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Preface

I have written my master thesis within the organization KPMG Accountants N.V. in Eindhoven to obtain working experience within the field of accounting. Writing my thesis via an internship has resulted in self-development. Not only I improved my academic skills, I also learned to plan better and to be more confident about the choices I make. Therefore, I want to thank my supervisor from KPMG, Constanze van Breemen-Koreman, who helped me realize the aforementioned items. Furthermore, I thank her for her critical assessment and for her help to stay on the right track.

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Carmen Joosten

Summary

This study, in line with Zang (2012), examines the extent to which the relative costs of real earnings management and accrual-based earnings management affect the trade-off between both strategies to manage earnings. In contrast to Zang (2012), this study focuses on European listed firms. Consequently, investor protection is added as substitute for Sox. Furthermore, since Zang's (2012) proxy for financial distress, the Z-score, is intertwined with earnings management, this study rather uses cash flow-to-total debts to proxy for financial distress. The results show that European listed firms use real earnings management and accrual-based earnings management as substitutes to manage earnings downwards. Furthermore, it is evident, in line with Zang (2012), that the substitutive trade-off is a function of the relative costs if firms face constraints that are associated with real earnings management. Firms which experience financial distress and higher industry competition have higher levels of accrual manipulation as both constrain real activities manipulation. Higher tax rates, however, do not constrain the use of real earnings management, but rather increase its use. However, in contrast to Zang (2012), it is less evident that the substitutive trade-off is a function of the relative costs if firms face constraints that are associated with accrual manipulation. Whereas mixed evidence is acquired that investor protection increases real earnings management, accounting flexibility decreases real earnings management. Regarding downwards earnings management, this study reveals that accrual manipulation substitutes real earnings management if firms face financial distress and industry competition.

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1 Introduction

The accounting scandals of recent years, such as Worldcom and Enron, increased regulators' scrutiny considerable by, for example, implementing Sarbanes-Oxley Act (Sox) in 2002. The act was implemented to increase internal control and to increase the transparency of the financial statements so that accounting scandals do not occur in the future anymore. The objective of Sox was successful as it has been revealed that after the passage of Sox accrual-based earnings management (AEM) declined substantially (Cohen et al. 2008). However, the increased regulators' scrutiny had negative consequences as well as firms continued to manage earnings via real manipulation activities, such as reductions and postponements of investments (e.g., Roychowdhury 2006). This phenomenon is defined as real earnings management (REM). Recently, it has been revealed that the two manipulation strategies substitute each other (Zang 2012). If the costs of applying REM are higher than the costs of applying AEM, AEM is applied to a higher extent and vice versa. The costs that are identified to constrain REM are industry competition, the marginal tax rate, institutional ownership and financial distress. The costs that limit the use of AEM are accounting flexibility, auditors' scrutiny and regulators' scrutiny.

To understand whether more firms, besides US firms, trade off REM and AEM as substitutes on the basis of their relative costs, this study focuses on European listed firms. As a result, Zang's (2012) proxy for regulators' scrutiny, Sox, is substituted by investor protection. Furthermore, Zang's (2012) proxy for financial distress, the Z-score, is replaced as well since the Z-score consists of ratios that are either intertwined with REM or AEM. To avoid bias, this study uses the ratio cash flow-to-total debts to proxy for financial distress.

To get a comprehensive understanding how these two different proxies alter the results presented by Zang (2012), the hypotheses developed by Zang (2012) are reexamined in this study. Therefore, the research question of this study is similar to Zang's (2012) research question and investigates the extent to which the relative costs of REM and AEM affect the trade-off between both manipulation strategies.

The research question is examined by, first, estimating normal levels of research and development expenditures (R&D), selling, general and administrative expenditures (SG&A) and production costs. Deviations from these estimations are classified as real earnings management practices. Furthermore, the abnormal level of accruals is calculated by applying the Defond and

Park model (2001). After having determined the earnings management levels, descriptive statistics and correlation matrices provide evidence that firms use REM and AEM as substitutes to manage earnings downwards. As the real activities executed during the fiscal-year appear at year-end to reduce earnings to a higher extent than predicted, upward AEM is used to increase the earnings to the desired earnings level. Thereby, affirming that firms trade off REM and AEM in order to manage earnings downwards.

Furthermore, regressions on REM and AEM reveal that the substitutive relation is determined by the relative costs of the two manipulation strategies. In particular, this holds for the costs associated with REM. Higher levels of industry competition and financial distress result in higher levels of AEM as both constraints increase the costs of applying REM. In contrast, the regression results demonstrate that firms which face higher tax rates use more REM to manage earnings downwards. Therefore, in contrast to upwards earnings management, higher tax rates are not a constraint of REM. The regressions on REM and AEM, however, provide limited evidence that the substitutive trade-off is a function of the relative costs if firms face constraints that are associated with accrual- based earnings management. Whereas investor protection demonstrates contradictory evidence that it increases REM, accounting flexibility demonstrates that it decreases REM. Therefore, this study only agrees with Zang (2012) that industry competition and financial distress, as costs of REM, result in higher levels of AEM. It should, however, be noted that the evidence presented in this study is based on a small sample size, in comparison to Zang's (2012) sample. Therefore, the evidence should be interpreted with caution.

Nevertheless, this evidence could still be relevant from an academic perspective as it contributes to the existing literature about earnings management. The substitutive relation that is presented in this study reveals that both earnings management strategies should be incorporated when examining a firm's manipulation. Focusing solely on AEM does not explain the complete effect of the earnings management activities since European listed firms trade off both manipulation strategies to manage earnings. Moreover, this study contributes to Zang (2012) as it shows that the substitutive trade-off is not solely prevalent in the case of upward earnings management, but also in the case of downward earning management. This study contributes additionally to Zang (2012) as this study reinforces Zang's (2012) conclusion that firms which face financial distress have higher levels of AEM. The reason for this is that this study uses a

firm sample that differs to a higher extent in the level of financial distress than Zang's (2012) firm sample.

From societal perspective this study is relevant as it has implications for investors. Investors should be aware that firms which face financial distress and industry competition substitute AEM for REM to meet short-term targets. Therefore, investors are recommended to be more skeptical and are advised to analyze the financial statements thoroughly before investing in a firm that faces high industry competition or financial distress. Furthermore, this study is relevant to auditors. Auditors should be skeptical when auditing a firm that faces high industry competition or financial distress as it is likely that the firm applies AEM. Moreover, regulators should increase the regulations in order to avoid that these firms can apply AEM.

2 Literature and hypotheses

2.1 Earnings management

The main objective of firms is to maximize shareholders' value by exploiting the assets that were acquired by equity capital and debt. To raise capital, shareholders should be incentivized to invest, which only occurs if they expect positive future firm performance. It is therefore in the firm's interest to report positive earnings, positive earnings growth and to meet analysts' forecasts in order to acquire capital (Degeorge et al. 1999). However, it is unlikely that firms are able to meet these expectations all the time, though they are unwilling to suffer stock price decreases. As a result, firms might manage earnings in order to meet shareholders' expectations and to hold equity.

Since earnings are composed of cash flow from operations and accruals, firms have two options to manage earnings. First, firms can manage earnings through deviation from the normal business operations, so that the cash flow from operations will be affected. Deviating from normal business practices to manipulate reported income is defined as real earnings management (REM) (Rowchowdhury 2006). Second, a firm can alter the level of accruals to obtain the desired level of earnings. Managers use judgments in financial reporting which can be defined as accrual-based earnings management (AEM) (Healy and Wahlen 1998).

As both manipulation strategies affect the level of earnings in different ways, earnings management via real activities manipulation and via accruals manipulation are explained in next sections.

2.2 Real earnings management

To obtain the desired earnings level, firms could choose to manage earnings through deviating from the normal business activities although this may affect the future economic performance of the firm negatively (Rowchowdhury 2006).

Previous studies (e.g., Bange and De Bondt 1998, Rowchowdhury 2006, Pincus and Rajgopal 2002) have identified several methods to manage earnings through deviations from

normal business activities. These methods can either be divided into deviations from operating and investing activities, and deviations from financing activities (Xu et al. 2007).

Firms could deviate from operating and investing activities by, for example, altering the level of discretionary expenditures, such as research and development expenditures (R&D) and selling, general and administrative expenditures (SG&A). Under IFRS research and advertising costs are expensed in the period in which they are incurred. Therefore, by reducing these costs reported income is immediately affected. Developments costs are, in first instance, expensed rather than capitalized due to uncertainty issues regarding the developing product or service (IASB 1998, IAS No. 38, para. 57). Therefore, postponing development projects can increase earnings as well. Furthermore, operating and investing activities can be deviated from if firms overproduce, provide price reductions to boost sales volume and build up inventory to lower the cost of goods sold which influence earnings (Rowchowdhury 2006). If firms overproduce, costs of goods sold per product decrease since the fixed overhead costs will then be spread over a larger number of products. Moreover, firms can also sell fixed assets to manage earnings if the assets are sold with a gain. The last option that researchers identify to alter the operating and investing activities is by restructuring them. For example, firms might enter in business acquisitions or engage either in operational or capital leases with the main objective to increase reported income (Xu et al. 2007, Dye 2002).

Firms might also choose to manipulate earnings by deviating from financial activities. Stock options are granted if actual earnings are just below the earnings target as compensation through stock options does not involve cash (Matsunaga 1995). Granting these options results in a decrease of earnings per share (EPS). To avoid this decrease or dilution of EPS, stocks are repurchased which then leads to increase in EPS (Hribar et al. 2006, Bens et al. 2003). Firms also acquire financial instruments to hedge themselves from earnings decreases. Debt-to-equity swaps are used as well so that the swap gain increases reported income (Hand 1989).

Several possibilities exist to alter the level of earnings through influencing the cash flow from operations. Moreover, earnings can be manipulated as well by changing the level of accruals. The following paragraph explains how earnings can be manipulated by accruals.

