested and answered. The findings of this study will be discussed using the hypotheses as developed in chapter six and the findings will be compared to the prior literature as stated in chapter five.

Table 13 and 14 present the results of this study. Chapter 7.2 provides the descriptive statistics of the regressions used to investigate the relation between equity incentives and earnings management. The variables in table 13 and 14 are defined in Appendix 2. Table 13 contains the regression results between equity incentives and earnings management using absolute abnormal accruals (Kothari et al., 2005) and table 14 contains the regression results between equity incentives and earnings management using real activities manipulation (Roychowdhury, 2006). Both the tables demonstrate the relation between equity incentives and earnings management for the period 2004 - 2012, the period 2004 - 2007 (Pre-Crisis) and the period 2009 - 2012 (Post-Crisis). The year 2008 is excluded from both periods, because the financial crisis started somewhere in 2008, but when it exactly started cannot be determined. The results are presented for three types of incentives. First the total equity incentives representing: option grants, unexercisable options, exercisable options, restricted stock grants and share ownership. The second only represents the option-based equity incentives and the third only represents the stock-based equity incentives.

Table 13

Results regression equity incentives and earnings management using absolute abnormal accruals (Kothari et al., 2005)

The relation between equity incentives and earning management. Measured over three different periods; a sample from 2004 to 2012 a pre-Crisis sample running from 2004 until 2007 and a post-Crisis sample running from 2009 until 2012. For all periods three regressions are performed, absolute abnormal accruals are used as dependent variable against total equity incentives, option incentives and stock incentives. The t values are reported in parenthesis. The 10%, 5% and 1% significance levels are indicated by respectively *,**,***. The variables are defined in appendix 2.

Model: $EM_{it} = \alpha_0 + \alpha_1 TOT\_EI_{it} + \beta_{1i} Crisis_{it} + \beta_{2i} Size_{it} + \beta_{3i} Bonus_{it} + \beta_{4i} Leverage_{it} + \beta_{5i} \sigma CFO_{it} + \beta_{6i} \sigma Rev_{it} + \beta_{7i} MtB_{it} + \beta_{8i} Loss_{it} + \varepsilon_{it}$

	Total period 2004-2012			Pre-Crisis 2004-2007			Post-Crisis 2009-2012		
Variables	Total incentive	Option incentive	Stock incentive	Total incentive	Option incentive	Stock incentive	Total incentive	Option incentive	Stock incentive
EI(it)	0,000	0,000*	0,000	0,000	0,000**	0,000	0,000	0,000*	0,000
	(-0,98)	(3,74)	(1,53)	(-1,28)	(2,26)	(1,19)	(0,20)	(3,01)	(0,84)
Crisis(it)	-0,002**	-0,002***	-0,002**	N/A	N/A	N/A	N/A	N/A	N/A
	(-2,41)	(-1,92)	(-2,37)	N/A	N/A	N/A	N/A	N/A	N/A
Size(it)	-0,005*	-0,005*	-0,005*	-0,006*	-0,006*	-0,006*	-0,004*	-0,004*	-0,004*
	(-13,49)	(-13,85)	(-13,53)	(-11,35)	(-11,49)	(-11,30)	(-7,39)	(-7,72)	(-7,51)
Salary(it)	0,000	0,000***	0,000***	0,000	0,000	0,000	0,000**	0,000**	0,000**
	(-1,48)	(-1,96)	(-1,66)	(0,09)	(-0,35)	(-0,21)	(-2,39)	(-2,53)	(-2,36)
Bonus(it)	0,001	0,001	0,001	0,000	0,000	0,000	0,002***	0,002***	0,002***
	(1,48)	(1,41)	(1,38)	(0,35)	(0,14)	(0,16)	(1,74)	(1,81)	(1,72)
Leverage(it)	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
	(-1,25)	(-1,17)	(-1,25)	(-1,19)	(-1,11)	(-1,18)	(-0,62)	(-0,54)	(-0,62)
STD_CFO(it)	0,000*	0,000*	0,000*	0,000*	0,000*	0,000*	0,000*	0,000*	0,000*
	(4,79)	(4,81)	(4,74)	(3,99)	(3,91)	(4,04)	(3,22)	(3,26)	(3,15)
STD_REV(it)	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
	(0,71)	(0,55)	(0,76)	(-0,62)	(-0,73)	(-0,60)	(1,15)	(1,05)	(1,19)
MtB(it)	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
	(0,68)	(0,55)	(0,67)	(0,82)	(0,67)	(0,78)	(0,36)	(0,027)	(0,36)
Loss(it)	0,013**	0,013**	0,013**	0,011	0,011	0,011***	0,015***	0,015***	0,015***
	(2,50)	(2,51)	(2,53)	(1,62)	(1,64)	(1,67)	(1,84)	(1,83)	(1,84)
N	9608	9608	9608	5247	5247	5247	4361	4361	4361

Variables are explained in appendix 2

See appendix 4 for more details on: adjusted R2, F, significance and P-value

Table 14

Results regression equity incentives and earnings management using real activities manipulation (Roychowdhury, 2006)

The relation between equity incentives and earning management. Measured over three different periods; a sample from 2004 to 2012 a pre-Crisis sample running from 2004 until 2007 and a post-Crisis sample running from 2009 until 2012. For all periods three regressions are performed, absolute abnormal accruals are used as dependent variable against total equity incentives, option incentives and stock incentives. The t values are reported in parenthesis. The 10%, 5% and 1% significance levels are indicated by respectively *,**,***. The variables are defined in appendix 2.

Model: $EM_{it} = \alpha_0 + \alpha_1 TOT\_EI_{it} + \beta_{1i} Crisis_{it} + \beta_{2i} Size_{it} + \beta_{3i} Bonus_{it} + \beta_{4i} Leverage_{it} + \beta_{5i} \sigma CFO_{it} + \beta_{6i} \sigma Rev_{it} + \beta_{7i} MtB_{it} + \beta_{8i} Loss_{it} + \varepsilon_{it}$

	Total period 2004-2012			Pre-Crisis 2004-2007			Post-Crisis 2009-2012		
Variables	Total incentive	Option incentive	Stock incentive	Total incentive	Option incentive	Stock incentive	Total incentive	Option incentive	Stock incentive
EI(it)	0,000	0,000*	0,000	0,000	0,000*	0,000	0,000	0,000**	0,000
	(-1,42)	(4,51)	(0,85)	(-0,88)	(3,94)	(0,93)	(0,05)	(2,00)	(0,24)
Crisis(it)	-0,027*	-0,022**	-0,027*	N/A	N/A	N/A	N/A	N/A	N/A
	(-2,97)	(-2,38)	(-2,93)	N/A	N/A	N/A	N/A	N/A	N/A
Size(it)	-0,092*	-0,094*	-0,092*	-0,100*	-0,102*	-0,099	-0,091*	-0,092*	-0,091*
	(-21,63)	(-22,06)	(-21,65)	(-16,41)	(-16,84)	(-16,44)	(-15,07)	(-15,32)	(-15,17)
Salary(it)	0,000*	0,000*	0,000*	0,000*	0,000*	0,000	0,000*	0,000*	0,000*
	(7,92)	(7,40)	(7,79)	(4,07)	(3,65)	(3,95)	(8,03)	(7,94)	(8,05)
Bonus(it)	-0,013	-0,014	-0,014	-0,017	-0,019	-0,019	0,005	0,006	0,005
	(-1,41)	(-1,54)	(-1,56)	(-1,27)	(-1,44)	(-1,42)	(0,42)	(0,46)	(0,41)
Leverage(it)	-0,001*	-0,001*	-0,001*	-0,001*	-0,001*	-0,001	-0,001**	-0,001**	-0,001**
	(-2,86)	(-2,77)	(-2,87)	(-3,22)	(-3,08)	(-3,21)	(-2,53)	(-2,47)	(-2,53)
STD_CFO(it)	0,000	0,000	0,000	0,000	0,000	0,000	0,000***	0,000***	0,000***
	(-0,61)	(-0,59)	(-0,60)	(1,57)	(1,32)	(1,60)	(-1,74)	(-1,71)	(-1,75)
STD_REV(it)	0,000*	0,000*	0,000*	0,000*	0,000*	0,000	0,000*	0,000*	0,000*
	(8,54)	(8,35)	(8,56)	(5,32)	(5,15)	(5,33)	(6,75)	(6,68)	(6,76)
MtB(it)	0,001*	0,001*	0,001*	0,002*	0,002*	0,002	0,001*	0,001*	0,001*
	(4,99)	(4,83)	(4,97)	(5,66)	(5,43)	(5,63)	(2,80)	(2,74)	(2,80)
Loss(it)	0,723*	0,725*	0,726*	0,901*	0,900*	0,903	0,435*	0,435*	0,435*
	(12,69)	(12,73)	(12,75)	(11,84)	(11,85)	(11,88)	(5,05)	(5,05)	(5,05)
N	9608	9608	9608	5247	5247	5247	4361	4361	4361

Variables are explained in appendix 2

See appendix 4 for more details on: adjusted R2, F, significance and P-value

7.5.1 Hypothesis 1

The first hypothesis of this paper is:

H1: There is a positive association between earnings management and equity incentives.

This hypothesis is tested using the following equation:

$$EM_{it} = \alpha_0 + \alpha_i TOT\_EI_{it} + \beta_{1i} Crisis_{it} + \beta_{2i} Size_{it} + \beta_{3i} Bonus_{it} + \beta_{4i} Leverage_{it} + \beta_{5i} \sigma CFO_{it} + \beta_{6i} \sigma \mathrm{Re}v_{it} + \beta_{7i} MtB_{it} + \beta_{8i} Loss_{it} + \varepsilon_{it}$$

This hypothesis is tested for both earnings management using absolute abnormal accruals (Kothari et al., 2005) and earnings management using real activities manipulation (Roychowdhury, 2006) for the period 2004 – 2012. Chapter 7.2 provides the descriptive statistics of the regressions used to investigate the relation between equity incentives and earnings management.

The results of this test, presented in table 13 and 14 are showing a negative relation between earnings management and total equity incentives, however the relation is not significant. This relation is found using both absolute abnormal accruals and real activities manipulation. Hypothesis 1 is rejected, the results show a negative relation between earnings management and equity incentives for the period 2004 – 2012.

7.5.2 Hypothesis 2

The second hypothesis tested is:

H2: The association between equity incentives and earnings management is stronger for option-based incentives than for share-based incentives.

The second hypothesis is examined using the following equation:

$$EM_{it} = \alpha_0 + \alpha_i TOT\_EI_{it} + \beta_{1i} Crisis_{it} + \beta_{2i} Size_{it} + \beta_{3i} Bonus_{it} + \beta_{4i} Leverage_{it} + \beta_{5i} \sigma CFO_{it} + \beta_{6i} \sigma \mathrm{Re}v_{it} + \beta_{7i} MtB_{it} + \beta_{8i} Loss_{it} + \varepsilon_{it}$$

Like hypothesis one, this hypothesis is also tested for both earnings management using absolute abnormal accruals (Kothari et al., 2005) and earnings management using real activities manipulation (Roychowdhury, 2006) for the period 2004 – 2012. The hypothesis is tested by making a minor adjustment to the equation above, measuring the relation between (1) earnings management and option-based equity incentives and the (2) earnings management and share-based equity incentives separately.

This hypothesis is based on the expectation that there is a stronger relation for option-based incentives than for share-based incentives (Burns & Kedia, 2006; Gao & shrieves, 2002; Cohen et al., 2005 Cohen et al., 2008). This is due to the character of options as short-time incentive. It is easy for

management to make quick gains with options in years where many options can be exercised. Due to the reversing character of accruals they are well suited to use in combination with short-term incentives. The findings in this research, presented in table 13 and 14, are showing a positive and significant relation between option-based incentives and earnings management. This relation is significant using both absolute abnormal accruals and real activities manipulation. The findings relate to the entire research period, however it is not possible to say whether these results also relate to the financial crisis. The results are more significant for the period before the crisis using real activities manipulation, but this does not count using absolute abnormal accruals. The results in table 13 and 14 show no significant relationship between share-based incentives and earnings management. The relation between earnings management and share-based incentives is never significant in this study. The opposite is found for the relation between option-based incentives and earnings management, where the significance of the results are relatively high. This means that the hypothesis of a stronger association between equity incentives and earnings management for option-based incentives than for share-based incentives is supported by this study.

7.5.3 Hypothesis 3

The third hypothesis examined is:

H3: There is a negative association between the financial crisis and earnings management due to equity incentives.