2.3 Accrual-based earnings management

The primary objective of accruals is to demonstrate the true performance of the firm by recording revenues and expenses to the period in which they are incurred, rather than presenting the cash in- and outflows. For example, deferred revenue is an accrual which is reported when the cash flow from a sale is received before the recording of the sale (FASB 1985, SFAC No. 6, para. 139 and FASB 1985, SFAC No. 6, para. 145).

Although accruals have the objective to reflect the true performance of a firm, they can also be used to manage earnings. Reported income can be manipulated when managers have to book accruals for events that require discretion in accounting standards. Examples of these events are losses from bad debts, asset impairments and the salvage value of long-term assets. If these estimates are biased in order to affect the underlying true economic performance, AEM has been applied (Healy and Wahlen 1998).

Therefore, two options exist to manage earnings, REM and AEM. The preference of firms to apply one particular earnings management strategy more in comparison to the other is determined by the relative cost of these strategies according to Zang (2012). It implies that REM is applied relatively more in comparison to AEM if the costs of using AEM are higher compared to the costs of REM and vice versa. The costs of engaging in earnings management depends on the constraints that are imposed on applying REM and AEM (Zang 2012). In order to better understand how the constraints affect the relative use of REM and AEM, the constraints on both manners to manipulate earnings will be discussed more thoroughly in following sections.

2.4 Constraints on real earnings management

If the costs of REM are lower compared to the costs of AEM, REM is relatively applied more than AEM and vice versa (Zang 2012). Zang (2012) argues that the costs of applying real earnings management equal the economic consequences of deviating from optimal business activities as firm value could be affected.

However, these economic consequences differ across firms due to their operating environment. For example, it is more costly to depart from normal business practices for firms that face competitive pressure within the industry as it would reduce their competitive advantage relative to their industry peers which face less competition (Zang 2012). Therefore, the level of competition within an industry constrains the use of REM. Furthermore, Rowchowdhury (2006) demonstrates that higher levels of institutional ownership reduce the application of REM due to the higher degree of monitoring. Moreover, increases in book income through the application of REM rather than the application of AEM result in higher levels of taxable income. Therefore, higher marginal tax rates would constrain firms to use REM in order to increase earnings (Zang 2012). Last, Zang (2012) argues that firms in financial distress would perceive applying REM as a costly device to manipulate earnings as their main objective is to enhance the normal operating activities (Zang 2012). Due to the high costs related to REM, Zang (2012) suggests that firms in financial distress reduce their manipulation via real activities.

Gunny (2010) acknowledges that manipulation through real activities is costly due to the economic consequences, but argues furthermore that the benefits of applying REM outperform the costs if earnings targets are met. Meeting targets signals positive future performance (Gunny 2010) as it has been revealed that not meeting targets would result in stock decreases or stock price decreases (e.g., Skinner and Sloan 2002). This positive signal appears to be important to managers as Graham et al. (2005) demonstrate that managers are willing to apply REM to meet short-term earnings targets, although this is unfavorable in the long-run. This can also be observed in practice as evidence exists that firms which face cash flow constraints reduce capital expenditures as well as R&D expenditures (Fazarri et al. 2000, Himmelberg and Petersen 1994). As Beaver (1966) argues that financially distressed firms have less cash flow relative to financial healthy firms, it could be suggested that financial distress is positively related to earnings manipulating activities such as R&D expenditures. Beaver (1966), furthermore, reveals

that financial distress is predicted accurately by the ratio cash flow-to-total debts which is, therefore, the proxy for financial distress in this study. Financial distress might be positively related to determinants of REM.

However, the positive correlation between financial distress and reductions in investments could also be caused by the preference of managers for internal funds over external finance with respect to new investments (Pinegar and Wilbricht 1989). Therefore, the relation between financial distress and REM is ambiguous.

As prior research (e.g. Zang 2012, Rowchowdhury 2006, Himmelberg and Petersen 1994) does not agree on the relation between financial distress and REM, and it is difficult to know the real motive why financially distressed firms perform these activities, it is relevant to examine this relation more thoroughly. To obtain an in-depth understanding, the constraints on AEM and its effect on the use of AEM are presented in the next section.

2.5 Constraints on accrual-based earnings management

AEM is defined as the use of managers' discretion in financial reporting to manipulate earnings (Healy and Wahlen 1998). However, this discretion can be constrained by several aspects. First, the use of AEM is restricted by auditors' scrutiny. The reason for this is that larger audit firms, such as the Big Four, have more experience, face more reputational risk and invest more in audit resources to detect AEM in comparison with smaller audit firms (Becker et al. 1998). Second, the application of AEM is constrained by a firm's accounting flexibility. Barton and Simko (2002) reveal that a firm's ability to manipulate earnings through accruals is constrained by the extent to which accruals have been applied in previous periods as they should be reversed in other periods. Lagged net operating assets (NOA_{t-1}) proxies for the extent of AEM in previous periods. Higher values of NOA_{t-1}, therefore, indicate less accounting flexibility. A firm's operating cycle affects the accounting flexibility of a firm as well. Accrual reversals can be deferred to a larger extent if the operating cycle is longer (Zang 2012).

Moreover, the possibility to use discretion in financial reporting is reduced by regulator's scrutiny as it has been revealed that the level of AEM applied decreased with the adoption of Sox

(Cohen et al. 2008). As Sox is a manner to protect outside investors, it can be argued that investor protection in general restricts firms' ability to apply AEM. The negatively correlation between investor protection and AEM is confirmed by Leuz et al. (2003). The reason they provide is that if investors are protected more, it is more difficult for insiders to acquire private control benefits which eliminates the incentives to conceal the true economic performance (Leuz et al. 2003). The application of AEM is restricted by auditors' scrutiny, accounting flexibility and investor protection.

As the constraints on REM and AEM are discussed, it can be examined in the next section how these constraints influence European listed firms to trade off REM and AEM.

2.6 Hypothesis development

Zang (2012) suggests that one earnings management strategy is preferred to the other strategy if the other strategy's costs are relatively higher due to more constraints. Therefore, it can be stated that REM is applied relatively more than AEM if AEM is constrained more than REM and vice versa. This results in the first hypothesis, which is in consistence with Zang (2012).

Hypothesis 1: Ceteris paribus, the relative use of accrual-based earnings management vis-à-vis real earnings management depends on the relative cost.

Accounting flexibility could constrain AEM. If a firm has already booked accruals in previous years to disguise true performance, it is more likely that the firm uses REM currently as the firm would increase its probability of being detected when AEM is used.

Hypothesis 2: Ceteris paribus, firms with lower levels of accounting flexibility have higher levels of real earnings management.

Tax incentives could constrain the application of REM as well. Increasing the book income via real activities manipulation increases taxable income inevitably, this as opposed to AEM. Therefore, for firms that face higher marginal tax rates, it is more costly to apply REM than AEM as REM increases taxable income (Zang 2012).

Hypothesis 3: Ceteris paribus, firms that face higher marginal tax rates have higher levels of accrual-based earnings management.

The application of REM requires firms to deviate from normal business practices. Therefore, it is a costly device as it could negatively affect firm value in the long run. This holds, especially for firms that face competitive pressure from peers within their industry. The reason for this is that followers in comparison with market leaders have less competitive advantages, such as economies of scales and bargaining power of suppliers (Zang 2012).

Hypothesis 4: Ceteris paribus, firms which face higher levels of industry competition have higher levels of accrual-based management.

Furthermore, this study agrees with Zang (2012) that regulators' scrutiny results in the application of REM. However, as this study focuses on the relative engagement of REM and AEM of European listed firms, Sox as a constraint of AEM cannot be used. Therefore, investor protection is used in this study as a proxy for regulators' scrutiny. It is expected that if investors are protected more, managers would engage in REM to conceal the acquired private control benefits as this is not possible via the manipulation of accruals.

Hypothesis 5: Ceteris paribus, firms which face higher degrees of investor protection have higher levels of real earnings management.

According to Zang (2012) firms which face financial distress apply AEM more because deviation from optimal business operations has unfavorable economic consequences (Zang 2012). Although Zang (2012) concludes this, she does not make a clear distinction between good- and bad financial health as her measure of financial health, the Z-score, always exceeds the threshold of financial distress.

Furthermore, the Z-score (Altman 1968) cannot be used to examine the relation between financial health and earnings management, although it is in itself an appropriate proxy for a firm's financial position. The reason for this is that the ratios considered to determine the Z-score are intertwined with earnings management. These ratios are: retained earnings scaled by total assets, earnings before interest and tax, scaled by total assets, sales scaled by total assets, working capital scaled by total assets and market value of equity-to-book value of total liabilities

(Altman 1968). As sales as well as earnings can be manipulated either by REM or by AEM, the relation between earnings management and financial health as defined by the Z-score could not be examined accurately. Moreover, AEM is measured by abnormal working capital accruals which are part of working capital. As both the Z-score and AEM are (partially) based on the level of working capital, the effect of financial distress on the relative use of REM and AEM cannot be investigated appropriately.

Due to the cohesion between the ratios included in the Z-score and earnings management, a different proxy for financial health should be applied. Therefore, this study uses cash flow- to-total debts as Beaver (1966) argues that this ratio predicts a firm's financial position best in comparison with other ratios. This study, therefore, hypothesize that financially distressed firms, which have lower cash flow-to-total debts, have higher levels of AEM.

Hypothesis 6: Ceteris paribus, firms which face financial distress have higher levels of accrual-based earnings management.

It is observable from the aforementioned hypotheses that the hypotheses are equal to Zang' s (2012) hypotheses. However, the hypotheses with respect to regulators' scrutiny and differ financial distress from Zang' s (2012) hypotheses as the proxies used for these variables by Zang (2012), are substituted by other proxies, investor protection and cash flow-to-total debts, which are expected to be more suitable. Furthermore, no hypotheses are developed for the effects of auditors' scrutiny and institutional ownership due to data constraints.

As the hypotheses are discussed, the research method and the sample selection are both addressed in chapter three before testing the hypotheses. Furthermore, the measures used to test these hypotheses are also presented in chapter three. Chapter four provides the empirical results. The conclusions and limitations are presented in chapter five.