The third hypothesis is tested using the following equation:

$$EM_{it} = \alpha_0 + \alpha_i TOT\_EI_{it} + \beta_{1i} Crisis_{it} + \beta_{2i} Size_{it} + \beta_{3i} Bonus_{it} + \beta_{4i} Leverage_{it} + \beta_{5i} \sigma CFO_{it} + \beta_{6i} \sigma \mathrm{Re}v_{it} + \beta_{7i} MtB_{it} + \beta_{8i} Loss_{it} + \varepsilon_{it}$$

The third hypothesis is based on the expectation that earnings management activities declines during the financial crisis period (Chia et al., 2007; Gilson and Vetsuypens, 1993; and Gorgan et al., 2012). During the financial crisis, managers have expectations of temporary poor earnings. When faced with such a situation, the managers' incentives would be to save their companies and preserve their jobs instead of attempting to maximize their accounting-based bonuses. As mentioned in the previous sections, earnings management is measured using both absolute abnormal accruals (Kothari et al., 2005) and using real activities manipulation (Roychowdhury, 2006). To measure the effects of the financial crisis the sample is split into two periods, the first period represents the pre-crisis period (2004 – 2007) and the second period represents the crisis period (2009 – 2012). This separation into two periods is shown in the second and third column of table 13 and 14.

This hypothesis is based on the effects of the financial crisis of 2008, which might have influenced the environment where businesses operate. As discussed in section 7.5.1 the findings of this research do not show a significant association between earnings management and equity incentives for the total sample period (2004 – 2012). The results in the second and third columns are also showing a non-

significant relation. As mentioned in section 7.5.2 the findings in this research are showing a positive and significant relation between option-based incentives and earnings management for the entire research period. However it is not possible to say whether these results also relate to the financial crisis. The results are more significant for the period before the crisis using real activities manipulation, but this does not count when using absolute abnormal accruals. Following prior research (Chia et al., 2007; Gilson and Vetsuypens, 1993; and Gorgan et al., 2012) it was expected that earnings management activities would decline during the financial crisis period. The findings of this study are showing the opposite, negative earnings management during the pre-crisis period (2004 – 2007) and positive earnings management during the crisis period (2009 – 2012). It is possible that executives manage earnings upwards in these (crisis) periods to smooth earnings or to restrict the negative effects of the financial crisis. However this study does not provide significant evidence for the relation between earnings management and the financial crisis due to equity incentives.

7.5.4 Hypothesis 4

The last hypothesis tested is:

H4: The financial crisis period is associated with a higher level of accrual based earnings management due to equity incentives.

The fourth hypothesis is also examined using the following equation:

$$EM_{it} = \alpha_0 + \alpha_i TOT\_EI_{it} + \beta_{1i} Crisis_{it} + \beta_{2i} Size_{it} + \beta_{3i} Bonus_{it} + \beta_{4i} Leverage_{it} + \beta_{5i} \sigma CFO_{it} + \beta_{6i} \sigma \mathrm{Re}v_{it} + \beta_{7i} MtB_{it} + \beta_{8i} Loss_{it} + \varepsilon_{it}$$

This hypothesis is tested for earnings management using both absolute abnormal accruals (Kothari et al., 2005) and using real activities manipulation (Roychowdhury, 2006). This makes it possible to test whether the association is stronger for accrual based earnings management compared to real activities manipulation. As mentioned in section 7.5.1 the sample is split into two periods, the first period represents the pre-crisis period (2004 – 2007) and the second period represents the crisis period (2009 – 2012). In order to examine this hypothesis there will only be focused on the crisis period, the third column of table 13 and 14.

As stated by the hypothesis, the association between earnings management and equity incentives is expected to be stronger using absolute abnormal accruals (Kothari et al., 2005) than real activities manipulation (Roychowdhury, 2006) during the crisis period (Zang 2012; Cohen et al. 2008; and Cohen and Zarowin 2010). As discussed in section 7.5.1 the findings of this research do not show a significant association between earnings management and equity incentives for the three different periods, when looking at the total incentives. However, table 13 and 14 are showing a higher coefficient for the total incentives during the crisis period, when using the absolute abnormal accruals model than when the real activities manipulation model is being used. The coefficient using the absolute abnormal accruals model (0,20) is 4 times higher than the coefficient when using the real activities manipulation model (0,05). When looking at the option based incentives, table 13 and 14

show a significant association between earnings management and equity incentives during the crisis period. This relation is already discussed in section 7.5.2. The coefficient for the option based incentives are like the total incentives higher when using the absolute abnormal accruals model (3,01) than the coefficient when using the real activities manipulation model (2,00). The stock based incentives are just like the total incentives not showing a significant association between earnings management and equity incentives for the crisis period. The coefficient using the absolute abnormal accruals model (0,84) is also almost 4 times higher than the coefficient when using the real activities manipulation model (0,24). These results indicate that the crisis period is associated with more accrual based earnings management than real activities manipulation and confirms the hypothesis. However, it does not provide a significant association between earnings management and equity incentives for the total incentives.

7.6 The contribution to the literature

This study provides evidence on the relation between equity incentives and earnings management and the effect on this relation due to the global financial crisis of 2008. This relation is measured using both accrual based and real activities earnings management.

The first hypothesis of this paper suggests that there is a positive association between earnings management and equity incentives. However, the result of this study is showing a negative relation between earnings management and total equity incentives. These findings are inconsistent with prior research, which are showing that there is a positive relations between the level of equity incentives and earnings management (Cheng & Warfield, 2005; Bergstresser & Philippon, 2006; Gao & shrieves, 2002; and Cohen et al., 2005). Prior research show higher coefficients and explanatory value for the relation between equity incentives and earnings management than the explanatory value found in this paper. The difference between this study and prior literature is possibly due to the used periods. They measure the relation between the level of equity incentives and earnings management in the period before the major accounting scandals and without any influence of the financial crisis. The descriptive statistics presented in chapter 7 show that earnings management over the period used in this study is lower than earnings management for sample period of prior studies. This indicates that the use of earnings management has decreased, which is supported by the findings of Jing et al. (2010). Similar to the findings in this research Jiang et al. (2010) find a negative relation between equity incentives and earnings management for the post-Sarbanes Oxley period. The fact that this study is only based on a sample period after the introduction of the Sarbanes Oxley act may explain why there is found a negative relation between equity incentives and earnings management, in contrast to Bergstresser and Philippon (2006). The descriptive statistics in section 7.2 reveal that the accrual levels found in this study are much lower than the accrual levels Bergstresser and Philippon (2006) found.

The second hypothesis of this study assumes that the association between equity incentives and earnings management is stronger for option-based incentives than for share-based incentives. The findings in this research are showing a positive and significant relation between option-based incentives and earnings management. These findings are comparable to the results in prior research (Burns & Kedia, 2006; Gao & shrieves, 2002; Cohen et al., 2005 Cohen et al., 2008), as discussed in

section 5.4. Also more recent research by Kim, Li, and Zhang (2011) found similar results. Kim et al. (2011) tested for the association between CFO and CEO equity incentives and crash risk. Like Bergstresser and Philippon (2006), the authors use the total equity incentive ratio to measure equity incentives. Similar to this study Kim et al. (2011) also find a significant positive relations between crash risk and option-based incentives, but not for the relation between crash risk and share-based incentives. The findings in this study indicate that the results found by Kim et al. (2011) for crash risk also apply to earnings management.

With the third hypothesis it is expected that there is a negative association between the financial crisis and earnings management due to equity incentives. However, inconsistent with prior literature (Chia et al., 2007; Gilson and Vetsuypens, 1993; and Gorgan et al., 2012) the results in this study even show a negative relation, between earnings management and equity incentives, in the pre-crisis period and a positive relation for the crisis period. As mentioned before Jiang et al. (2010) also find a negative relation between equity incentives and earnings management for the post-Sarbanes Oxley period. The authors believe that the reason for this negative relation is because executives think that investors will punish them for the combination of high equity incentives and earnings management. The model being used by Jiang et al. (2010) and this study could also be the reason for this negative relation, because the model includes both exercisable and unexercisable options. Resulting in high equity incentives, but because the options are not exercisable, the executives are not able to convert the options into cash. This could lead to a situation where they manage earnings downwards when options are unexercisable and do the opposite when option are exercisable.

The last hypothesis assumes that the financial crisis period is associated with a higher level of accrual based earnings management due to equity incentives. The results of this study indicate that the crisis period is associated with more accrual based earnings management than real activities manipulation and confirms the hypothesis. These findings are consistent with prior studies (Zang 2012; Cohen et al. 2008; and Cohen and Zarowin 2010) which examine whether companies use real activities manipulation as a substitute for accrual based earnings management. As discussed in section 5.7 these studies find that real activities manipulation is used as a substitute for accrual based earnings management and vice versa. However when real activities manipulation is more costly, due to having a less competitive status in the industry, being in a less healthy financial condition, experiencing higher levels of monitoring from institutional investors, and incurring greater tax expenses in the current period, firms use more accrual-based earnings management and less real activities manipulation (Zang, 2012). Especially firms in a unhealthy financial situation, in this case the financial crisis. Although the findings of this study are consistent with prior studies, it does not provide a significant association between earnings management and equity incentives for the total incentives.

7.7 Summary

The main purpose of this thesis is to answer the question about the effects on the association between equity incentives and earnings management in the United States of America during the global financial crisis of 2008. This chapter discussed the results of the empirical part of this study and answered sub

question six. This chapter also included the descriptive statistics of the research data, addressed the regression conditions and correlation matrix.

The results of this study, found by using the absolute abnormal accruals model (Kothari et al., 2005) and the real activities manipulation model (Roychowdhury, 2006) and a sample of firms listed in the United States that are part of the S&P 1500 index between 2004 – 2012, show a negative relation between earnings management and total equity incentives. However the relation is not significant. The results also show no significant relationship between share-based incentives and earnings management. The relation between earnings management and share-based incentives is never significant in this study. The opposite is found for the relation between option-based incentives and earnings management, where the significance of the results are relatively high. Meaning that the hypothesis of a stronger association between equity incentives and earnings management for option-based incentives than for share-based incentives is supported by this study. Furthermore are the findings of this study, inconsistent with prior literature, showing negative earnings management during the pre-crisis period (2004 – 2007) and positive earnings management during the crisis period (2009 – 2012). It is possible that executives manage earnings upwards in these (crisis) periods to smooth earnings or to restrict the negative effects of the financial crisis. However this study does not provide significant evidence for the relation between earnings management and the financial crisis due to equity incentives. Looking at the coefficients the results indicate, consistent with prior studies, that the crisis period is associated with more accrual based earnings management than real activities manipulation. Although the findings of this study are consistent with prior studies, it does not provide a significant association between earnings management and equity incentives for the total incentives.

8. Summary

8.1 Introduction

Finally this last chapter starts with a summary of this study that also includes a conclusion, answering the research question as stated in the introduction of this thesis. Subsequently the limitation of this study, due to the sample used and research design, will be discussed on. It is important to take these limitations into account when reading the findings of this research. At last this thesis will end with suggestions for further research.

8.2 Summary

Since the world is in the middle or recovering from a financial crisis, one can not be sure that a company's financial report, provides a true and fair view. Because in such periods the share prices become under a certain pressure, managers who's compensation is based on these share prices are more probable to use earnings management. This study investigated the association between equity incentives and earnings management in a pre financial crisis period (2004 – 2007) and post financial crisis period (2009 – 2012). By providing evidence of one possible effect of stock-based compensation and ownership, this thesis should be interesting for boards of directors considering compensation contracts for managers, but also to investors and regulators. So the main purpose of this thesis is to answer the question about the effects on the association between equity incentives and earnings management in the United States of America during the global financial crisis of 2008.

The main research question of this study is: *"In what way did the relation between equity incentives and earnings management change in the United States of America due to the Global Financial Crisis of 2008?"*

The results of this study, found by using the absolute abnormal accruals model (Kothari et al., 2005) and the real activities manipulation model (Roychowdhury, 2006) and a sample of firms listed in the United States that are part of the S&P 1500 index between 2004 – 2012, show a negative relation between earnings management and total equity incentives. However the relation is not significant. The results also show no significant relationship between share-based incentives and earnings management. The relation between earnings management and share-based incentives is never significant in this study. The opposite is found for the relation between option-based incentives and earnings management, where the significance of the results are relatively high. Meaning that the hypothesis of a stronger association between equity incentives and earnings management for option-based incentives than for share-based incentives is supported by this study. Furthermore are the findings of this study, inconsistent with prior literature, showing negative earnings management during the pre-crisis period (2004 – 2007) and positive earnings management during the crisis period (2009 – 2012). It is possible that executives manage earnings upwards in these (crisis) periods to smooth

earnings or to restrict the negative effects of the financial crisis. However this study does not provide significant evidence for the relation between earnings management and the financial crisis due to equity incentives. Looking at the coefficients the results indicate, consistent with prior studies, that the crisis period is associated with more accrual based earnings management than real activities manipulation. Although the findings of this study are consistent with prior studies, it does not provide a significant association between earnings management and equity incentives for the total incentives.

8.3 Limitations

This research contains several limitations, arising from the research methodology and sample being used. These limitations should be taken into account in the interpretation of the findings of this research.

The sample being used causes the first limitation of this study. The sample consists of firms listed in the United States that are part of the S&P 1500 index. By using S&P 1500 firms, the data sample does not include small firms. Meaning that the findings found by using this sample does not necessarily imply that they would be the same for organizations with other characteristics than the S&P 1500 listed firms. Because the S&P 1500 sample mainly contains large companies, which are more of a public interest, management of these companies could act in a certain way to preserve the reputation. Smaller organizations are less of a public interest, that's why the results of this study could be different when using a sample of smaller firms.

The second limitation is created by the distribution of the data used for this study. The condition of normality is examined in section 7.4.2 and is showing that the residuals are normally distributed, but not perfect. Many statistical analyzes assume that the dependent variable needs to be normally distributed to be useful. The average is not the ideal norm to summarize a group of observations when the distribution is skewed. The data not being normally distributed affects the usefulness of the results and conclusion in this study as they are generated by performing a multiple linear regression.

Another limitation of this study is not adding reversals to the model for detecting earnings management. As mentioned in section 5.8 Dechow et al. (2012) provided a model to measure accrual based earnings management. The authors suggest that adding reversals to the model, enhances the power of testing accrual based earnings management. However, before adding these reversals to the model, it should be possible to separate the sample into a period where earnings are supposed to be managed through accruals and a period where this is expected to reverse. By using a sample of companies appointed by SEC as having managed earnings, the authors were able to make a distinction between these two periods. This information was not available for this study, therefore reversals were not added to model for detecting earnings management in this study.

The period that is being tested could also be one of the limitations of this study. The period (2004 – 2012) that has been examined in this study includes certain events that could have major implications on the accounting field. Firstly there were these accounting scandals of the 2000's, which has led to the introduction of the Sarbanes Oxley act in 2002. This could have influenced the financial reporting

and also the behaviour of management after the introduction of 2002, since financial reporting became of public interest. The affects are actually shown in the test of hypothesis 1 in section 7.4.1 of this study. Inconsistent with prior literature, the results of this study show a negative relation between earnings management and total equity incentives. It might be possible that running this test for another sample period could result in other findings.

A limitation related to the model for measuring equity incentives, is that it includes both exercisable as unexercisable options. Resulting in high equity incentives, but because the options are not exercisable, the executives are not able to convert the options into cash. This could lead to a situation where they manage earnings downwards when options are unexercisable and do the opposite when option are exercisable.

Another limitation is related to the model for measuring earnings management. This study uses absolute discretionary accruals for measuring earnings management, but Hribar and Nichols (2007) mentioned in their study that the results of studies that use absolute discretionary accruals do not hold when controls for volatility of sales and cash flow are included in the model. Earnings management studies based on accruals (i.e. DeAngelo, 1986; Healy, 1985; Dechow et al., 1995; Jones, 1991) can be separated into a signed prediction (income decreasing or increasing) or unsigned prediction (no specific direction). This study uses this unsigned measure for earnings management (absolute discretionary accruals), causing potential biases when controlling for volatility of sales and cash flow.

Also omitted variables are creating a possible limitation of this study. There are several control variables used in this study for: firm size, change in revenues, gross property, plant, and equipment, change in net receivables and for return on assets, etc. It might be possible other variables, not included as control variable, could have an effect as well. For example Jiang et al. (2010) use more control variables compared to this study, like industry dummies and corporate governance.

At last, as mentioned before one would have to take into account that the results of this study are found using a specific research model and sample. Using another research model or sample could lead to different results. Choices about the models to use in order to answer the research question were made when creating the design of this study, affecting the results of this research. For example, the Kothari model is an widely used and accepted model for measuring earnings management, but this does not mean that the model provides a perfect estimation of earnings management. Taking these limitation into consideration, this study does not provide significant evidence for a positive relation between earnings management and equity incentives for firms listed in the United States that are part of the S&P 1500 index.

8.4 Suggestions for further research

The limitations that are mentioned in section 8.3 create suggestions for further research. This research concentrates on option- and share-based incentives and is showing a difference between the two types of equity incentives. However, this study did not focus on the specific details of equity incentives and the other types of compensation. It might be interesting to take these details and other types of compensation into consideration when doing further research on the relation between equity incentives

and earnings management. Secondly, this study only includes CEO equity incentives, future research should also focus on the CFO equity incentives. The influence of equity incentives on earnings management could be different in a situation where an CEO does have equity incentives and a CFO does not. Another suggestion for further research could be to extend the study with for example European and also smaller companies, increasing external validity. At last, the relation between earnings management and equity incentives is being examined in this study, but no certainty is given that the findings of this study is only caused by earnings management. As mentioned before other circumstances, for example the introduction of the Sarbanes Oxley act in 2002, could also have affected the results of this study. Future studies should focus on the extent to which the findings of this research could be related to earnings management.

References

- Ahmed, A., Duellman, S., & Abdel-Meguid, A. (2008). Equity incentives, corporate governance, and earnings management (Working paper).
- Allen, E. J., Larson, C. R., & Sloan, R. G. (2013). Accrualreversals,earningsandstockreturns. *Journal of Accounting and Economics 56* , 113–129.
- Arens, A. A., Beasley, M., & Elder, J. R. (2011). *Auditing and Assurance Services: An Integrated Approach 14th edition.* Pearson Education Limited.
- Bal, H. S., & Wong, B. M. (2007). Sec Issues Final Rules on Executive and Director Compensation Disclosure Requirements. *Bloomberg Corporate Law Journal* , 1-10.
- BALL, R., & SHIVAKUMAR, L. (2008). How Much New Information Is There in Earnings? *Journal of Accounting Research Vol. 46 No. 5* , 975-1016.
- Ball, R., & Shivakumar, L. (2006). The Role of Accruals in Asymmetrically Timely Gain and Loss Recognition. *Journal of Accounting Research, Vol. 44, No. 2* , 207-242.
- Balla, R., & Shivakumarb, L. (2008). Earnings quality at initial public offerings. *Journal of Accounting and Economics 45* , 324–349.
- Bartov, E. (1993). The Timing of Asset Sales and Earnings Manipulation. *The Accounting Review* , 840-855.
- Bartov, E., Gul, F. A., & Tsui, J. S. (2001). Discretionarry-accruals models and audit qualifications. *Journal of Accounting and Economics 30* , 421-452.
- Becker, C. L., DeFond, M. L., Jiambalvo, J., & Subramanyam, K. (1998). The Effect of Audit Quality on Earnings Management. *Contemporary Accounting Research Vol. 15 No. 1* , 1-24.
- Beneish, M. D., & Vargus, M. E. (2002). Insider Trading, Earnings Quality, and Accrual Mispricing. *The Accounting Review, Vol. 77, No. 4* , 755-791.
- Bergstresser, D., & Philippon, T. (2006). CEO incentives and earnings management. *Journal of Financial Economics 80* , 511-529.
- Bergstresser, D., Desai, M., & Rauh, J. (2006). Earnings Manipulation, Pension Assumptions, and Managerial Investment Decisions. *The Quarterly Journal of Economics, Vol. 121, No. 1* , 157-195.
- Burns, N., & Kedia, S. (2006). The impact of performance-based compensation on misreporting. *Journal of Financial Economics, 79* , 35-67.
- Carcello, J. V., Hollingsworth, C., & Mastrolia, S. A. (2011). The effect of PCAOB inspections on Big 4 audit quality. *Research in Accounting Regulation 23* , 85–96.
- Chambers, R. (1995). *An Accounting Thesaurus: 500 Years of Accounting.* Oxford: Pergamon.
- Chen, C.-Y., Lin, C.-J., & Lin, Y.-C. (2008). Audit Partner Tenure, Audit Firm Tenure, and Discretionary Accruals: Does Long Auditor Tenure Impair Earnings Quality? *Contemporary Accounting Research Vol. 25 No. 2* , 415–45.
- Chen, K. Y., Lin, K.-L., & Zhou, J. (2005). Audit quality and earnings management for Taiwan IPO firms. *Managerial Auditing Journal Vol. 20, No. 1* , 86-104.
- Cheng, Q., & Warfield, T. D. (2005). Equity Incentives and Earnings Management. *THE ACCOUNTING REVIEW Vol. 80, No. 2* , 441-476.
- Cheng, Q., Warfield, T., & Ye, M. (2009). Equity Incentives and Earnings Management: Evidence from a Regulated Industry (Working Paper). *CAAA Annual Conference 2009 Paper* .
- Chi, W., & Huang, H. (2005). Discretionary Accruals, Audit-Firm Tenure and Audit-Partner Tenure: Empirical Evidence from Taiwan. *Journal of Contemporary Accounting & Economics 1* , 65-92.
- Chia, Y., Lapsley, I., & Lee, H. (2007). Choice of auditors and earnings management during the Asian financial crisis. *Managerial Auditing Journal, Volume 22, Issue 2* , 177-196.
- Cohen, D. A., & Zarowin, P. (2010). Accrual-based and real earnings management activities around seasoned equity offerings. *Journal of Accounting and Economics 50* , 2-19.
- Cohen, D. A., Dey, A., & Lys, T. Z. (2005). *Trends in Earnings Management and Informativeness of Earnings Announcements in the Pre- and Post-Sarbanes Oxley Periods.* Kellogg School of Management Northwestern University Evanston, Illinois.
- Cohen, D., Dey, A., & Lys, T. (2008). Real and Accrual-based Earnings management in the Pre- and Post-Sarbanes-Oxley Periods. *The Accounting Review, vol. 83, no. 3* , 757-787.
- Cornett, M., Marcus, A., & Tehranian, H. (2008). Corporate governance and pay-for-performance: The impact of earnings management. *Journal of Financial Economics, vol. 87* , 357-373.
- Davis, L. R., Soo, B. S., & Trompeter, G. M. (2009). Auditor Tenure and the Ability to Meet or Beat Earnings Forecasts. *Contemporary Accounting Research Vol. 26 No. 2* , 517-548.

- Davis, L. R., Soo, B., & Trompeter, G. (2000). *Auditor Tenure, Auditor Independence and Earnings Management.* Michigan: Michigan Tech University; Boston College.
- DeAngelo, L. E. (1986). Accounting numbers as Market Valuation Substitutes: a study of management buyouts of public stockholders. *The Accounting Review 61* , 400-420.
- DeAngelo, L. E. (1981). Auditor size and audit quality. *Journal of Accounting and Economics 3* , 183-199.
- Dechow, P. M. (1994). Accounting earnings and cashflows as measure of firm performance: The role of accounting accruals. . *Journal of Accounting and Economics 18* , 3-42.
- Dechow, P. M., Hutton, A. P., Kim, J. H., & Sloan, R. G. (2012). Detecting Earnings Management: A New Approach. *Journal of Accounting Research Vol. 50 No. 2* , 275-334.
- Dechow, P. M., Kothari, S. P., & Watts, R. L. (1998). The relation between earnings and cash flows. *Journal of Accounting and Economics 25* , 133-68.
- Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting Earnings Management. *The Accounting Review, Vol. 70, No. 2* , 193-225.
- Dechow, P., & Dichev, I. (2002). The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review 77* , 35-59.
- Deegan, C., & Unerman, J. (2006). *Financial Accounting Theory, European Edition.* Berkshire: McGraw-Hill.
- DeFond, M. L., & Jiambalvo, J. (1994). Debt covenant violation and manipulation of accruals . *Journal of Accounting and Economics Volume 17, Issues 1–2* , 145-176.
- DeFond, M. L., & Subramanyam, K. (1998). Auditor changes and discretionary accruals. *Journal of Accounting and Economics 25* , 35-67.
- Defond, M. L., Raghunandan, K., & Subramanyam, K. R. (2002). Do Non-Audit Service Fees Impair Auditor Independence? Evidence from Going Concern AuditOpinions. *Journal of Accounting Research, Vol. 40, No. 4* , 1247-1274.
- Field, A. (2013). *Discovering Statistics using IBM SPSS Statistics 4TH Edition.* Sage Publication Ltd. .
- Gao, P., & Shrieves, R. (2002). *Earnings Management and Executive Compensation: A Case of Overdose of Option and Underdose of Salary? Working paper.* Northwestern University, University of Tennessee at Knoxville.
- Gerakos, J. (2012). Discussion of Detecting Earnings Management: A New Approach. *Journal of Accounting Research Vol. 0 No. 0 xxxx 2012* , 1-13.
- Gilson, S., & Vetsuypens, M. (1993). CEO Compensation in Financially Distressed Firms: An Empirical Analysis. *The Journal of Finance, Volume 48, Issue 2* , 425-458.
- Goldman, E., & Slezak, S. L. (2006). An equilibrium model of incentive contracts in the presence of information manipulation. *Journal of Financial Economics 80* , 603-626.
- Gorgan, C., Gorgan, V., Dumitru, V. F., & Pitulice, I. C. (2012). THE EVOLUTION OF THE ACCOUNTING PRACTICES DURING THE RECENT ECONOMIC CRISIS: EMPIRICAL SURVEY REGARDING THE EARNINGS MANAGEMENT. *Academy of Economic Studies, Bucharest, Romania Vol. XIV, No. 32* , 550-562.
- Gradison, B., & Boster, R. (2010). The PCAOB's First Seven Years: A Retrospection. *Current Issues in Auditing Volume 4, Issue 1* , 9–20.
- Guay, W. (2002). Discussion of real investment implications of stock option exercises. *Journal of Accounting Research vol 40* , 395-406.
- Gunny, K. A. (2010). The Relation Between Earnings Management Using Real Activities Manipulation and Future Performance: Evidence from Meeting Earnings Benchmarks. *Contemporary Accounting Research, vol. 27, no. 3* , 855-888.
- Healy, P. M., & Wahlen, J. M. (1999). A Review of the Earnings Management Literature and Its Implications for Standard Setting. *Accounting Horizons Vol. 13 No. 4* , 365-383.
- Healy, P. (1985). The effect of bonus schemes on accounting decisions. *Journal of Accounting and Economics 7* , 85-107.
- Holthausen, R. W., Larcker, D. F., & Sloan, R. G. (1995). Annual bonus schemes and the manipulation of earnings. *Journal of Accounting and Economics, 19* , 29-74.
- Hribar, P., & Collins, D. W. (2002). Errors in Estimating Accruals: Implications for Empirical Research. *Journal of Accounting Resean Vol. 40 No. 1* , 105-134.
- HRIBAR, P., & NICHOLS, D. C. (2007). The Use of Unsigned Earnings Quality Measures in Tests of Earnings Management. *Journal of Accounting Research Volume 45, Issue 5* , 1017–1053.
- Hribar, P., Jenkins, N. T., & Johnson, W. B. (2006). Stock repurchases as an earnings management. *Journal of Accounting and Economics 41* , 3-27.