3 Research method

This chapter addresses how the relation between the costs and the relative use of REM and AEM is examined. Section 3.1 describes the data and the sample selection procedure. Sections 3.2 and 3.3 present the models that are used to test the hypotheses. Moreover, sections 3.4 and 3.5 address the test – and control variables that are included in the models.

3.1 Data collection and sample selection

For the collection of the data, this study uses the databases Compustat Global and Orbis, which both provide comprehensive information about companies worldwide. This study, however, concentrates on publicly listed firms within thirteen European countries following the research setting of Burgstahler et al. (2006). These thirteen European countries are: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, The Netherlands, Portugal, Spain, Sweden and The United Kingdom.

Data for the year 2008 is collected for the publicly listed firms in these countries. 2008 is selected as it is a year of financial crisis. Therefore, it is more likely that the level of financial distress varies substantially among firms. As a result of this variation, this study can examine the effect of financial distress on the relative use of REM and AEM more thoroughly than Zang (2012) since Zang (2012) only includes firms that are, on average, financial healthy. The data collection for the publicly listed firms in 2008 results in 9099 firm observations. Since the models explained in section 3.2 and 3.3 require prior year information, data on the years 2006 and 2007 is collected.

Consistent with prior research (Burgstahler and Dichev 1997, Zang 2012), banks and financial institutions (SIC codes 6000-6999), public administrative institutions (SIC codes > 9000) and firms in regulated industries (SIC codes 4400-4999) are eliminated from the sample. Excluding these firms, reduces the sample to 3917 firms. Missing values further reduce the dataset, which results in a final sample of 869 firms.

To understand whether European listed firms trade off REM and AEM to manage earnings, firms should first be selected as being suspects of having managed their earnings.

According to Zang (2012), firms are suspected of having managed their earnings if current earnings meet or beat last year's earnings, analysts' forecasts or management's forecasts. A firm is, furthermore, suspected of having managed earnings if current earnings equal zero (Zang 2012). These criteria are not suitable for this study as it is likely that firms in financial distress are not able to meet or beat zero earnings. Moreover, analysts' and management forecasts are not the focus of this study. Firms rather attempt to meet or beat prior year's earnings, even if they are negative, as firms are rewarded if an earnings growth pattern is reported (Barth et al. 1999). Therefore, firms are selected as earnings management suspects if they report earnings increases between zero and ten per cent. This demarcation is chosen as psychology reveals that meeting or beating targets is solely crucial if the target is not beaten by more than ten per cent (Degeorge et al. 1999). From the 869 firms included in the total sample, only 204 firms have earnings increases of less than 10 per cent, and are therefore suspected of having managed their earnings. However, missing values reduce the suspect sample even further which is mainly due to the control variable EARN. As a result, the suspect sample contains approximately 20 firms.

3.2 Real Earnings Management model

If firms are willing to manage their earnings through real activities, the level of activities executed is adjusted during the fiscal year. However, the extent to which the activities manipulate the earnings is only visible at year-end. Therefore, when firms set the level of real activities in order to manage earnings, it is solely a prediction. The predicted level of REM is as follows:

$$\begin{aligned}\mathrm{PREDRM_{j,s,t}} = {} & \alpha_0 + \alpha_1 CD + \alpha_2 ENG_s + \alpha_3 GER_s + \alpha_4 SCA_s + \alpha_5 FR_s \\ & + +\alpha_6 ENF_s + \alpha_7 MKT_{j,s} + \alpha_8 TAX_{j,s} + \alpha_9 CYCLE_{j,s} + \alpha_{10} NOA7_{j,s} \\ & + \alpha_{11} LOGTA8_{j,s} + \alpha_{12} MTB8_{j,s} + \alpha_{13} EARN_{j,s} + u_{j,s}\end{aligned} \quad (1)$$

Where:

$PREDRM_{j,s,t}$ = the total level of real activities manipulation $firm_j$ in $country_s$ predicts to apply during the fiscal year 2008. $PredRM_{j,s,t}$ comprises REM through reducing R&D expenditures, reducing SG&A expenditures and increasing production

CD =cash flow-to-total debts which proxies for financial distress

ENG_s= dummy variable equals 1 if $country_s$ is of English legal origin, 0 otherwise

GER_s= dummy variable equals 1 if $country_s$ is of German legal origin, 0 otherwise

SCA_s= dummy variable equals 1 if $country_s$ is of Scandinavian legal origin, 0 otherwise

FR_s= dummy variable equals 1 if $country_s$ is of French legal origin, 0 otherwise

ENF_s= the level of enforcement in $country_s$

$MKT_{j,s}$=market share of $firm_j$ in $country_s$ in year 2007, which proxies for the level of industry competition

$TAX_{j,s}$=effective tax rate of $firm_j$ in $country_s$ in year 2008, which proxies for the marginal tax rate

$CYCLE_{j,s}$=operating cycle of $firm_j$ in $country_s$ in year 2008

$NOA7_{j,s}$=net operating assets of $firm_j$ in $country_s$ in year 2007

$LOGTA8_{j,s}$=logarithm of total assets of $firm_j$ in $country_s$ in year 2007

$MTB8_{j,s}$= market-to-book ratio of $firm_j$ in $country_s$ in year 2008

$EARN_{j,s}$= earnings before extraordinary items of $firm_j$ in $country_s$ in year 2008 minus working capital accruals and production costs plus R&D expenditures and SG&A expenditures

The dependent variable, PREDRM, concentrates on three real activities to manipulate earnings: R&D expenditures, SG&A expenditures and the aggregate of overproduction, price reductions and inventory on REM. This study focuses on discretionary expenditures, such as R&D expenditures and SG&A expenditures, because they are the primary aspects to manage earnings. Graham et al. (2005) reveal that 80 per cent of the managers are willing to reduce

discretionary expenditures in order to meet short-term earnings targets. Another activity that is addressed is the aggregate effect of overproduction, price reductions and inventory on REM. These three activities are considered simultaneously because price reductions to boost sales result in overproduction and in inventory build-up.

Although the existence of these activities could imply earnings management, this is not always the case. These activities, however, can also be used to support sales or to continue businesses. Therefore, it is necessary to define the extent to which it can be argued that these activities are used to continue businesses or to manipulate earnings. A firm manipulates earnings via REM if the realized levels of the activities deviate from the expected levels, the levels needed to support sales. The deviation is referred to as abnormal levels. To be able to conclude that a firm engages in REM, normal or expected levels of the activities should be determined.

To measure the normal level of R&D, the model of Gunny (2005) is followed rather than the model of Perry and Grinaker (1994) as Gunny (2005) recognizes in her model that REM is used more if firms are constrained to use AEM. This constraint depends on the level of equity that was already overstated on the balance sheet. To incorporate this constraint into the model, the logarithm of the market value of equity is added to the model. Furthermore, Gunny (2005) considers the trade-off of an investment, by incorporating Tobin's Q. The trade-off between marginal benefits and marginal costs is not reflected by the model of Perry and Grinaker (1994). For these reasons, this study follows Gunny's model (2005) to estimate the normal level of R&D expenses.

$$\frac{RD_t}{TA_{t-1}} = \alpha_0 + \beta_1 \frac{RD_{t-1}}{TA_{t-1}} + \beta_2 INT_t + \beta_3 Q_t + \beta_4 CX_t + \beta_5 \text{LOG}\, MV \quad (2)$$

Where

$\frac{\mathrm{RD_t}}{\mathrm{TA_{t-1}}} = \mathrm{R\&}D\ in\ \mathrm{year_t}$ scaled by lagged total assets

$\mathrm{INT_t} =$ Internal funds in $\mathrm{year_t}$, which equals earnings before extraordinary items, depreciation and R&D

$\mathrm{Q_t}$ =Tobin' s Q which reflects the market value of total assets scaled by the book value of total assets

$\mathrm{CX_t} =$ Capital Expenditures in $\mathrm{year_t}$

$\mathrm{LOG\,MV} =$ Logarithm of market value of equity

As aforementioned firms manage their earnings if the realized levels deviate from the normal levels. In the case of manipulating earnings upwards through reductions in R&D, the realized levels of R&D are lower than the normal levels of R&D. This implies that the abnormal levels are negative. The abnormal levels of R&D are multiplied by -1 so that higher values indicate that higher amounts of R&D expenditures are reduced to increase reported net income.

To estimate the normal level of SG&A expenditures the model of Gunny (2005) has been used as the researcher considers the stickiness of the SGA in the model to estimate the expected level of SG&A. A cost is sticky if "the magnitude of a cost increase associated with increased sales is greater than the magnitude of a cost decrease associated with an equal decrease in sales" (Gunny, 2005, p. 12).

In times of low sales figures, managers reconsider whether to maintain or to sell unused resources which could be repurchased in times of high sales figures. This depends basically on the stickiness of the cost (Xu et al. 2007). If this is not incorporated, the response of costs to sales could be underestimated (Xu et al. 2007). Therefore, by recognizing the stickiness of SG&A expenditures increase the explanatory variable of the model. Following Gunny (2005) the expected level of SG&A expenditures can be estimated:

$$log\left(\frac{SGA_t}{SGA_{t-1}}\right) = \alpha_0 + \beta_1 log\left(\frac{S_t}{S_{t-1}}\right) + \beta_2 log\left(\frac{S_t}{S_{t-1}}\right) * DD_t + \beta_3 log\left(\frac{S_{t-1}}{S_{t-2}}\right) + \beta_4 log\left(\frac{S_{t-1}}{S_{t-2}}\right) * DD_{t-1} + \varepsilon \quad (3)$$

Where:

SGA= SGA and advertising expenditures
S = sales
DD = dummy variable equal to 1 when sales revenues decreases, 0 otherwise

Firms reduce SG&A expenditures to increase reported earnings. Therefore, negative abnormal levels indicate upward earnings management. The abnormal levels of SG&A are multiplied by -1 so that higher values suggest a higher extent of upward earnings management through reductions of SG&A.