- Jameson, M. (1988). *A Practical Guide to Creative Accounting.* London: Kogan Page Ltd.
- Jensen, M. C., & Murphy, K. (1990). CEO incentives: It's not how much you pay. It's how. *Journal of Applied Corporate Finance, 3* , 36-49.
- Jensen, M., & Meckling, W. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics 3* , 305-360.
- Jiang, J. X., Petroni, K. R., & Wang, I. Y. (2010). CFOs and CEOs: Who have the most influence on earnings management? *Journal of Financial Economics 96* , 513-526.
- Jones, J. J. (1991). Earnings Management During Import Relief Investigations. *Journal of Accounting Research, Vol. 29, No. 2* , 193-228.
- Kedia, S. (2003). Do Executive Stock Options Generate Incentives for Earnings Management? Evidence from Accounting Restatements. *Harvard Business School & Ohio State University* , 1-37.
- Kim, J.-B., Li, Y., & Zhang, L. (2011). CFOs versus CEOs: Equity incentives and crashes. *Journal of Financial Economics 101* , 713–730.
- Kindleberger, C. P., & Aliber, R. Z. (2005). *Anatomy of a Typical Crisis.* Palgrave Macmillan UK.
- Kothari, S., Leone, A. J., & Wasley, C. E. (2005). Performance matched discretionary accrual measures. *Journal of Accounting and Economics 39* , 163–197.
- Lam, S.-S., & Chang, S.-L. (1994). Auditor Service Quality and Auditor Size: Evidence from Initial Public Offerings in Singapore. *Journal of International Accounting Auditing & Taxation 3* , 103-l 14.
- Levitt, A. (1998). *Securities and Exchange Commission: The "Numbers Game".* NYU: Center for Law and Business.
- McNichols, M. F. (2000). Research design issues in earnings management studies. *Journal of Accounting and Public Policy 19* , 313-345.
- Mohanram, P. S. (2003). How to manage earnings management. *Accounting World* , 1-11.
- Murphy, K. (1999). *Executive compensation (Working Paper).* University of Southern California.
- O'Connell, B. (2004). Enron.Con: "He that filches from me my good name…makes me poor indeed.". *Critical Perspectives on Accounting, 15* , 733-749.
- Palepu, K. G., & Healy, P. M. (2008). *Business Analysis & Valuation: Using Financial Statements, 4th edition.* Mason: Thomson South-Western.
- Palepu, K. G., Healy, P. M., & Peek, E. (2010). *Business analysis and valuation: text and cases.* London: Cengage Learning.
- Palepu, K. L., Healy, P. M., Bernard, V. L., & Erik, P. (2007). *Business Analysis & Valuaion: IFRS edition.* London: Thomson Learning.
- Ronen, J., & Yaari, V. L. (2008). *Earnings Management: Emerging Insights in Theory, Practice, and Research.* New York: Springer Science+Business Media, Inc.
- Roychowdhury, S. (2006). Earnings management through real activities manipulation. *Journal of Accounting and Economics 42* , 335-370.
- Schipper, K. (1989). Commentary on earnings management. *Accounting Horizons 3* , 91-102.
- Stolowy, H., & Breton, G. (2004). Accounts Manipulation: A literature review and Proposed Conceptual Framework. *Review of Accounting & Finance 3* , 5-66.
- Watts, R., & Zimmerman, J. (1978). Towards a Positive Theory of the Determination of Accounting Standards. *The Accounting Review 53* , 112-134.
- Whalen, C. J. (2007). The US credit crunch of 2007: A Minsky moment. *Public Policy Brief No. 92* , 1-26.
- White, G. I., Sondhi, A. C., & Fried, D. (1994). *The Analysis and Use of Financial Statements.* Connecticut: John Wiley & Sons, Inc.
- Xu, R. Z., Taylor, G. K., & Dugan, M. T. (2007). Review of Real Earnings Management Literature. *Journal of Accounting Literature* , 195-228.
- Zang, A. (2005). *Evidence on the tradeoff between real manipulation and accrual manipulation (working paper).* University of Rochester.
- Zang, A. Y. (2012). Evidence on the trade-off between real activities manipulation and accrual-based earnings management. *The Accounting Review, vol. 87, no. 2* , 675-703.

Appendix 1: Literature overview

Author	Year	Research object	Sample	Method	Results
Healy	1985	The association between managers' accrual and accounting procedure decisions and their income reporting incentives under these plans	Sample of the 94 largest U.S. listed industrial firms from the period 1930 – 1980	Assigning the observations of earnings to a part of the bonus contract; this can be under the lower bound of the bonus range (low earnings), or above the bonus range (high earnings). Earnings management is measured using accruals, total accruals are measured as the estimated difference between reported accounting earnings and cash flow from operations. As proxy for normal accruals he uses the average total accruals of the last 10 years. To test his hypotheses, Healy (1985) compares the accruals with the place the firms' take in the bonus contracts.	Healy finds prove for his bonus maximizing hypothesis, he finds that managers manage earnings downward under the lower bound of the bonus plan and downward above the lower bounds of the bonus plans. He also finds evidence for earnings management around the upper boundaries of bonus plans.
Holthausen, Lacker, and Sloan	1995	Investigate the extent to which executives manipulate earnings to maximize the present value of bonus plan payments	Sample from the period 1982 – 1984 and 1987 – 1991	Assigning observations to parts of the bonus schemes, observations can be under the lower boundary of the bonus scheme, in between the boundaries of the bonus scheme or above the boundaries of the bonus scheme. Earnings management is measured using the Jones and modified Jones model to measure accruals	The results provide support for the proposition that executives manipulate accounting earnings to maximize their compensation, but only in certain regions of the contract. In particular, they find that discretionary accruals are more negative when the CEO is at the upper bound than when the CEO is between the lower and upper bounds. The authors do not find evidence that CEOs take more negative discretionary accruals when they are below the lower bound than when they are between the lower and upper bounds. They also find no evidence that investment decisions (e.g., advertising, capital investment, or research and development) are influenced by the annual bonus compensation contract faced by the executive.
Beneish and Vargus	2002	Whether insider trading is informative regarding the quality of earnings and the valuation implications of accruals	Based on a sample of 3906 firms, resulting in 21,678 firm-years over the period 1985 – 1996	First they assess whether a signal depending on insider trading predicts one year ahead income persistence and also can help identifying companies with low and high earnings quality. Secondly, the authors use hedge portfolio tests and market pricing tests to investigate whether the magnitude of mispricing of accruals is different between firms with high versus low earnings quality. Third, they investigate the magnitude to which low earnings quality is the consequence of earnings manipulation.	Their results show that increasing earnings accruals are significantly less persistent for companies with abnormal insider selling and significantly more persistent for companies with abnormal insider buying, compared to companies with no abnormal insider trading. As opposed, they find that insider trading offers little indication of the persistency of earnings decreasing accruals. The pricing tests indicates that (1) accrual mispricing is caused by earnings increasing accruals mispricing, (2) when management engages in abnormal buying, earnings increasing accruals seem to be priced rationally and when management engages in abnormal selling, overpriced, (3) when top management of a company is not trading, market participants also overprice earnings increasing accruals, however overpricing is less serious than when management engages in abnormal selling, and (4) market participants seem to price all earnings increasing accruals as if they are of high quality. Their finding of accrual mispricing suggests that investors are not understanding the lower persistency of some earnings increasing accruals. The authors also find indications that the lower persistence of earnings increasing accruals together with abnormal insider selling is at least partially due to opportunistic earnings management.
Bergstresser, Desai, and Rauh	2006	Identifying a straightforward mechanism for manipulation of income, investigates how manipulation through that channel is associated with CEO motives, and shows that management changes investment decisions in order to capitalize, and justify, this type of earnings management.	sample of 20,598 firm-years from 3350 firms over the period 1991 – 2002	Earnings management is measured as the difference between earnings and cash flows (accruals). In order to identify the motive to use earnings management, other measures of the sensitivity of a company's earnings to the assumed return on pension assets are created.	Managers opportunistically use the assumed returns, and this opportunism significantly interacts with investment decisions, firm financial, and major individual. In addition, the authors also find that these opportunistic modifications in assumed returns also seem to affect asset allocations in companies pension plans. To justify aggressive return assumptions, managers could raise equity allocations. The findings indicate that changes to the assumed return result in changes in asset allocation decisions. The evidence suggests that manipulation of the income, as examined here, is unlikely to reflect the interests of the shareholders