The normal or expected level of overproduction is measured following Rowchowdhury (2006). Since, production costs equal costs of goods sold plus the increase in inventory, both elements are incorporated in the model. The expected production costs can be measured as follows.

$$\frac{PROD_t}{TA_{t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{TA_{t-1}}\right) + \beta_1 \left(\frac{S_t}{TA_{t-1}}\right) + \beta_2 \left(\frac{\Delta S_t}{TA_{t-1}}\right) + \beta_3 \left(\frac{\Delta S_{t-1}}{TA_{t-1}}\right) + \varepsilon_t \quad (4)$$

Where

$\frac{\mathrm{PROD_t}}{\mathrm{TA_{t-1}}} = \text{production costs in year}_\mathrm{t} \text{ scaled to lagged total assets}$

$\mathrm{S_t} = \text{sales in year}_\mathrm{t}$

$\Delta \mathrm{S_t} = \text{ sales in year}_\mathrm{t} - \text{ sales in year}_{\mathrm{t-1}}$

Earnings are managed upwards through overproduction if the realized levels exceed the normal level, i.e. the abnormal levels are positive. The total level of manipulation through real activities is measured by aggregating the abnormal levels of R&D expenditures, SG&A expenditures and production costs, which is defined by RMtot.

3.3 Accrual-based earnings management model

Zang (2012) argues that the level of AEM is determined after the determination of REM as AEM is determined after fiscal year-end, whereas REM is executed throughout the fiscal year to obtain the desired earnings level. If it appears at year-end that REM did not have the desired impact on earnings, the AEM level is adjusted to still obtain the desired earnings level. Therefore, the AEM model includes RMtot which can be divided into predicted and unpredicted levels of REM. The AEM model is as follows.

$$AM_{j,s} = \delta_0 + \delta_1 CD + \delta_2 ENG_s + \delta_3 GER_s + \delta_4 SCA_s + \delta_5 FR_s + +\delta_6 ENF_s + \delta_7 UNPREDRM_{j,s} + \delta_8 MKT_{j,s} + \delta_9 TAX_{j,s} + \delta_{10} CYCLE_{j,s} + \delta_{11} NOA7_{j,s} + \delta_{12} LOGTA8_{j,s} + \delta_{13} MTB8_{j,s} + \delta_{14} PREDRM_{j,s} + v_{j,s} \quad (5)$$

Where

$\mathrm{AM_{j,s,t}}$ = AWCA scaled by lagged total assets of $\mathrm{firm_j}$ in $\mathrm{country_s}$ in $\mathrm{year_t}$
$\mathrm{UNPREDRM_{j,s}}$ = Estimated residual from equation 1 for $\mathrm{firm_j}$ in $\mathrm{country_s}$ in $\mathrm{year_t}$
$\mathrm{PREDRM_{j,s}}$ = predicted values of equation 1

The level of AEM or the amount of discretion used in financial reporting is estimated by the level of abnormal accruals, also defined as discretionary accruals. The level of abnormal accruals equals the difference between realized accruals used and the level of accruals expected to be applied in order to support the current sales levels. This study uses the model of DeFond and Park (2001) to measure the level of abnormal accruals or the level of AEM. Following the model (DeFond and Park 2001) AEM can be measured as follows:

$$\frac{AWCA_t}{TA_{t-1}} = WC_t - \left[\left(\frac{WC_{t-1}}{S_{t-1}}\right) * S_t\right] \quad (6)$$

Where:

$\frac{\mathrm{AWCA_t}}{\mathrm{TA_{t-1}}}$ = Abnormal working capital accrual in $\mathrm{year_t}$ scaled by lagged total assets
$\mathrm{WC_t}$ = realized working capital in year $_t$
$\mathrm{S_t}$ = sales in $\mathrm{year_t}$

3.4 Measures for the costs of REM and AEM

3.4.1 Financial position measure

In this study a firm's financial position is measured by the ratio cash flow-to-total debts since Beaver (1966) reveals that this ratio predicts financial distress most accurate relative to other ratios. The commonly used proxy for financial distress, the Z-score (Altman 1968), is therefore, not applied. The reason for this is that the ratios that comprise the Z-score are intertwined with earnings management. As a result, the effect of financial distress on the relative application of both manipulation strategies cannot be studied without noise. Cash flow-to-total debts proxies for financial distress. Higher ratios imply less financial distress.

3.4.2 Investor protection measure

Leuz et. al (2003) agree that the measures of La Porta et al. (1998, 1999) incorporate the main factors that affect investor protection. These factors are outsider investor rights, legal enforcement level, ownership concentration, the importance of the equity market and the level of disclosure. Leuz et al. (2003), furthermore, reveal that a country's legal tradition, as expressed by common or code law, and the level of enforcement can be used as summary measures to determine the degree of investor protection. In comparison, common-law countries outperform civil-law countries even if both countries have high enforcement levels (Leuz et al. 2003). Burgstahler et al. (2006) extend the distinction of Leuz et al. (2003) by discriminating the countries using civil law on the basis of a country's legal origin. The reason for this is that La Porta et al. (1998) reveal that British common-law countries provide the strongest investor protection while French-civil law countries provide the weakest investor protection. The level of investor protection of German and Scandinavian civil-law countries lies between the two extremes (La Porta et al. 1998).

Following Burgstahler et al. (2006), this study uses the variables 'legal origin' and 'the level of enforcement' as proxies for the degree of investor protection countries provide to outside investors. Both variables are separately included in equations 1 and 5 to proxy for the level of investor protection.

Furthermore, it can be observed from equations 1 and 5 that other variables affect the use of REM and AEM beside financial position and investor protection. Since these other variables are not the focus of this study, they are included as control variables.

3.5 Control variables

3.5.1 Control variables of REM

As discussed in the previous section, other variables can increase the costs of REM, and therefore, the use of REM as well. Since this study mainly focuses on financial distress as a cost of REM, the other variables are included as control variables. Therefore, this study controls for lagged market share and the effective tax rate. Lagged market share proxies for the level of industry competition a firm faces, which is measured by firm sales of 2007 scaled by industry sales of 2007. The effective tax rate proxies for the marginal tax rate because the databases do not have the required data to calculate the marginal tax rates. This study does not control for institutional ownership, which is another cost of REM, due to data limitations.

If REM and AEM are substitutes, the costs of AEM also affect the use of REM. Therefore, the other costs associated with AEM are included in equation 1 as well. Lagged net operating assets (NOA_{t-1}) and lagged operating cycle both proxy for the level of accounting flexibility. NOA_{t-1} is measured by shareholders' equity less cash plus total debts. Following Dechow and Dichev (2002), lagged operating cycle is measured as follows: 360/(Sales/Average Accounts Receivable) + 360/(Cost of Goods Sold/Average Inventory).

To control for systematic variation in the abnormal levels of R&D expenditures, SG&A expenditures and production costs, due to growth opportunities, firm performance, and firm size, the control variables market-to-book ratio (MTB), earnings, return on assets (ROA) and the logarithm of total assets are included in equation 1.

3.5.2 Control variables for AEM

To control for other variables affecting the costs of AEM, and therefore, the use of AEM, NOA_{t-1} and lagged operating cycle are included in equation 5. Both variables proxy for a firm's level of accounting flexibility. This study does not control for auditors' scrutiny due to data constraints.

Furthermore, the AEM model controls for the costs of REM which could affect the use of AEM if both manipulation strategies are substitutes. Therefore, lagged market share and the effective tax rate as well as cash flow-to-total debts are included in equation 5. Equation 5 controls, moreover, for the predicted and unpredicted levels of REM as both determine the level of AEM as well. The reason for this is that the level of manipulation through accruals is determined after fiscal year –end, whereas real activities manipulation is executed and realized before year-end. This implies that if REM does not have the desired effect on earnings, the level of AEM is adjusted to obtain the desired earnings level (Zang 2012). The predicted levels of REM are measured by the predicted values of equation 1. The unpredicted levels are measured by the estimated residuals from equation 1.

As with the REM model, the AEM model controls for the logarithm of total assets, MTB, earnings and ROA.

4 Empirical results

This chapter presents the results of the empirical tests. In section 4.1 estimations of the normal levels of R&D, SG&A and production costs are provided. Section 4.2 presents descriptive statistics for the abnormal levels as well as for the costs associated with either AEM or REM. Section 4.3 reveals Pearson correlations. Sections 4.4 and 4.5 present, respectively, the regressions results of the PREDRM model and the AM model. Robustness checks are performed in section 4.6.

4.1 Estimations of the normal levels

To be able to determine the abnormal levels of R&D, SG&A and production costs, normal levels should be estimated first. To obtain accurate estimates of the normal levels, all firms in the total sample, 869 firms, are included in the regression. Table 1 presents the results of the regressions to estimate these normal levels. The R^2 of the production model and the R&D model are 62 per cent and 74,6 per cent, respectively, indicating that the models have reasonable explanatory power. In contrast, the SG&A model does not have reasonable explanatory power as the R^2 is 8,2 per cent, although the model is significant. Therefore, results related to the SG&A model should be interpreted with caution.

In an attempt to increase the explanatory power of the SG&A model, an alternative model to estimate the SG&A model is applied. This alternative model (Roychowdhury 2006) estimates normal levels of the discretionary expenditures ($DISX_{2008}/TA_{2007}$)[1]. Further explanations on the alternative model are provided in the appendix. The R^2 is 4,1 per cent, indicating that the alternative model has lower explanatory power than the SG&A model. Therefore, the SG&A model, as mentioned in Table 1, is used to estimate the abnormal levels of SG&A expenditures.