Burns and Kedia	2006	Examining if and how management motives, from their compensation contracts, influence the probability of using uncommon accounting practices that lead to a restatement of the financial reports.	They compare S&P 1500 firms that announce a restatement of their financial statements over the period 1995 to 2002 with those firms that do not restate	The authors measure the sensitivity of all components of CEO compensation to firm performance and examine the effect of this sensitivity on the incentives to adopt aggressive accounting practices that result in a restatement.	They find that option sensitivity is positively associated with misreporting. The greater the sensitivity of CEO wealth is to share price arising from the CEO's option holdings, the greater is the propensity to misreport. Further, they find significant evidence that the greater the convexity of CEO wealth to share price, the greater is the propensity to misreport. Like stock options, equity and restricted stock also tie CEO wealth to share price. However, the authors do not find evidence that incentives from equity and restricted stock are associated with misreporting. The results show no evidence that long-term incentive payouts are associated with a propensity to misreport. Increased bonus payments associated with higher earnings are also likely to encourage CEOs to misreport. However, there is no significant evidence that an increase in salary plus bonus is a motivation for misreporting.
Cheng and Warfield	2005	Testing for two relations, the main focus of their study is to investigate whether high equity incentive managers are more likely to manage earnings. The second relation tested is whether high equity incentive managers sell more shares in the future.	The initial sample includes all firm-years with data on CEOs' ownership and stock-based compensation obtainable from the Standard & Poor's ExecuComp database for the period 1993–2000.	As measure for equity incentives Cheng and Warfield (2005) use a ratio of five equity elements (e.g. exercisable options, unexercisable options, option grants, stock ownership, and restricted stock grants), divided by the total outstanding shares of the firm. Earnings management is measured by testing if the company's earnings surprise per share would have negative earnings surprises and abnormal accruals.	The results indicate that managers with high equity incentives have significantly higher levels of net sales in the year after earnings announcements. They find a significantly higher occurrence of meeting or just beating analysts' forecasts for firms with higher managerial equity incentives. Their results indicate that managers with high equity incentives sell more after meeting or beating analysts' forecasts than after missing analysts' forecasts. At last they find that managers who have high equity incentives use more income increasing abnormal accruals than managers with low equity incentives.
Bergstresser and Philippon	2006	the association between earnings management and equity incentives	For the Compustat sample the period is from 1993-2000 and for Thomson the period is between 1996 and 2001.	CEO equity incentive is measured using the dollar change in the value of CEO's option and stock ownerships comming from a 1% increase of the company's share price and deflated by total CEO compensation (i.e. salary and bonus are included), resulting in a incentive ratio. To measure earnings management the authors use the Jones and the modified Jones accrual model and detect discretionary accruals.	They find that in companies where CEO's compensation is related to share price, discretionary accruals are more actively used to manage earnings. CEO's with stronger equity incentives are found to show higher affinity to exercise options during the time phase when accruals are high. Furthermore, there is significant evidence that when accruals are used to increase earnings, the level of insider sales is considerably higher.
Gao and shrieves	2002	Investigating how the elements of compensation affect earnings management behaviour.	Sample of 1200 firms over the period 1992 – 2000	They examine earnings management (discretionary accruals) in relation to the entire CEO compensation package, consisting of; options, bonuses, salaries, restricted stocks and long-term incentive plans.	The results indicate that earnings management intensity is related to managerial compensation contract design. The incentive intensity of stock options, amount of bonuses and stock options, are positively associated with earnings management intensity, while salaries are negatively associated. Their findings do not reliably support, positive or negative influence of long-term incentive plans or restricted stock compensation on earnings management intensity, except for the incentive intensity effect of restricted stock.
Cohen, Dey, and Lys	2005	They investigate the trends in and potential determinants of corporate earnings management activities in the periods preceding and following the passage of SOX.	sample of 33.581 firm-quarters from 2078 firms over the period 1992 – 2003	Earnings management is examined over time, where earnings management is measured using a principal factor analysis of the six earnings management metrics (i.e. three discretionary accruals measures, ratio of the absolute value of accruals to the absolute value of cash flows from operations, ratio of change in accounts receivables to change in sales, ratio of the change in inventories to change in sales and the frequency of negative special items).	The authors find that the pre SOX period was characterized by rapidly increasing earnings management that reached a peak during the SCA period and is concentrated in poorly performing industries. However, following the passage of SOX earnings management reversed. Their results are partially consistent with the hypothesis that high earnings management activity during the pre-SOX period was driven by managers' opportunistic behaviours. No association was found between the fraction of compensation derived from bonus contracts and earnings management.
Chia, Lapsley, and Lee	2007	Investigating the presence of negative earnings management activities in service oriented public-listed companies in Singapore during the Asian financial crisis.	Using a sample of 383 firm-observations from 125 service-oriented companies listed at the SES for the fiscal years of 1995 – 1998.	Using the cross-sectional modified Jones model (1991) in order to detect earnings management.	The authors find evidence that service-oriented firms use income decreasing earnings management in time of crisis. In times of financial crisis, management temporary expects income to be poor. When confronted with such a situation, managements' incentive would be to save their firms and retain their jobs instead of trying to maximize their bonuses. The results also show that only Big 6 companies are able to significantly reduce earnings management of the managers of these firms.

Gilson and Vetsuypens	1993	Examine management compensation policy	Management compensation policy in 77 publicly traded firms that filed for bankruptcy or privately restructured their debt to avoid bankruptcy for the period 1981 – 1987.	Looking at the median changes	Members of the senior management team incur significant personal losses when their firms are financially distressed. Almost one-third of the CEO's in their sample are replaced in a given year around default, and those who remain often take substantial cuts in their salary and bonus. Newly appointed CEO's with ties to previous management are paid 35% less (at the median) than the outgoing CEO. In contrast, the median CEO hired from outside the firm earns 36% more than his or her predecessor. Outside replacement CEO's also receive large grants of stock options as part of their compensation. They also find that compensation policy is often an important part of firms' overall strategy for dealing with financial distress, through provisions that change managers' incentives or facilitate negotiations with creditors. Almost a third of their firms lower the exercise price of outstanding executive stock options which have fallen out of the money.
Gorgan, Gorgan, Dumitru, and Pitulice	2012	Examining the degree to which financial reporting is involved in the financial crisis and outline the changes introduced by the crisis in the quality of financial information provided by firms.	The study is conducted on a sample of the biggest 30 European companies included in Global Fortune 2009, for the period 2007 – 2009.	Earnings management is measured through discretionary accruals by the modified version of the Jones model (1991), before and during the recent economic crisis.	They reveal that there is a decline of earnings management during the economic crisis compared to previous period. However, the authors also mention there are also other factors that could have had an influence on this decline. For example, the increased vigilance of investors, new regulation from professional bodies, investigations of governmental institutions, etc.
Zang	2012	Whether managers use real and accrual based earnings management as substitutes to manage earnings	Sample of 6680 earnings management suspect firm-years over the period 1987–2008.	The authors investigation of real activities manipulation includes overproducing inventory and cutting in discretionary expenditures (including advertising, SG&A, and R&D expenditures) and is measured using the cross-sectional models developed by Roychowdhury (2006). Discretionary accruals are used as proxy for accrual-based earnings management and are measured using the modified Jones (1991) model.	When real activities manipulation is more costly, because the firm is experiencing more monitoring from institutional investors, being in a less healthy financial situation, incurring larger tax expenditure for the current period, and has a less competitive status in the industry, companies use more accrual based earnings management and less real activities manipulation. It also shows that if real activities manipulation turns out to be unexpectedly high (low), then managers will decrease (increase) the amount of accrual-based earnings management they carry out. The results reveal that, if accrual based earnings management is restricted by a limited accounting flexibility because of shorter operating cycles and accrual manipulation in previous years, and more scrutiny of accounting practices post-SOX, companies use real activities manipulation (accrual based earnings management) to a greater (lesser) degree.
Cohen, Dey, and Lys	2008	Real and accrual-based earnings management in the pre-SOX period and in the post-SOX period.	Sample of 2018 firms and 31,668 firm-year observations	Earnings management is examined over time, where earnings management is measured using the modified cross sectional Jones model of discretionary accruals and to measure real activities manipulation they rely on the models developed by Roychowdhury (2006) to estimate the abnormal levels of real transactions as the proxies for real activities manipulation.	They find a increasing accrual-based earnings management in the pre-SOX period and an even larger increase in the SCA period, but declining real earnings management. Their results also reveal that this increase in the SCA period was associated with an increase in option based compensation. While new options grants are negatively associated with income-increasing discretionary accruals, they find that unexercised options are positively associated with income-increasing discretionary accruals. The authors do not find a association between accrual-based earnings management and acquired exercisable options. For the post-SOX period there is a declining association between income-increasing discretionary accruals and unexercised options (excluding new option grants). Although the authors find that accrual-based earnings management declined in the post-SOX period, they find real earnings management to increase. However, option based compensation decreased. They find that both pre- and post-SOX, suspected firms have higher discretionary accruals compared to non-suspect firms. However, these suspected firms use less income-increasing accrual-management in the post-SOX period. This analysis also shows that there is an increase of real earnings management activities after SOX.

Kim, Li, and Zhang	2011	The association between CFO and CEO equity incentives and crash risk	Sample of publicily held US firms, with data available on CEO and CFO compensation between 1993 – 2009.	Total equity incentive ratio to measure equity incentives of Bergstresser and Philippon (2006)	They find a significant positive relations between crash risk and option-based incentives, but not for the relation between crash risk and share-based incentives.
Cohen and Zarowin	2010	Real and accrual-based earnings management activities associated with seasoned equity offerings (SEOs)	Sample of 1511 completed U.S. offers over the period 1987 – 2006.	To capture accrual-based earnings management they use the cross-sectional Jones (1991) model and to measure real earnings management they follow the models developed by Roychowdhury (2006).	First, the authors state that companies use accrual-based earnings management around SEOs and also that SEO companies often, either outperform their peers in the period prior to the SEO and underperform their peers after the SEO. Secondly, they find that firms use both accrual-based and real earnings management around SEOs, and that this varies cross-sectionally. The capability of the company to use accrual-based earnings management and the costs thereof, is causing these differences. Their results show that the level of net operating assets, the presence of a Big 8 auditor, being in a high-litigation industry, and longer auditor tenure are all positively related with the propensity to use real earnings manipulation around SEOs.
Jiang, Petroni, and Wang	2010	Examined the relation between CFO and CEO equity incentives and earnings management pre and post-Sarbanes Oxley.	Sample of S&P 1500 firms that is derived from the ExecuComp database for the period 1993 – 2006	Like Bergstresser and Philippon (2006), they use the total equity incentive ratio to measure equity incentives and added the option delta to the model. The authors measure earnings management using the accrual model by Dechow et al. (2003), calculating total accruals as the difference between earnings before extraordinary items, scaled by lagged total assets (cash flow data). Furthermore they control for: leverage, the volatility of sales growth, firm age and firm size.	They find a negative relation between equity incentives and earnings management for the post-Sarbanes Oxley period.

Appendix 2: Description of variables

Abnormal accruals	
TA	= total accruals
∆CA	= change in current assets (COMPUSTAT data item 4)
∆CL	= change in current liabilities (COMPUSTAT data item 5)
∆Cash	= change in cash and cash equivalents (COMPUSTAT data item 1)
∆STD	= change in debt included in current liabilities (COMPUSTAT data item 34)
Dep	= depreciation and amortization expense (COMPUSTAT data item 14)
A	= total assets (COMPUSTAT data item 6)
DA	= Discretionary accruals
TA	= total accruals
NDA	= Nondiscretionary accruals
∆REV	= change in revenues (COMPUSTAT data item **12**)
∆AR	= change in accounts receivable (REC in the Dechow et al. model) (COMPUSTAT data item **2**)
PPE	= gross property, plant and equipment (COMPUSTAT data item **7**)
ROA	= Return on Assets measured using net income (COMPUSTAT data item **18**)
i	= index for firm, i = 1,2,…,N
t	= index for period (year) in the estimation period, t = 1,2,…,T
∆	= change in a given variable
α β δ	= regression coefficients

Real activities manipulation	
CFO_{it}	= cash flow from operations in year *t* for firm *i*;
S_{it}	= sales in year *t* for firm *i*;
ΔS_{it}	= sales in year *t* less sales in year *t* – 1 for firm *i*;
ε	= error term.
$NCFO_{it}$	= normal cash flow from operations in year t for firm i.
ABN_CFO_{it}	= abnormal cash flow from operations in in year t for firm i.
$COGS_{it}$	= costs of goods sold in year t for firm i.
ΔINV_{it}	= inventory in year t less inventory in year t – 1 for firm i.
$PROD_{it}$	= production costs in year t for firm i.
$NPROD_{it}$	= normal production costs in year t for firm i.
ABN_PROD_{it}	= abnormal production costs in year t for firm i.
$DISEXP_{it}$	= discretionary expenditures (R&D, SG&A and Advertising) in year *t* for firm *i*.
$NDISEXP_{it}$	= normal Discretionary expenditures in year t for firm i.
ABN_DISEXP_{it}	= abnormal discretionary expenditures in year t for firm i.

Equity incentives	
TOT_EI_{it}	= total equity incentives in year t for firm i;
EI_OPTGR_{it}	= option grants / common shares outstanding;
$EI\_UNEXOPT_{it}$	= unexercisable options / common shares outstanding;
EI_EXOPT_{it}	= exercisable options / common shares outstanding;
EI_RESST_{it}	= restricted stock grants / common shares outstanding;
EI_STOWN_{it}	= share ownership / common shares outstanding.