[1] $DISX_{2008}/TA_{2007}$ includes both R&D expenditures and SG&A expenditures

Table 1: Estimations of the normal levels of production costs, R&D expenditures and SG&A expenditures

$\mathbf{Prod_{2008}/TA_{2007}}$	
Intercept	-0,138*** (0,000)
$\mathbf{1/TA_{2007}}$	-183,798** (0,011)
$\mathbf{S_{2008}/TA_{2007}}$	0,766*** (0,000)
$\mathbf{\Delta S_{2008}/TA_{2007}}$	0,001 (0,955)
$\mathbf{\Delta S_{2007}/TA_{2007}}$	-0,199*** (0,000)
R^2	0,620
Adj. R^2	0,619
F-statistic	1011,747***
N	2485

$\mathbf{RD_{2008}/TA_{2007}}$	
Intercept	0,031** (0,014)
$\mathbf{RD_{2007}/TA_{2007}}$	0,759*** (0,000)
INT	1,817E-9 (0,544)
Q	-0,004** (0,026)
CX	-3,590E-9 (0,385)
Log MV	-0,002 (0,352)
R^2	0,746
Adj. R^2	0,744
F-statistic	506,800***
N	869

$\mathbf{\log\left(\frac{SGA_{2008}}{SGA_{2007}}\right)}$	
Intercept	0,018*** (0,000)
$\mathbf{\log\left(\frac{S_{2008}}{S_{2007}}\right)}$	0,255*** (0,000)
$\mathbf{\log\left(\frac{S_{2008}}{S_{2007}}\right) * DD_{2008}}$	0,034 (0,538)
$\mathbf{\log\left(\frac{S_{2007}}{S_{2006}}\right)}$	0,053** (0,031)
$\mathbf{\log\left(\frac{S_{2007}}{S_{2006}}\right) * DD_{2007}}$	0,159*** (0,002)
R^2	0,082
Adj. R^2	0,080
F-statistic	45,262***
N	2036

*, **, *** Represent significance at level of 10 per cent, 5 per cent and 1 per cent, respectively.

4.2 Descriptive statistics

By means of the normal levels, the abnormal levels can be determined for the suspect sample, which includes approximately 20 firms. Table 2 provides descriptive statistics for the variables included in the PREDRM model and AM model. Note that descriptive statistics for the total sample of 869 firms are presented by Table A1 which is included in the appendix.

Panel A of Table 2 shows that the medians of RMsga, RMprod, RMtot are negative. These negative medians indicate that the realized levels of REM (RMtot, RMsga or RMprod) are lower than the expected levels of REM which imply that suspect firms use real activities to manage earnings downwards. Two suggestions can be provided for this. First, it could be that the estimations of the normal levels are inaccurate which result in inaccurate abnormal levels. Consequently, the interpretation that suspect firms, on average, manage their earnings downwards might be incorrect. This explanation could be plausible as the R^2 of the SG&A

model is low. Second, if it is assumed that the normal levels are accurately estimated, the negative means could imply that the suspect firms in fact manage their earnings downwards. Since the suspect firms report managed earnings increases between 0 and 10 per cent, it implies that those firms have pre-managed earnings increases of more than 10 per cent. As earnings increases of more 10 per cent have similar effects on stock prices than earnings increases of 10 per cent (Degeorge et al. 1999), the firms that report pre-managed earnings increases of more than 10 per cent have incentives to manage earnings downwards to earnings increases of 10 per cent. The 'big bath' that is created by the downwards earnings management can be applied in future years in which pre-managed earnings increases are lower than 10 per cent, so that additional earnings increases have marginal effects on the stock price.

Although panel A of Table 2 presents negative medians for RMtot, RMsga and RMprod, it shows a positive median for RMrd, suggesting R&D expenditures are reduced to manipulate earnings upwards. Nevertheless, the aggregate effect of all real activities manipulation suggests that earnings are managed downwards. The contradiction could be due to the R&D model which estimates the normal level of R&D expenditures. The R&D model does not control extensively for the financial crisis that is prevalent in 2008 as the only variable that controls for it, INT, is insignificant.

Although the medians of the real manipulation strategies suggest that suspect firms manage their earnings downwards, the positive median of AM indicates upward accrual-based earnings management. The descriptive statistics on RMtot and AM do not contradict each other, but in fact provide preliminary evidence that REM and AEM are used as substitutes. Suspect firms apply REM to manage earnings downwards during the fiscal year to obtain the desired earnings level. After fiscal year-end, it appears that the applied REM reduces earnings to a higher extent than predicted or desired. Therefore, the majority of the suspect firms applies upward AEM to increase the earnings to the desired earnings level. A substitutive relation between REM and AEM is, thus, observable.

The substitutive trade-off between REM and AEM is demonstrated by the medians of both RMtot and PREDRM as well. Since the median RMtot has a higher negative value (-0,6575) than the median PREDRM which equals -0,4678, it indicates that the real effect of REM applied reduces earnings to a larger extent than expected. As a result, upward AEM is

applied to increase earnings to the desired earnings level. The unexpected large effect of downward REM should be observable from a negative median of UNPREDRM[2], which is not demonstrated in Table 2. A reason for the unexpected positive median of UNPREDRM could be due to the fact that median of UNPREDRM might be based on less observations than the medians of RMtot and PREDRM. In contrast to the median of UNPREDRM, the medians of RMtot, PREDRM and AM reveal preliminary evidence that REM and AEM are used as substitutes, affirming Zang's conclusion (2012).

Table 2: Descriptive statistics for suspect sample

Panel A: Earnings management strategies

	Mean	Std. Deviation	Min	25 Percentile	Median	75 Percentile	Max
RMtot	-0,628	0,4694	-2,940	-0,853	-0,658	-0,391	0,330
RMrd	0,000	0,02645	-0,130	-0,001	0,010	0,015	0,030
RMsga	-0,007	0,0942	-0,540	-0,049	-0,004	0,031	0,370
RMprod	-0,567	0,4679	-3,040	-0,810	-0,522	-0,330	0,350
AM	-0,002	0,1644	-1,870	-0,019	0,001	0,030	0,430
PREDRM	-0,186	1,0484	-1,090	-0,735	-0,468	-0,290	3,360
UNPREDRM	0,002	0,1209	-0,220	-0,087	0,003	0,084	0,290

The preliminary evidence of a substitutive relation between REM and AEM in this study is based on a sample of firms that manage earnings downwards. In contrast, Zang (2012) concludes the substitutive relation on firms that apply, on average, upward earnings management. This can be observed from the descriptive statistics for suspect firms in Zang's (2012) paper where the means of AM and RM (is similar to RMtot in this study) are positive. The cause for the inclusion of firms that use downward management rather than upward management is the use of a different criterion than Zang (2012) to select firms as being suspected of having managed their earnings.

Since a different criterion is used, this study selects firms with different firm characteristics than Zang (2012). Panel B of Table 2 provides descriptive statistics for the firm

[2] UNPREDRM is the effect of REM on earnings that is not predicted by the firm. UNPREDRM equals RMtot minus PREDRM. Therefore, in the case of downward earnings management or negative PREDRM, UNPREDRM is negative if RMtot is smaller or more negative than PREDRM. The real effect of REM on to decrease earnings is higher than expected.

characteristics of the approximately 20 firms included in the suspect sample of this study. The median NOA7 is 109.627. Furthermore, the median operating cycle equals 69.33 days. Comparing this with the median operating cycle of Zang (2012) which equals 122.68 days, it suggests that the suspect firms in this study have less accounting flexibility. Moreover, Table 2 presents that the mean effective tax rate is 19,3 per cent which may support that the suspect firms are, in line with Zang (2012), profitable, on average. However, this seems not plausible with the fact that the suspect firms face, financial distress, on average and have, negative ROA, on average as well. Therefore, the argument of profitability that is based on tax could rather be the result of dividing negative tax expenses by negative pre-taxable income. Therefore, results with respect to the effective tax rate should be interpreted with caution.

Furthermore, panel B of Table 2 shows that the mean market share is 0,009, suggesting that the firms in the suspect sample posses 0,9 per cent of the market within their industry. Therefore, suspect firms face high competitive pressure from industry peers. Comparing 0,9 per cent market share to the mean market share of Zang's (2012) suspect sample which equals 3, 78 per cent, it reveals that the suspect firms in this study face higher industry competition than the suspect firms selected by Zang (2012). If REM and AEM are substitutes this should indicate that the suspect firms in this study have higher levels of AEM relative to the suspect firms in Zang's paper (2012). Moreover, Table 2 demonstrates that the mean ENF is 8, 98 which suggests that the majority of the suspect sample face high enforcement. From the dummy variables, it can be observed that 22 per cent of the firms within the suspect sample is of British origin and 18 per cent is of German origin. Another 18 per cent of the suspect firms is of Scandinavian origin. The remaining 42 per cent is of French origin.

The median CD equals 0,1480 indicating that the majority of the suspect firms face financial distress. Since the median Z-score equals 2,165, this reaffirms that the majority of the suspect firms are in financial distress as the demarcation level for financial health equals 2.675. In contrast, the median Z-score of the firms that Zang (2012) selects, equals 4.2748, suggesting that the majority of the suspect firms is financial healthy. As this study, in contrast to Zang (2012), both includes firms that face financial distress as well as firms that face financial health, this study can determine the effect of financial distress on the relative use of REM and AEM more accurately than Zang (2012).

The control variables, ROA2008 LOGTA8 and EARN in panel B demonstrate that suspect firms are, on average, medium-sized firms that are not profitable. The average MTB shows that suspect firms have few growth opportunities. The higher mean MTB of Zang (2012) suggests that the suspect firms in her sample have more growth opportunities than the suspect firms selected in this study.

In summary, this section provides preliminary evidence that firms which report earnings increases of less than 10 per cent are suspected of having managed their earnings downwards through real activities manipulation during the fiscal year. However, the majority of the firms observe, after year-end, that the real activities reduce earnings to a higher extent than predicted or desired. As a result, AEM is applied to increase earnings to the desired earnings level.