Appendix 3: Multicollinearity

Bivariate: Pearson correlation

Correlations

		Accrual_EM(it)	Real_EM(it)	TOT_EI(it)	Crisis(it)	Size(it)	Salary(it)	Bonus(it)	Leverage(it)	STD_CFO(it)	STD_REV(it)	MtB(it)	Loss(it)
Accrual_EM(it)	Pearson Correlation	1	.333**	.002	-.086**	-.229**	-.179**	.000	-.008	-.034**	-.019	-.007	.148**
	Sig. (2-tailed)		.000	.882	.000	.000	.000	.984	.420	.001	.064	.490	.000
	N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
Real_EM(it)	Pearson Correlation	.333**	1	.002	-.042**	-.213**	-.102**	-.009	-.012	-.007	.032**	.032**	.153**
	Sig. (2-tailed)	.000		.825	.000	.000	.000	.379	.230	.477	.002	.002	.000
	N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
TOT_EI(it)	Pearson Correlation	.002	.002	1	-.032**	-.056**	.069**	.126**	.012	-.071**	-.056**	.020	-.029**
	Sig. (2-tailed)	.882	.825		.001	.000	.000	.000	.251	.000	.000	.054	.004
	N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
Crisis(it)	Pearson Correlation	-.086**	-.042**	-.032**	1	.117**	.181**	-.249**	.015	.060**	.042**	-.010	-.012
	Sig. (2-tailed)	.000	.000	.001		.000	.000	.000	.148	.000	.000	.315	.234
	N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
Size(it)	Pearson Correlation	-.229**	-.213**	-.056**	.117**	1	.739**	.038**	.030**	.429**	.386**	.018	-.107**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.003	.000	.000	.073	.000
	N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
Salary(it)	Pearson Correlation	-.179**	-.102**	.069**	.181**	.739**	1	.105**	.019	.354**	.311**	.030**	-.056**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.065	.000	.000	.004	.000
	N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
Bonus(it)	Pearson Correlation	.000	-.009	.126**	-.249**	.038**	.105**	1	-.008	.010	.024*	-.012	-.022*
	Sig. (2-tailed)	.984	.379	.000	.000	.000	.000		.405	.307	.019	.238	.029
	N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
Leverage(it)	Pearson Correlation	-.008	-.012	.012	.015	.030**	.019	-.008	1	.007	.003	.621**	-.057**
	Sig. (2-tailed)	.420	.230	.251	.148	.003	.065	.405		.485	.761	.000	.000
	N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
STD_CFO(it)	Pearson Correlation	-.034**	-.007	-.071**	.060**	.429**	.354**	.010	.007	1	.779**	.021*	-.012
	Sig. (2-tailed)	.001	.477	.000	.000	.000	.000	.307	.485		.000	.036	.227
	N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
STD_REV(it)	Pearson Correlation	-.019	.032**	-.056**	.042**	.386**	.311**	.024*	.003	.779**	1	.001	-.013
	Sig. (2-tailed)	.064	.002	.000	.000	.000	.000	.019	.761	.000		.950	.204
	N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
MtB(it)	Pearson Correlation	-.007	.032**	.020	-.010	.018	.030**	-.012	.621**	.021*	.001	1	-.046**
	Sig. (2-tailed)	.490	.002	.054	.315	.073	.004	.238	.000	.036	.950		.000
	N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
Loss(it)	Pearson Correlation	.148**	.153**	-.029**	-.012	-.107**	-.056**	-.022*	-.057**	-.012	-.013	-.046**	1
	Sig. (2-tailed)	.000	.000	.004	.234	.000	.000	.029	.000	.227	.204	.000	
	N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Bivariate: Spearman correlation

Correlations

			Accrual_EM(it)	Real_EM(it)	TOT_EI(it)	Crisis(it)	Size(it)	Salary(it)	Bonus(it)	Leverage(it)	STD_CFO(it)	STD_REV(it)	MtB(it)	Loss(it)
Spearman's rho	Accrual_EM(it)	Correlation Coefficient	1.000	.149**	-.011	-.056**	-.213**	-.183**	.009	-.173**	-.068**	-.121**	.048**	.051**
		Sig. (2-tailed)	.	.000	.271	.000	.000	.000	.373	.000	.000	.000	.000	.000
		N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
	Real_EM(it)	Correlation Coefficient	.149**	1.000	-.017	-.036**	-.136**	-.075**	-.003	-.101**	.005	.016	.053**	.109**
		Sig. (2-tailed)	.000	.	.091	.000	.000	.000	.757	.000	.599	.111	.000	.000
		N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
	TOT_EI(it)	Correlation Coefficient	-.011	-.017	1.000	.002	-.020*	.119**	.160**	-.011	-.057**	.010	.235**	-.038**
		Sig. (2-tailed)	.271	.091	.	.828	.045	.000	.000	.275	.000	.315	.000	.000
		N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
	Crisis(it)	Correlation Coefficient	-.056**	-.036**	.002	1.000	.116**	.189**	-.249**	.027**	.136**	.075**	-.152**	-.012
		Sig. (2-tailed)	.000	.000	.828	.	.000	.000	.000	.007	.000	.000	.000	.234
		N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
	Size(it)	Correlation Coefficient	-.213**	-.136**	-.020*	.116**	1.000	.779**	.030**	.441**	.822**	.832**	.033**	-.081**
		Sig. (2-tailed)	.000	.000	.045	.000	.	.000	.004	.000	.000	.000	.001	.000
		N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
	Salary(it)	Correlation Coefficient	-.183**	-.075**	.119**	.189**	.779**	1.000	.067**	.334**	.669**	.664**	.035**	-.059**
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.	.000	.000	.000	.000	.001	.000
		N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
	Bonus(it)	Correlation Coefficient	.009	-.003	.160**	-.249**	.030**	.067**	1.000	.004	.030**	.029**	.003	-.022*
		Sig. (2-tailed)	.373	.757	.000	.000	.004	.000	.	.666	.003	.005	.735	.029
		N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
	Leverage(it)	Correlation Coefficient	-.173**	-.101**	-.011	.027**	.441**	.334**	.004	1.000	.309**	.331**	.079**	-.045**
		Sig. (2-tailed)	.000	.000	.275	.007	.000	.000	.666	.	.000	.000	.000	.000
		N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
	STD_CFO(it)	Correlation Coefficient	-.068**	.005	-.057**	.136**	.822**	.669**	.030**	.309**	1.000	.772**	.030**	-.037**
		Sig. (2-tailed)	.000	.599	.000	.000	.000	.000	.003	.000	.	.000	.004	.000
		N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
	STD_REV(it)	Correlation Coefficient	-.121**	.016	.010	.075**	.832**	.664**	.029**	.331**	.772**	1.000	.064**	-.085**
		Sig. (2-tailed)	.000	.111	.315	.000	.000	.000	.005	.000	.000	.	.000	.000
		N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
	MtB(it)	Correlation Coefficient	.048**	.053**	.235**	-.152**	.033**	.035**	.003	.079**	.030**	.064**	1.000	-.017
		Sig. (2-tailed)	.000	.000	.000	.000	.001	.001	.735	.000	.004	.000	.	.095
		N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608
	Loss(it)	Correlation Coefficient	.051**	.109**	-.038**	-.012	-.081**	-.059**	-.022*	-.045**	-.037**	-.085**	-.017	1.000
		Sig. (2-tailed)	.000	.000	.000	.234	.000	.000	.029	.000	.000	.000	.095	.
		N	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608	9608

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Multicollinearity: Accrual based earnings management by Kothari et al. (2005)

Coefficients[a]

Model		Unstandardized Coefficients		ed Coefficient			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.084	.002		37.046	.000		
	TOT_EI(it)	.000	.000	-.010	-.978	.328	.952	1.050
	Crisis(it)	-.002	.001	-.025	-2.407	.016	.891	1.122
	Size(it)	-.005	.000	-.211	-13.485	.000	.406	2.465
	Salary(it)	.000	.000	-.023	-1.478	.139	.421	2.376
	Bonus(it)	.001	.001	.016	1.483	.138	.900	1.112
	Leverage(it)	.000	.000	-.016	-1.250	.211	.612	1.633
	STD_CFO(it)	.000	.000	.078	4.792	.000	.372	2.689
	STD_REV(it)	.000	.000	.011	.707	.479	.390	2.567
	MtB(it)	.000	.000	.009	.683	.495	.612	1.634
	Loss(it)	.013	.005	.025	2.495	.013	.981	1.019

a. Dependent Variable: Accrual_EM(it)

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					Square Change	F Change	df1	df2	Sig. F Change	
1	.215[a]	.046	.045	.03725	.046	46.738	10	9597	.000	.095

a. Predictors: (Constant), Loss(it), Crisis(it), STD_REV(it), MtB(it), TOT_EI(it) , Bonus(it), Salary(it), Leverage(it), Size(it), STD_CFO(it)

b. Dependent Variable: Accrual_EM(it)

Multicollinearity: Real activities manipulation by Roychowdhury (2006)

Coefficients[a]

Model		Unstandardized Coefficients		ed Coefficient			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1.033	.026		40.213	.000		
	TOT_EI(it)	.000	.000	-.014	-1.418	.156	.952	1.050
	Crisis(it)	-.027	.009	-.031	-2.968	.003	.891	1.122
	Size(it)	-.092	.004	-.331	-21.628	.000	.406	2.465
	Salary(it)	.000	.000	.119	7.917	.000	.421	2.376
	Bonus(it)	-.013	.009	-.014	-1.406	.160	.900	1.112
	Leverage(it)	-.001	.000	-.036	-2.865	.004	.612	1.633
	STD_CFO(it)	.000	.000	-.010	-.613	.540	.372	2.689
	STD_REV(it)	.000	.000	.133	8.536	.000	.390	2.567
	MtB(it)	.001	.000	.062	4.987	.000	.612	1.634
	Loss(it)	.723	.057	.125	12.690	.000	.981	1.019

a. Dependent Variable: Real_EM(it)

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					Square Change	F Change	df1	df2	Sig. F Change	
1	.293[a]	.086	.085	.42129	.086	89.960	10	9597	.000	1.869

a. Predictors: (Constant), Loss(it), Crisis(it), STD_REV(it), MtB(it), TOT_EI(it) , Bonus(it), Salary(it), Leverage(it), Size(it), STD_CFO(it)

b. Dependent Variable: Real_EM(it)

Multicollinearity: Accrual based earnings management compared with option-based and share-based equity incentives

Coefficients[a]

Model		Unstandardized Coefficients		ed Coefficient			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.085	.002		38.397	.000		
	Crisis(it)	-.001	.001	-.017	-1.617	.106	.868	1.152
	Size(it)	-.005	.000	-.221	-14.050	.000	.400	2.497
	Salary(it)	.000	.000	-.033	-2.142	.032	.423	2.365
	Bonus(it)	.001	.001	.013	1.231	.219	.906	1.104
	Leverage(it)	.000	.000	-.015	-1.190	.234	.612	1.635
	STD_CFO(it)	.000	.000	.084	4.709	.000	.314	3.188
	STD_REV(it)	.000	.000	.011	.688	.491	.386	2.590
	MtB(it)	.000	.000	.007	.584	.559	.611	1.637
	Loss(it)	.012	.005	.024	2.421	.015	.981	1.019
	EI_OPTGR(it)	.000	.000	.036	2.690	.007	.546	1.830
	EI_UNEXOPT(it)	.000	.000	-.011	-.855	.393	.573	1.746
	EI_EXOPT(it)	.000	.000	.034	2.593	.010	.574	1.743
	EI_RESST(it)	.000	.000	-.012	-.954	.340	.598	1.673
	EI_STOWN(it)	.000	.000	-.008	-.692	.489	.751	1.331

a. Dependent Variable: Accrual_EM(it)

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					Square Change	F Change	df1	df2	Sig. F Change	
1	.220[a]	.049	.047	.03722	.049	35.005	14	9593	.000	.097

a. Predictors: (Constant), EI_STOWN(it), Leverage(it), Crisis(it), Loss(it), STD_REV(it), Bonus(it), EI_UNEXOPT(it), Salary(it), EI_RESST(it), MtB(it), EI_EXOPT(it), EI_OPTGR(it), Size(it), STD_CFO(it)

b. Dependent Variable: Accrual_EM(it)

Multicollinearity: Real activities manipulation compared with option-based and share-based equity incentives

Coefficients[a]

Model		Unstandardized Coefficients		ed Coefficient			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1.045	.025		41.690	.000		
	Crisis(it)	-.020	.009	-.022	-2.133	.033	.868	1.152
	Size(it)	-.095	.004	-.342	-22.211	.000	.400	2.497
	Salary(it)	.000	.000	.105	6.985	.000	.423	2.365
	Bonus(it)	-.015	.009	-.017	-1.684	.092	.906	1.104
	Leverage(it)	-.001	.000	-.034	-2.744	.006	.612	1.635
	STD_CFO(it)	.000	.000	-.003	-.178	.858	.314	3.188
	STD_REV(it)	.000	.000	.134	8.559	.000	.386	2.590
	MtB(it)	.001	.000	.060	4.782	.000	.611	1.637
	Loss(it)	.719	.057	.124	12.644	.000	.981	1.019
	EI_OPTGR(it)	.000	.000	.025	1.876	.061	.546	1.830
	EI_UNEXOPT(it)	.000	.000	.042	3.240	.001	.573	1.746
	EI_EXOPT(it)	.000	.000	.021	1.610	.107	.574	1.743
	EI_RESST(it)	.000	.000	-.015	-1.160	.246	.598	1.673
	EI_STOWN(it)	.000	.000	-.022	-1.957	.050	.751	1.331

a. Dependent Variable: Real_EM(it)

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					Square Change	F Change	df1	df2	Sig. F Change	
1	.299[a]	.089	.088	.42051	.089	67.338	14	9593	.000	1.872

a. Predictors: (Constant), EI_STOWN(it), Leverage(it), Crisis(it), Loss(it), STD_REV(it), Bonus(it), EI_UNEXOPT(it), Salary(it), EI_RESST(it), MtB(it), EI_EXOPT(it), EI_OPTGR(it), Size(it), STD_CFO(it)

b. Dependent Variable: Real_EM(it)

Appendix 4: Multivariate regression results

Regression model: Accrual based earnings management and total equity incentives 2004 - 2012

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Loss(it), Crisis(it), STD_REV(it), MtB(it), TOT_EI(it) , Bonus(it), Salary(it), Leverage(it), Size(it), STD_CFO(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Accrual_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.215[a]	.046	.045	.03725

a. Predictors: (Constant), Loss(it), Crisis(it), STD_REV(it), MtB(it), TOT_EI(it) , Bonus(it), Salary(it), Leverage(it), Size(it), STD_CFO(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.649	10	.065	46.738	.000[a]
	Residual	13.316	9597	.001		
	Total	13.965	9607			

a. Predictors: (Constant), Loss(it), Crisis(it), STD_REV(it), MtB(it), TOT_EI(it) , Bonus(it), Salary(it), Leverage(it), Size(it), STD_CFO(it)

b. Dependent Variable: Accrual_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.084	.002		37.046	.000
	TOT_EI(it)	.000	.000	-.010	-.978	.328
	Crisis(it)	-.002	.001	-.025	-2.407	.016
	Size(it)	-.005	.000	-.211	-13.485	.000
	Salary(it)	.000	.000	-.023	-1.478	.139
	Bonus(it)	.001	.001	.016	1.483	.138
	Leverage(it)	.000	.000	-.016	-1.250	.211
	STD_CFO(it)	.000	.000	.078	4.792	.000
	STD_REV(it)	.000	.000	.011	.707	.479
	MtB(it)	.000	.000	.009	.683	.495
	Loss(it)	.013	.005	.025	2.495	.013

a. Dependent Variable: Accrual_EM(it)

Regression model: Accrual based earnings management and exercisable options 2004 - 2012

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EI_EXOPT(it), Leverage(it), Bonus(it), Loss(it), STD_CFO(it), Crisis(it), Salary(it), MtB(it), Size(it), STD_REV(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Accrual_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.218[a]	.048	.047	.03722

a. Predictors: (Constant), EI_EXOPT(it), Leverage(it), Bonus(it), Loss(it), STD_CFO(it), Crisis(it), Salary(it), MtB(it), Size(it), STD_REV(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.667	10	.067	48.106	.000[a]
	Residual	13.298	9597	.001		
	Total	13.965	9607			

a. Predictors: (Constant), EI_EXOPT(it), Leverage(it), Bonus(it), Loss(it), STD_CFO(it), Crisis(it), Salary(it), MtB(it), Size(it), STD_REV(it)

b. Dependent Variable: Accrual_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.084	.002		38.405	.000
	Crisis(it)	-.002	.001	-.020	-1.921	.055
	Size(it)	-.005	.000	-.216	-13.853	.000
	Salary(it)	.000	.000	-.030	-1.958	.050
	Bonus(it)	.001	.001	.015	1.406	.160
	Leverage(it)	.000	.000	-.015	-1.171	.242
	STD_CFO(it)	.000	.000	.079	4.814	.000
	STD_REV(it)	.000	.000	.009	.554	.579
	MtB(it)	.000	.000	.007	.551	.582
	Loss(it)	.013	.005	.025	2.511	.012
	EI_EXOPT(it)	.000	.000	.039	3.742	.000

a. Dependent Variable: Accrual_EM(it)

Regression model: Accrual based earnings management and share ownership 2004 - 2012

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EI_STOWN(it), Leverage(it), Crisis(it), Loss(it), STD_REV(it), Bonus(it), Salary(it), MtB(it), Size(it), STD_CFO(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Accrual_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.216[a]	.047	.046	.03725

a. Predictors: (Constant), EI_STOWN(it), Leverage(it), Crisis(it), Loss(it), STD_REV(it), Bonus(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.650	10	.065	46.882	.000[a]
	Residual	13.314	9597	.001		
	Total	13.965	9607			

a. Predictors: (Constant), EI_STOWN(it), Leverage(it), Crisis(it), Loss(it), STD_REV(it), Bonus(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

b. Dependent Variable: Accrual_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.084	.002		38.235	.000
	Crisis(it)	-.002	.001	-.025	-2.374	.018
	Size(it)	-.005	.000	-.210	-13.533	.000
	Salary(it)	.000	.000	-.025	-1.656	.098
	Bonus(it)	.001	.001	.014	1.381	.167
	Leverage(it)	.000	.000	-.016	-1.248	.212
	STD_CFO(it)	.000	.000	.078	4.740	.000
	STD_REV(it)	.000	.000	.012	.760	.447
	MtB(it)	.000	.000	.008	.667	.505
	Loss(it)	.013	.005	.025	2.527	.012
	EI_STOWN(it)	.000	.000	.015	1.529	.126

a. Dependent Variable: Accrual_EM(it)

Regression model: Accrual based earnings management and total equity incentives 2004 – 2007

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Loss(it), STD_REV(it), TOT_EI(it) , Leverage(it), Bonus(it), Salary(it), MtB(it), Size(it), STD_CFO(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Accrual_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.216[a]	.047	.045	.03783

a. Predictors: (Constant), Loss(it), STD_REV(it), TOT_EI(it) , Leverage(it), Bonus(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.367	9	.041	28.518	.000[a]
	Residual	7.494	5237	.001		
	Total	7.861	5246			

a. Predictors: (Constant), Loss(it), STD_REV(it), TOT_EI(it) , Leverage(it), Bonus(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

b. Dependent Variable: Accrual_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.089	.003		28.517	.000
	TOT_EI(it)	.000	.000	-.018	-1.277	.202
	Size(it)	-.006	.001	-.237	-11.346	.000
	Salary(it)	.000	.000	.002	.085	.932
	Bonus(it)	.000	.001	.005	.349	.727
	Leverage(it)	.000	.000	-.022	-1.188	.235
	STD_CFO(it)	.000	.000	.090	3.989	.000
	STD_REV(it)	.000	.000	-.013	-.617	.537
	MtB(it)	.000	.000	.015	.817	.414
	Loss(it)	.011	.007	.022	1.619	.106

a. Dependent Variable: Accrual_EM(it)

Regression model: Accrual based earnings management and exercisable options 2004 - 2007

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EI_EXOPT(it), Leverage(it), Bonus(it), Loss(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Accrual_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.218[a]	.047	.046	.03782

a. Predictors: (Constant), EI_EXOPT(it), Leverage(it), Bonus(it), Loss(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.372	9	.041	28.921	.000[a]
	Residual	7.489	5237	.001		
	Total	7.861	5246			

a. Predictors: (Constant), EI_EXOPT(it), Leverage(it), Bonus(it), Loss(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

b. Dependent Variable: Accrual_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.089	.003		28.974	.000
	Size(it)	-.006	.001	-.241	-11.485	.000
	Salary(it)	.000	.000	-.007	-.352	.725
	Bonus(it)	.000	.001	.002	.141	.888
	Leverage(it)	.000	.000	-.020	-1.110	.267
	STD_CFO(it)	.000	.000	.088	3.906	.000
	STD_REV(it)	.000	.000	-.016	-.728	.466
	MtB(it)	.000	.000	.012	.671	.502
	Loss(it)	.011	.007	.023	1.645	.100
	EI_EXOPT(it)	.000	.000	.033	2.257	.024

a. Dependent Variable: Accrual_EM(it)

Regression model: Accrual based earnings management and share ownership 2004 - 2007

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EI_STOWN(it), Leverage(it), Bonus(it), STD_REV(it), Loss(it), Salary(it), MtB(it), Size(it), STD_CFO(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Accrual_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.216[a]	.047	.045	.03783

a. Predictors: (Constant), EI_STOWN(it), Leverage(it), Bonus(it), STD_REV(it), Loss(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.367	9	.041	28.492	.000[a]
	Residual	7.494	5237	.001		
	Total	7.861	5246			

a. Predictors: (Constant), EI_STOWN(it), Leverage(it), Bonus(it), STD_REV(it), Loss(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

b. Dependent Variable: Accrual_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.088	.003		28.953	.000
	Size(it)	-.006	.001	-.235	-11.300	.000
	Salary(it)	.000	.000	-.004	-.205	.837
	Bonus(it)	.000	.001	.002	.160	.873
	Leverage(it)	.000	.000	-.022	-1.185	.236
	STD_CFO(it)	.000	.000	.091	4.043	.000
	STD_REV(it)	.000	.000	-.013	-.602	.547
	MtB(it)	.000	.000	.014	.783	.434
	Loss(it)	.011	.007	.023	1.669	.095
	EI_STOWN(it)	.000	.000	.016	1.188	.235

a. Dependent Variable: Accrual_EM(it)

Regression model: Accrual based earnings management and total equity incentives 2009 – 2012

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	TOT_EI(it) , Bonus(it), Loss(it), Leverage(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Accrual_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.206[a]	.042	.040	.03653

a. Predictors: (Constant), TOT_EI(it) , Bonus(it), Loss(it), Leverage(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.257	9	.029	21.377	.000[a]
	Residual	5.807	4351	.001		
	Total	6.064	4360			

a. Predictors: (Constant), TOT_EI(it) , Bonus(it), Loss(it), Leverage(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

b. Dependent Variable: Accrual_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.077	.003		23.735	.000
	Size(it)	-.004	.001	-.176	-7.387	.000
	Salary(it)	.000	.000	-.055	-2.392	.017
	Bonus(it)	.002	.001	.026	1.740	.082
	Leverage(it)	.000	.000	-.013	-.624	.533
	STD_CFO(it)	.000	.000	.078	3.219	.001
	STD_REV(it)	.000	.000	.027	1.154	.248
	MtB(it)	.000	.000	.008	.356	.722
	Loss(it)	.015	.008	.027	1.843	.065
	TOT_EI(it)	.000	.000	.003	.199	.843

a. Dependent Variable: Accrual_EM(it)

Regression model: Accrual based earnings management and exercisable options 2009 - 2012

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EI_EXOPT(it), Leverage(it), Loss(it), Bonus(it), STD_CFO(it), Salary(it), MtB(it), Size(it), STD_REV(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Accrual_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.211[a]	.044	.042	.03649

a. Predictors: (Constant), EI_EXOPT(it), Leverage(it), Loss(it), Bonus(it), STD_CFO(it), Salary(it), MtB(it), Size(it), STD_REV(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.269	9	.030	22.421	.000[a]
	Residual	5.795	4351	.001		
	Total	6.064	4360			

a. Predictors: (Constant), EI_EXOPT(it), Leverage(it), Loss(it), Bonus(it), STD_CFO(it), Salary(it), MtB(it), Size(it), STD_REV(it)

b. Dependent Variable: Accrual_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.078	.003		25.385	.000
	Size(it)	-.004	.001	-.183	-7.724	.000
	Salary(it)	.000	.000	-.058	-2.535	.011
	Bonus(it)	.002	.001	.027	1.807	.071
	Leverage(it)	.000	.000	-.012	-.540	.590
	STD_CFO(it)	.000	.000	.079	3.263	.001
	STD_REV(it)	.000	.000	.025	1.050	.294
	MtB(it)	.000	.000	.006	.272	.785
	Loss(it)	.015	.008	.027	1.833	.067
	EI_EXOPT(it)	.000	.000	.046	3.006	.003

a. Dependent Variable: Accrual_EM(it)

Regression model: Accrual based earnings management and share ownership 2009 - 2012

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EI_STOWN(it), Leverage(it), Loss(it), Bonus(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Accrual_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.206[a]	.042	.041	.03653

a. Predictors: (Constant), EI_STOWN(it), Leverage(it), Loss(it), Bonus(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.258	9	.029	21.454	.000[a]
	Residual	5.806	4351	.001		
	Total	6.064	4360			

a. Predictors: (Constant), EI_STOWN(it), Leverage(it), Loss(it), Bonus(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

b. Dependent Variable: Accrual_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.078	.003		25.191	.000
	Size(it)	-.004	.001	-.178	-7.506	.000
	Salary(it)	.000	.000	-.054	-2.357	.018
	Bonus(it)	.002	.001	.026	1.719	.086
	Leverage(it)	.000	.000	-.013	-.625	.532
	STD_CFO(it)	.000	.000	.077	3.150	.002
	STD_REV(it)	.000	.000	.028	1.188	.235
	MtB(it)	.000	.000	.008	.359	.720
	Loss(it)	.015	.008	.027	1.839	.066
	EI_STOWN(it)	.000	.000	.013	.837	.402

a. Dependent Variable: Accrual_EM(it)