Table 2: Descriptive statistics for suspect sample

Panel B: Firm characteristics

	Mean	Std. Deviation	Min	25 Percentile	Median	75 Percentile	Max
NOA7	2559762,351	12614855,678	1,000	22503,500	109627,000	584623,190	1,58E8
CYCLE	377,880	2715,683	0,150	40,918	69,330	114,701	30161,970
TAX	0,193	0,319	-3,530	0,065	0,263	0,313	0,950
MKT	0,009	0,024	0,000	0,000	0,001	0,004	0,150
ENF	8,989	0,872	6,820	8,680	9,220	9,440	10,000
ENG	0,221	0,416	0,000	0,000	0,000	0,000	1,000
GER	0,177	0,382	0,000	0,000	0,000	0,000	1,000
SCA	0,177	0,382	0,000	0,000	0,000	0,000	1,000
FR	0,427	0,496	0,000	0,000	0,000	1,000	1,000
CD	-0,406	2,942	-24,740	0,046	0,148	0,308	2,680
ZSCORE	2,475	2,532	-3,660	1,416	2,165	2,971	23,640
ROA2008	-0,200	1,315	-14,000	0,010	0,055	0,093	0,530
LOGTA8	5,121	1,154	1,180	4,343	5,083	5,786	8,210
MTB8	2,109	4,742	-2,960	0,650	1,322	2,449	57,500
EARN	-5081010,539	24658233,601	-1,83E8	-1573805,036	-80882,453	1011,630	4194727,270

4.3 Pearson correlations

To affirm that REM and AEM are substitutes if downward earnings management is applied, Pearson correlations among the various manipulation strategies are provided for the approximately 20 firms that are suspected of having managed their earnings. These correlations are presented in Table A2 in the appendix. The table shows, first, that AM is negatively correlated with RMtot[3] and RMprod (-0,455 and -0,447). The negative correlation between AM and RMtot indicates that negative values of real activities manipulation or downward REM result in positive values of AM[4] or upward AM. This affirms the substitutive relation between REM and AEM. However, the positive correlation between AM and RMrd (0,337) contradicts this. As aforementioned in section 4.1, this could be due to the R&D model which does not control extensively for the financial crisis in 2008. This might also explain why RMrd is negatively correlated with RMprod and with RMtot (-0.401 and -0.289). The positive correlation between RMprod and RMtot is mechanical as RMtot contains RMprod.

Furthermore, Table A2 in the appendix shows that PREDRM is negatively correlated with TAX (-0,582). This might indicate that firms with higher tax rates aim to apply lower levels of REM. Since the suspect firms all apply negative REM or downward real activities manipulation, it assumes that higher tax rates in fact increase downward REM. The assumption seems plausible since earnings can be decreased to a larger extent via REM than via AEM if firms face higher tax rates. This is due to the fact that REM, in contrast to AEM, is subject to a direct cash outflow. Higher tax rates, therefore, might increase the use of downward REM. Although it seems that this result assumes that hypothesis 3 might be incorrect, the opposite is true. This is due to the fact that hypothesis 3 is based on upward earnings management and not on downward earnings management.

The Pearsons correlations show, moreover, that ENF is negatively correlated with PREDRM (-0.776). This might imply that stronger enforcement results in negative or downward REM. Firms that face stronger enforcement rather aim to use higher levels of REM in order to manipulate earnings downwards. As the level of enforcement is one of the proxies for investor

[3] RMtot is the real effect of REM applied, i.e. the level of REM applied that is predicted by the firm plus any unexpected effects.

[4] This is in contrast to Zang (2012). Following her, a negative correlation should imply that only one of the two manipulation strategies is used to manage earnings.

protection, it can be assumed that hypothesis 5 might be correct. Firms that face stronger investor protection have higher levels of REM.

Besides the correlations aforementioned, Table 3 provides additional significant correlations. These correlations, however, are not discussed as they do not provide evidence for a possible substitutive relation between REM and AEM.

4.4 The effect of the costs on the use of REM

Although section 4.2 provides preliminary evidence that certain costs of REM and of AEM, respectively, decrease or increase the use of downward REM, this section tests regressions for the suspect sample of approximately 20 firms.

Table 3 presents the regression results for the PREDRM model (equation 1). The table shows that NOA7 has a slightly positive coefficient. Since the suspect firms apply negative or downward REM, the positive coefficient indicates that suspect firms with less accounting flexibility apply less downward REM. Therefore, hypothesis 2 is rejected which states that firms which face lower levels of accounting flexibility have higher levels of REM. The contradiction with the hypothesis might be the result of the fact that this study measures lagged NOA differently than Zang (2012). Whereas lagged NOA in this study is a continuous variable, it is a dummy variable in Zang's study (2012). For the other variable that proxies for accounting flexibility, lagged operating cycle, an insignificant coefficient is acquired.

Table 3 also presents insignificant results on TAX. Therefore, the assumption developed in section 4.3 that firms with higher tax rates have higher levels of downward REM cannot be reaffirmed. The table shows, however, a significant coefficient for MKT. As the coefficient equals -10,834 (p-value 0,042), it suggests that less (high) industry competition results in higher (lower) levels of downward real activities manipulation. Therefore, it can be stated that industry competition in fact constrains the use of REM, which is in line with Zang (2012).

Furthermore, Table 3 demonstrates that the coefficient on ENF is negative suggesting that the suspect firms which face higher levels of enforcement have higher levels of downward REM. Therefore, the negative coefficient affirms hypothesis 5 which states that firms which face

stronger investor protection have higher levels of REM to manage earnings (downwards). However, the positive coefficient on ENG and SCA argue that the hypothesis should be rejected as they suggest that suspect firms which face stronger investor protection use less negative REM or downward REM than suspect firms which face weaker investor protection. The contradictory results might rather indicate that the proxies of investor protection, ENF, ENG, SCA, GER and FR are not suitable. This is plausible as (untabulated) results indicate that the dummy variable FR is excluded from regression due to collinearity.

For the variable CD, insignificant results are acquired. Therefore, this study is unable to conclude that financial distress constrains the use of REM.

Table 3, furthermore, presents positive coefficients on EARN and MTB8, which indicate that higher earnings levels and more growth opportunities result in lower levels of downward REM. This is, however, unlikely since firms that have higher earnings and more growth opportunities should have higher pre-managed earnings increases than firms that have lower earnings and less growth opportunities. As a result, they should have more incentives to manipulate earnings downwards to earnings increases of 10 per cent. This is the cut-off to which marginal earnings increases affect stock prices.

In summary, this section reveals that accounting flexibility, rejects the hypothesis that it increases the use of REM. Firms do not substitute REM for AEM if accounting flexibility constrains the use of AEM. Moreover, industry competition in fact constrains the use of REM. Mixed results are provided for the fact that investor protection enhances the use of REM. Whereas the enforcement level affirms the increase in REM, the dummy variables ENG and SCA reject the increase. As a result, it cannot be stated whether firms trade off REM and AEM if investor protection constrains the use of AEM. As this section is able to state that industry competition in fact constrains, it is examined in the next section whether this constraint results in the use of REM and AEM as substitutes.

Table 3: Regression results on PREDRM model

	Coefficient	P-value
Intercept	15,892**	0,044
NOA7	6,397E-8**	0,029
CYCLE	1,782E-6	0,951
TAX	-0,662	0,685
MKT	-10,834**	0,042
ENF	-1,938**	0,038
ENG	1,172*	0,059
GER	1,061	0,128
SCA	2,330*	0,054
CD	0,228	0,662
ROA2008	-1,934	0,402
logTA8	0,076	0,481
MTB8	0,174**	0,048
EARN	5,337E-8**	0,023
R^2	0,884	
Adj. R^2	0,697	
F-statistic	4,708**	0,017
N	24	

*, ** Represent significance at level of 10 per cent and 5 per cent, respectively.

4.5 The effect of the costs on the use of AEM

To be able to determine whether the trade-off between REM and AEM is based on the relative costs, regressions on the AM model (equation 5) are estimated.

As observable from Table 4, NOA 7 is not included in the regression to proxy for accounting flexibility due to collinearity. The other proxy for accounting flexibility, CYCLE, is insignificant. Therefore, no inferences can be drawn whether accounting flexibility constrains the use of AEM. Due to similar reasons, this study is unable to conclude that hypothesis 3 regarding tax rates is correct. It cannot be concluded that firms which face higher tax rates have higher levels of AEM. Insignificant results are also acquired for the variable MKT. No inferences can be drawn on hypothesis 5 which states that firms that face higher levels of industry competition have higher levels of AEM. Since the proxies for investor protection have coefficients with insignificant p-values, this study is unable to conclude that investor protection constrains the use

of AEM in fact. For similar reasons, this study is unable to accept hypothesis 6 which states that firms that face financial distress have higher levels of AEM. The coefficient on UNPREDRM is insignificant as well. Therefore, the weak evidence that is provided by the descriptive statistics that firms use REM and AEM substitutes in case of downward earnings management cannot be reaffirmed.

Table 4 provides significant positive coefficients for the control variables logTA8 and EARN. Since the descriptive statistics in Table 2 show that majority of the suspect sample has positive AM, the positive coefficients suggest that larger firms and firms with higher earnings levels have higher levels of upward AEM. The suggestion is plausible as firms with higher earnings levels, which are frequently larger firms, are more able to book accruals in order to manage earnings.

Since, the regressions results presented by Table 4 only provides significant coefficients on the control variables, and not on the test variables, it cannot be revealed that firms trade off REM and AEM as substitutes on the basis of the relative costs.

Table 4: Regression results on AM model

	Coefficient	P-value
Intercept	0,035	0,945
CYCLE	5,618E-6	0,182
TAX	0,275	0,233
MKT	-0,389	0,352
ENF	-0,024	0,676
GER	0,015	0,658
SCA	0,028	0,466
FR	-0,028	0,538
CD	-0,024	0,735
UNPREDRM	0,052	0,315
ROA2008	0,183	0,590
logTA8	0,030*	0,076
MTB8	-0,026**	0,055
EARN	5,811E-10*	0,090
PREDRM	0,055	0,313
R^2	0,896	
Adj. R^2	0,687	
F-statistic	4,288**	0,030
N	22	

*, ** Represent significance at level of 10 per cent and 5 per cent, respectively.