Regression model: Real activities manipulation and total equity incentives 2004 - 2012

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	TOT_EI(it) , Leverage(it), Crisis(it), Loss(it), STD_REV(it), Bonus(it), Salary(it), MtB(it), Size(it), STD_CFO(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Real_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.293[a]	.086	.085	.42129

a. Predictors: (Constant), TOT_EI(it) , Leverage(it), Crisis(it), Loss(it), STD_REV(it), Bonus(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	159.667	10	15.967	89.960	.000[a]
	Residual	1703.335	9597	.177		
	Total	1863.002	9607			

a. Predictors: (Constant), TOT_EI(it) , Leverage(it), Crisis(it), Loss(it), STD_REV(it), Bonus(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

b. Dependent Variable: Real_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.033	.026		40.213	.000
	Crisis(it)	-.027	.009	-.031	-2.968	.003
	Size(it)	-.092	.004	-.331	-21.628	.000
	Salary(it)	.000	.000	.119	7.917	.000
	Bonus(it)	-.013	.009	-.014	-1.406	.160
	Leverage(it)	-.001	.000	-.036	-2.865	.004
	STD_CFO(it)	.000	.000	-.010	-.613	.540
	STD_REV(it)	.000	.000	.133	8.536	.000
	MtB(it)	.001	.000	.062	4.987	.000
	Loss(it)	.723	.057	.125	12.690	.000
	TOT_EI(it)	.000	.000	-.014	-1.418	.156

a. Dependent Variable: Real_EM(it)

Regression model: Real activities manipulation and exercisable options 2004 - 2012

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EI_EXOPT(it), Leverage(it), Bonus(it), Loss(it), STD_CFO(it), Crisis(it), Salary(it), MtB(it), Size(it), STD_REV(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Real_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.296[a]	.087	.086	.42089

a. Predictors: (Constant), EI_EXOPT(it), Leverage(it), Bonus(it), Loss(it), STD_CFO(it), Crisis(it), Salary(it), MtB(it), Size(it), STD_REV(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	162.918	10	16.292	91.967	.000[a]
	Residual	1700.084	9597	.177		
	Total	1863.002	9607			

a. Predictors: (Constant), EI_EXOPT(it), Leverage(it), Bonus(it), Loss(it), STD_CFO(it), Crisis(it), Salary(it), MtB(it), Size(it), STD_REV(it)

b. Dependent Variable: Real_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.036	.025		41.651	.000
	Crisis(it)	-.022	.009	-.025	-2.378	.017
	Size(it)	-.094	.004	-.337	-22.055	.000
	Salary(it)	.000	.000	.110	7.399	.000
	Bonus(it)	-.014	.009	-.016	-1.542	.123
	Leverage(it)	-.001	.000	-.035	-2.772	.006
	STD_CFO(it)	.000	.000	-.009	-.587	.557
	STD_REV(it)	.000	.000	.131	8.352	.000
	MtB(it)	.001	.000	.060	4.827	.000
	Loss(it)	.725	.057	.125	12.735	.000
	EI_EXOPT(it)	.000	.000	.047	4.513	.000

a. Dependent Variable: Real_EM(it)

Regression model: Real activities manipulation and share ownership 2004 - 2012

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EI_STOWN(it), Leverage(it), Crisis(it), Loss(it), STD_REV(it), Bonus(it), Salary(it), MtB(it), Size(it), STD_CFO(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Real_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.293[a]	.086	.085	.42132

a. Predictors: (Constant), EI_STOWN(it), Leverage(it), Crisis(it), Loss(it), STD_REV(it), Bonus(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	159.439	10	15.944	89.820	.000[a]
	Residual	1703.564	9597	.178		
	Total	1863.002	9607			

a. Predictors: (Constant), EI_STOWN(it), Leverage(it), Crisis(it), Loss(it), STD_REV(it), Bonus(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

b. Dependent Variable: Real_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.024	.025		41.364	.000
	Crisis(it)	-.027	.009	-.030	-2.932	.003
	Size(it)	-.092	.004	-.329	-21.651	.000
	Salary(it)	.000	.000	.116	7.789	.000
	Bonus(it)	-.014	.009	-.016	-1.563	.118
	Leverage(it)	-.001	.000	-.036	-2.866	.004
	STD_CFO(it)	.000	.000	-.010	-.603	.547
	STD_REV(it)	.000	.000	.134	8.559	.000
	MtB(it)	.001	.000	.062	4.968	.000
	Loss(it)	.726	.057	.126	12.746	.000
	EI_STOWN(it)	.000	.000	.008	.851	.395

a. Dependent Variable: Real_EM(it)

Regression model: Real activities manipulation and total equity incentives 2004 - 2007

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	TOT_EI(it) , Size(it), MtB(it), Loss(it), Bonus(it), STD_REV(it), Leverage(it), Salary(it), STD_CFO(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Real_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.325[a]	.105	.104	.44111

a. Predictors: (Constant), TOT_EI(it) , Size(it), MtB(it), Loss(it), Bonus(it), STD_REV(it), Leverage(it), Salary(it), STD_CFO(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	120.129	9	13.348	68.597	.000[a]
	Residual	1019.017	5237	.195		
	Total	1139.146	5246			

a. Predictors: (Constant), TOT_EI(it) , Size(it), MtB(it), Loss(it), Bonus(it), STD_REV(it), Leverage(it), Salary(it), STD_CFO(it)

b. Dependent Variable: Real_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.099	.036		30.264	.000
	Size(it)	-.100	.006	-.332	-16.409	.000
	Salary(it)	.000	.000	.082	4.075	.000
	Bonus(it)	-.017	.014	-.018	-1.266	.205
	Leverage(it)	-.001	.000	-.057	-3.216	.001
	STD_CFO(it)	.000	.000	.034	1.567	.117
	STD_REV(it)	.000	.000	.111	5.318	.000
	MtB(it)	.002	.000	.101	5.658	.000
	Loss(it)	.901	.076	.157	11.838	.000
	TOT_EI(it)	.000	.000	-.012	-.884	.377

a. Dependent Variable: Real_EM(it)

Regression model: Real activities manipulation and exercisable options 2004 - 2007

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EI_EXOPT(it), Leverage(it), Bonus(it), Loss(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Real_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.329[a]	.108	.106	.44049

a. Predictors: (Constant), EI_EXOPT(it), Leverage(it), Bonus(it), Loss(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	122.987	9	13.665	70.427	.000[a]
	Residual	1016.159	5237	.194		
	Total	1139.146	5246			

a. Predictors: (Constant), EI_EXOPT(it), Leverage(it), Bonus(it), Loss(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

b. Dependent Variable: Real_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.112	.036		31.103	.000
	Size(it)	-.102	.006	-.342	-16.838	.000
	Salary(it)	.000	.000	.072	3.655	.000
	Bonus(it)	-.019	.013	-.020	-1.437	.151
	Leverage(it)	-.001	.000	-.055	-3.080	.002
	STD_CFO(it)	.000	.000	.029	1.318	.188
	STD_REV(it)	.000	.000	.107	5.148	.000
	MtB(it)	.002	.000	.097	5.435	.000
	Loss(it)	.900	.076	.157	11.850	.000
	EI_EXOPT(it)	.000	.000	.056	3.939	.000

a. Dependent Variable: Real_EM(it)

Regression model: Real activities manipulation and share ownership 2004 - 2007

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EI_STOWN(it), Leverage(it), Bonus(it), STD_REV(it), Loss(it), Salary(it), MtB(it), Size(it), STD_CFO(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Real_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.325[a]	.105	.104	.44111

a. Predictors: (Constant), EI_STOWN(it), Leverage(it), Bonus(it), STD_REV(it), Loss(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	120.147	9	13.350	68.608	.000[a]
	Residual	1018.999	5237	.195		
	Total	1139.146	5246			

a. Predictors: (Constant), EI_STOWN(it), Leverage(it), Bonus(it), STD_REV(it), Loss(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

b. Dependent Variable: Real_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.093	.035		30.826	.000
	Size(it)	-.099	.006	-.331	-16.439	.000
	Salary(it)	.000	.000	.078	3.950	.000
	Bonus(it)	-.019	.013	-.019	-1.416	.157
	Leverage(it)	-.001	.000	-.057	-3.213	.001
	STD_CFO(it)	.000	.000	.035	1.597	.110
	STD_REV(it)	.000	.000	.111	5.330	.000
	MtB(it)	.002	.000	.100	5.635	.000
	Loss(it)	.903	.076	.158	11.882	.000
	EI_STOWN(it)	.000	.000	.012	.934	.351

a. Dependent Variable: Real_EM(it)

Regression model: Real activities manipulation and total equity incentives 2009 - 2012

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	TOT_EI(it) , Bonus(it), Loss(it), Leverage(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Real_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.265[a]	.070	.068	.39246

a. Predictors: (Constant), TOT_EI(it) , Bonus(it), Loss(it), Leverage(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	50.473	9	5.608	36.412	.000[a]
	Residual	670.148	4351	.154		
	Total	720.621	4360			

a. Predictors: (Constant), TOT_EI(it) , Bonus(it), Loss(it), Leverage(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

b. Dependent Variable: Real_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.926	.035		26.468	.000
	Size(it)	-.091	.006	-.354	-15.075	.000
	Salary(it)	.000	.000	.181	8.030	.000
	Bonus(it)	.005	.012	.006	.418	.676
	Leverage(it)	-.001	.001	-.054	-2.527	.012
	STD_CFO(it)	.000	.000	-.042	-1.736	.083
	STD_REV(it)	.000	.000	.159	6.754	.000
	MtB(it)	.001	.000	.059	2.801	.005
	Loss(it)	.435	.086	.074	5.054	.000
	TOT_EI(it)	.000	.000	.001	.048	.962

a. Dependent Variable: Real_EM(it)

Regression model: Real activities manipulation and exercisable options 2009 - 2012

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EI_EXOPT(it), Leverage(it), Loss(it), Bonus(it), STD_CFO(it), Salary(it), MtB(it), Size(it), STD_REV(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Real_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.266[a]	.071	.069	.39228

a. Predictors: (Constant), EI_EXOPT(it), Leverage(it), Loss(it), Bonus(it), STD_CFO(it), Salary(it), MtB(it), Size(it), STD_REV(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	51.086	9	5.676	36.887	.000[a]
	Residual	669.535	4351	.154		
	Total	720.621	4360			

a. Predictors: (Constant), EI_EXOPT(it), Leverage(it), Loss(it), Bonus(it), STD_CFO(it), Salary(it), MtB(it), Size(it), STD_REV(it)

b. Dependent Variable: Real_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.933	.033		28.099	.000
	Size(it)	-.092	.006	-.359	-15.319	.000
	Salary(it)	.000	.000	.179	7.939	.000
	Bonus(it)	.006	.012	.007	.462	.644
	Leverage(it)	-.001	.001	-.052	-2.470	.014
	STD_CFO(it)	.000	.000	-.041	-1.708	.088
	STD_REV(it)	.000	.000	.157	6.683	.000
	MtB(it)	.001	.000	.058	2.744	.006
	Loss(it)	.435	.086	.074	5.051	.000
	EI_EXOPT(it)	.000	.000	.030	1.996	.046

a. Dependent Variable: Real_EM(it)

Regression model: Real activities manipulation and share ownership 2009 - 2012

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	EI_STOWN(it), Leverage(it), Loss(it), Bonus(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Real_EM(it)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.265[a]	.070	.068	.39245

a. Predictors: (Constant), EI_STOWN(it), Leverage(it), Loss(it), Bonus(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	50.482	9	5.609	36.418	.000[a]
	Residual	670.139	4351	.154		
	Total	720.621	4360			

a. Predictors: (Constant), EI_STOWN(it), Leverage(it), Loss(it), Bonus(it), STD_REV(it), Salary(it), MtB(it), Size(it), STD_CFO(it)

b. Dependent Variable: Real_EM(it)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.927	.033		27.986	.000
	Size(it)	-.091	.006	-.354	-15.170	.000
	Salary(it)	.000	.000	.182	8.048	.000
	Bonus(it)	.005	.012	.006	.412	.680
	Leverage(it)	-.001	.001	-.054	-2.528	.012
	STD_CFO(it)	.000	.000	-.042	-1.749	.080
	STD_REV(it)	.000	.000	.159	6.758	.000
	MtB(it)	.001	.000	.059	2.802	.005
	Loss(it)	.435	.086	.074	5.054	.000
	EI_STOWN(it)	.000	.000	.003	.236	.814

a. Dependent Variable: Real_EM(it)