4.6 Additional analysis

Previous sections present weak evidence that REM and AEM are substitutes by means of descriptive statistics, although this is not affirmed by the correlations and regression results. The majority of these results is, however, insignificant or unexpected which might be due to the fact that this study uses different proxies than Zang (2012). Therefore, the tests are replicated though the proxy for financial distress used in this study, cash flow-to-total debts, is replaced by the Z-score, which is used by Zang (2012).

By using the Z-score as a proxy for financial distress, the PREDRM model is modified and is defined by ALTPREDRM. The unexpected effect of real activities manipulation equals ALT.UNPREDRM. The median ALT.UNPREDRM equals 1,3387 which suggests that at year-end it appears that the real activities manipulate earnings downwards to a lesser extent than predicted. The positive median of ALT.UNPREDRM contradicts the original UNPREDRM which has a negative median. The contradiction can be explained by the Z-score which has, in comparison to CD, an additional negative effect on the expected downward REM suspect firms are willing to apply during the fiscal year. Financial health, as proxied by the Z-score, results in more negative levels of ALTPREDRM compared to PREDRM. To rephrase, financial health (financial distress) increases (decreases) the use of downward REM. Therefore, the descriptive statistics provide preliminary evidence that financial distress constrains the use of REM.

To affirm and determine that financial distress results in lower levels and higher levels of REM and AEM, respectively, Pearson correlations and regressions are performed. Table A2 in the appendix presents the Pearson correlations. However, no evidence is provided for the substitutive relation between REM and AEM as the Z-score is not significantly correlated with at least one of the proxies for the earnings management strategies. The table, however, shows that the Z-score is positively correlated with the dummy variable ENG, which suggests that firms of British origin are financially healthier. The Z-score is positively correlated with MTB8 as well, suggesting financially healthy firms have better growth opportunities.

The regression results of the costs of REM and AEM on the use of REM are provided in Panel A of Table 5. Panel A shows a significant positive coefficient on NOA. Since all suspect firms apply negative or downward REM, the positive coefficient suggests that firms which face

less accounting flexibility apply less negative or downward REM. Consequently, hypothesis 2 is rejected which states that firms which face lower levels of accounting flexibility have higher levels of REM. The panel, furthermore, presents significantly negative and positive coefficients for the investor protection variables, ENF and SCA, respectively. This reaffirms that contradiction exists whether investor protection increases or decreases the use of REM. As aforementioned in section 4.4 the contradiction might be due the fact that the proxies used for investor protection are not suitable. Consequently, it would be optimal to substitute the measures for investor protection by Zang's (2012) dummy variable Sox which equals 1 if firms year observations are in or after 2003. However, since this study focuses on European firms in 2008 Sox is inapplicable.

The regression results show, furthermore, a significant coefficient for MKT which equals -9.757 (p-value 0,068). This suggests that firms which face less (high) industry competition use higher (lower) levels of downward REM. This result is similar to the regression result provided in Table 3. The regression results in Panel A, however, do not, provide significant results for the Z-score. Therefore, the preliminary evidence that financial distress constrains downward REM cannot be reaffirmed.

Panel B of Table 5 reveals the regression results for the alternative AM model which includes the Z-score. As the coefficients on MKT and on the Z-score are significantly negative, it can be stated that firms which face higher industry competition and/ or financial distress have higher levels of AEM. Incorporating both the descriptive statistics and the regressions results, it is revealed that firms which face industry competition and financial distress substitute AEM for REM to manage earnings downwards as both costs increase the use of REM.

Table 5: Regression results on the alternative models

Panel A: Alt.PredRM model

	Coefficient	P-value
Intercept	14,466*	0,073
NOA7	6,326E-8*	0,057
CYCLE	-1,897E-6	0,950
TAX	0,543	0,772
MKT	-9,757*	0,068
ENF	-1,801*	0,064
ENG	1,008	0,120
GER	0,903	0,210
SCA	2,152*	0,092
ZSCORE	0,024	0,452
ROA2008	-1,416	0,245
logTA8	0,075	0,634
MTB8	0,063	0,109
EARN	5,348E-8**	0,047
R^2	0,848	
Adj. R^2	0,566	
F-statistic	3,003*	0,075
N	22	

*, ** Represent significance at level of 10 per cent and 5 per cent, respectively.

Panel B: Alt. AM model

	Coefficient	P-value
Intercept	1,018	0,199
NOA7	4,503E-10	0,902
CYCLE	4,350E-6	0,170
TAX	0,297	0,136
MKT	-0,961*	0,069
ENF	-0,135	0,136
GER	0,024	0,374
SCA	0,104	0,114
FR	-0,088	0,157
ZSCORE	-0,007**	0,048
ALT.UNPREDRM	0,066	0,119
ROA2008	0,025	0,824
logTA8	0,017	0,274
MTB8	-0,004	0,267
EARN	4,310E-9*	0,089
R^2	0,917	
Adj. R^2	0,723	
F-statistic	4,732**	0,033
N	21	

*, ** Represent significance at level of 10 per cent and 5 per cent, respectively.

5 Conclusion

This study examines whether firms trade off REM and AEM as substitutes on the basis of their relative costs, which is in line with Zang (2012). Zang (2012) identifies that REM is constrained by higher levels of industry competition, tax rates and financial distress. AEM is, for example, constrained by accounting flexibility and regulators' scrutiny (Zang 2012). However, since this study focuses, in contrast to Zang (2012), on European listed firms, Zang's (2012) proxy for regulators' scrutiny, Sox, is substituted by investor protection. Furthermore, Zang's (2012) proxy for financial distress, the Z-score, is replaced as well as it is intertwined with earnings management. To avoid bias, this study uses cash flow-to-total debts to proxy for financial distress.

The results of this study show that European listed firms which report earnings increases between zero and ten per cent use real manipulation activities to manage earnings downwards. As the true effect of REM reduces earnings to a higher extent than predicted, firms apply upward AEM at year-end to obtain the desired earnings level. Consequently, it can be concluded that European listed firms use REM and AEM as substitutes.

Furthermore, evidence exists that the substitutive relation between REM and AEM is determined by the relative costs. Especially, this holds if European listed firms face costs associated with REM. Firms that experience higher industry competition have higher levels of AEM as it constrains the use of REM. Firms which face financial distress have higher levels of AEM as well, although it is less evident that financial distress constrains the use of REM. Higher tax rates rather enhance the use of downward REM, and is therefore, only a constraint for upward REM and not for downward REM. In contrast, it is less evident that the substitutive trade-off is a function of the relative costs if European listed firms face constraints associated with AEM. Whereas mixed evidence is acquired that investor protection enhances downward REM, accounting flexibility constrains downward REM. Therefore, this study reveals that, in the case of downwards earnings management, European listed firms which face financial distress and industry competition substitute AEM for REM as the costs to apply REM are relatively higher than the costs to apply AEM.

The findings have implications for investors, auditors and regulators, respectively. Investors should realize that firms which face financial distress or high industry competition might manage earnings to meet short-term targets. Therefore, it is recommended to analyze the financial statements thoroughly before investing in a firm. Furthermore, auditors should be more skeptical when auditing a firm that faces high industry competition and financial distress as it is likely that the firm applies AEM. Regulators should increase the regulations in order to avoid that these firms can apply AEM.

Increasing regulators' scrutiny should however not be an option if this study should have concluded, in line with Zang (2012), that firms which face strong investor protection and/ or less accounting flexibility substitute REM for AEM. The fact that this study does not provide similar evidence to Zang (2012) regarding the substitution of REM for AEM might be due to several caveats of this study.

First, this study uses a different criterion than Zang (2012) to select firms as being suspected of having managed their earnings. Consequently, this study includes firms that manage earnings downwards, in contrast to Zang (2012) who includes firms that apply upward earnings management. The difference might be the reason for the fact that there is no additional evidence acquired for the substitutive relation. Second, the weak evidence could be the result of the relative small size of both the total sample and the suspect sample. If the sample sizes were larger, then insignificant results would probably have been significant which could have been in favor of the evidence. Third, the proxies for investor protection are not suitable as they provide contradictory results on the effect of investor protection on the use of REM.

The fourth limitation that is identifiable is that database constraints could bias the results as well as this study could not control for institutional ownership and auditors' scrutiny due to these constraints. The database constrains limit, furthermore, the control for marginal tax rate as the measurement of the variable requires certain items to be included that are not provided by Orbis or by Compustat. In an attempt to still control for the marginal tax rate, the effective tax rate is instead used although it is less suitable.

The limitations could, however, be possible extensions for future research. For example, the sample size could be enlarged by incorporating more financial years. Furthermore, the research could be replicated by using different proxies for investor protection. A suggestion for

the different proxies are the variables used in the research of Leuz et al. (2003) to determine the degree of investor protection.

Moreover, future research could be devoted to the extent to which the costs of REM and AEM determine the substitutive trade-off with respect to downward earnings management even further. The primarily reason for this suggestion is that this study shows that higher tax rates increases the use of downward REM, rather than decreases as is revealed by Zang (2012) who focuses on upward earnings management.

Furthermore, this study could be reexamined by focusing on upward earnings management. Consequently, the criterion to select firms as being suspected of having managed their earnings should be altered. For example, firms could be selected if they report current earnings decreases between minus three and zero per cent. The reason for this selection criterion is that psychology reveals that meeting the target is critical as in contrast to beating it with ten per cent or missing it with three per cent (Degeorge et al.1999).

6 Appendix

Alternative model

The alternative model that is applied in an attempt to estimate normal levels of R&D and SG&A expenditures accurately, is the model of Roychowdhury (2006). This model is as follow:

$$\frac{DISX_t}{TA_{t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{TA_{t-1}}\right) + \beta_1 \left(\frac{S_t}{TA_{t-1}}\right) + \varepsilon_t \quad (8)$$

Where

$\frac{\mathrm{DISX_t}}{\mathrm{TA_{t-1}}}$ = the sum of R&D expenditures and SG&A expenditures, defined by discretionary expenditures which is scaled by lagged total assets

$\mathrm{S_t}$ = sales in $\mathrm{year_t}$

Table A1: Descriptive statistics of total firm sample

	Mean	Std. Deviation	Min	25 percentile	Median	75 percentile	Max
RMtot	-0,545	0,500	-3,660	-0,803	-0,517	-0,280	1,470
RMrd	0,001	0,060	-0,430	-0,004	0,011	0,017	0,700
RMsga	0,000	0,172	-1,590	-0,048	0,001	0,052	2,140
RMprod	-0,510	0,476	-3,040	-0,762	-0,487	-0,244	1,080
AM	-0,001	0,168	-1,870	-0,032	-0,001	0,028	5,340
PREDRM	0,360	5,024	-8,300	-0,662	-0,344	0,313	91,210
UNPREDRM	-0,711	5,452	-92,410	-0,749	-0,182	0,148	7,440
alt.predRM	-1,567	2,495	-12,470	-2,135	-1,854	-1,433	31,740
alt.unpredRM	1,235	2,584	-32,940	0,884	1,326	1,716	11,380
NOA7	1540168,724	8714100,077	1,000	15446,214	73514,000	370362,250	2,31E8
CYCLE	323,996	6111,063	-6,520	34,569	60,635	109,422	259106,840
TAX	0,168	1,554	-40,000	0,000	0,213	0,311	29,230
MKT	0,007	0,042	0,000	0,000	0,000	0,002	1,540
ENG	0,298	0,457	0,000	0,000	0,000	1,000	1,000
GER	0,190	0,392	0,000	0,000	0,000	0,000	1,000
SCA	0,148	0,355	0,000	0,000	0,000	0,000	1,000
FR	0,365	0,481	0,000	0,000	0,000	1,000	1,000
ENF	8,938	0,882	6,820	8,680	9,220	9,220	10,000
CD	-0,232	3,567	-129,320	-0,012	0,098	0,215	71,740
ZSCORE	2,832	18,037	-201,400	1,294	2,084	3,186	741,910
ROA2008	-0,357	7,097	-304,330	-0,071	0,018	0,062	5,430
LOGTA8	4,864	1,106	-2,950	4,158	4,842	5,553	8,420
MTB8	1,957	16,960	-389,910	0,563	1,052	1,929	526,910
EARN	-2330861,128	13077692,742	-2,52E8	806616,161	-92744,101	-3635,918	17695300,580

Table A2: Pearson Correlations of suspect sample

	AM	RM prod	RMrd	RM sga	RMtot	alt.unp redRM	alt.pred RM	ZSCO RE	UNPR EDRM	PRED RM	EARN
CD	0,028	-0,476**	0,610**	-0,152	-0,402**	0,131	-0,154	-0,058	0,005	-0,102	-0,022
ENG	-0,007	0,059	-0,065	-0,122	-0,020	0,245	-0,301	0,191*	-0,002	-0,230	-0,201
GER	0,072	-,0247*	0,112	0,206*	-0,208	-0,124	0,103	-0,157	-0,002	-0,059	-0,031
SCA	0,035	0,069	-0,211	-0,091	0,030	-0,205	0,133	-0,068	-0,001	-0,172	0,103
FR	-0,077	0,081	0,134	0,031	0,159	0,030	0,110	0,024	0,005	0,402	0,115
ENF	-0,041	-0,067	-0,277*	-0,018	-0,090	-0,124	-0,167	-0,041	-0,003	-0,776**	-0,029
MKT	-0,060	-0,207	0,168	0,010	-0,187	0,733**	-0,713**	0,121	0,003	-0,155	-0,492**
TAX	0,014	-0,416**	0,430**	-0,028	-0,533**	0,288	-0,447*	-0,067	0,003	-0,582**	-0,110
NOA7	-0,027	-0,115	0,033	0,029	-0,108	0,998**	-0,955**	0,036	0,001	-0,199	-0,955**
CYCLE	-0,013	0,307*	-0,409**	-0,034	0,281	-0,085	0,107	-0,093	-0,004	0,038	0,035
ROA2008	0,062	-0,469**	0,347**	-0,168	-0,425**	0,131	-0,157	-0,057	0,005	-0,116	-0,044
LOGTA8	0,015	-0,197	0,367**	-0,027	-0,123	0,541*	-0,518*	-0,056	0,005	-0,081	-0,411**
MTB8	0,016	0,170	-0,181	-0,057	0,120	0,008	0,165	0,257**	0,001	0,708**	0,041
EARN	0,180	0,161	0,019	-0,049	0,152	-0,976**	0,938**	-0,034	0,000	0,192	1
PREDRM	-0,066	0,354	-0,481*	-0,078	0,940**	-0,389	0,480*	-0,010	-0,002	1	0,192
UNPREDRM	0,133	0,249	-0,068	0,592**	0,338	0,050	-0,005	0,096	1	-0,002	0,000
ZSCORE	-0,039	-0,112	0,079	-0,089	0,015	0,054	-0,046	1	0,096	-0,010	-0,034
alt.predRM	0,381	0,479*	-0,047	-0,061	0,467*	-0,992**	1	-0,046	-0,005	0,480*	0,938**
alt.unpredR	-,0455*	-0,356	0,000	0,109	-0,352	1	-0,992**	0,054	0,050	-0,389	-0,976**
RMtot	-0,458**	0,979**	-0,289*	0,117	1	-0,352	0,467*	0,015	0,338	0,940**	0,152
RMsga	0,102	-0,084	-0,004	1	0,117	0,109	-0,061	-0,089	0,592**	-0,078	-0,049
RMrd	0,337*	-0,401**	1	-0,004	-0,289*	0,000	-0,047	0,079	-0,068	-0,481*	0,019
RMprod	-0,447**	1	-0,401**	-0,084	0,979**	-0,356	0,479*	-0,112	0,249	0,354	0,161
AM	1	-0,447**	0,337*	0,102	-0,458**	-0,455*	0,381	-0,039	0,133	-0,066	0,180

*, ** Represent significance at the level of 10 per cent and 5 per cent, respectively.

Table A2: Pearson Correlations of suspect sample

Continued Table A2: Pearson Correlations of suspect sample

	MTB8	LOGTA	ROA20	CYCLE	NOA7	TAX	MKT	ENF	FR	SCA	GER	ENG	CD
CD	-0,027	0,386**	0,551**	-0,177*	0,041	0,139	0,074	-0,081	0,164*	-0,056	-0,126	-0,031	1
ENG	-0,044	-0,082	0,081	-0,045	0,065	0,026	-0,030	0,141*	-0,459**	-0,246**	-0,246**	1	-0,031
GER	-0,020	-0,127	-0,210**	-0,036	-0,031	-0,031	-0,125	0,037	-0,399**	-0,214**	1	-0,246**	-0,126
SCA	0,148	-0,095	0,070	0,174	-0,075	-0,015	-0,114	0,538**	-0,399**	1	-0,214**	-0,246**	-0,056
FR	-0,064	0,240**	0,041	-0,072	0,026	0,014	0,204*	-0,562**	1	-0,399**	-0,399**	-0,459**	0,164*
ENF	0,066	-0,195**	-0,073	0,101	-0,016	-0,042	-0,058	1	-0,562**	0,538**	0,037	0,141*	-0,081
MKT	-0,050	0,611**	0,083	-0,065	0,687**	0,126	1	-0,058	0,204*	-0,114	-0,125	-0,030	0,074
TAX	0,084	0,263**	0,127	-0,054	0,065	1	0,126	-0,042	0,014	-0,015	-0,031	0,026	0,139
NOA7	-0,012	0,426**	0,041	-0,026	1	0,065	0,687**	-0,016	0,026	-0,075	-0,031	0,065	0,041
CYCLE	-0,030	-0,207*	-0,068	1	-0,026	-0,054	-0,065	0,101	-0,072	0,174	-0,036	-0,045	-0,177*
ROA200	-0,086	0,407**	1	-0,068	0,041	0,127	0,083	-0,073	0,041	0,070	-0,210**	0,081	0,551**
LOGTA8	-0,128	1	0,407**	-0,207*	0,426**	0,263**	0,611**	-0,195**	0,240**	-0,095	-0,127	-0,082	0,386**
MTB8	1	-0,128	-0,086	-0,030	-0,012	0,084	-0,050	0,066	-0,064	0,148	-0,020	-0,044	-0,027
EARN	0,041	-0,411**	-0,044	0,035	-0,955**	-0,110	-0,492**	-0,029	0,115	0,103	-0,031	-0,201	-0,022
PREDR	0,708**	-0,081	-0,116	0,038	-0,199	-0,582**	-0,155	-0,776**	0,402	-0,172	-0,059	-0,230	-0,102
UNPRE	0,001	0,005	0,005	-0,004	0,001	0,003	0,003	-0,003	0,005	-0,001	-0,002	-0,002	0,005
ZSCORE	0,257**	-0,056	-0,057	-0,093	0,036	-0,067	0,121	-0,041	0,024	-0,068	-0,157	0,191*	-0,058
alt.predR	0,165	-0,518*	-0,157	0,107	-0,955**	-0,447*	-0,713**	-0,167	0,110	0,133	0,103	-0,301	-0,154
alt.unpre	0,008	0,541*	0,131	-0,085	0,998**	0,288	0,733**	-0,124	0,030	-0,205	-0,124	0,245	0,131
RMtot	0,120	-0,123	-0,425**	0,281	-0,108	-0,533**	-0,187	-0,090	0,159	0,030	-0,208	-0,020	-0,402**
RMsga	-0,057	-0,027	-0,168	-0,034	0,029	-0,028	0,010	-0,018	0,031	-0,091	,0206*	-0,122	-0,152
RMrd	-0,181	0,367**	0,347**	-0,409**	0,033	0,430**	0,168	-0,277*	0,134	-0,211	0,112	-0,065	0,610**
RMprod	0,170	-0,197	-0,469**	0,307*	-0,115	-0,416**	-0,207	-0,067	0,081	0,069	-0,247*	0,059	-0,476**
AM	0,016	0,015	0,062	-0,013	-0,027	0,014	-0,060	-0,041	-0,077	0,035	0,072	-0,007	0,028

*, ** Represent significance at the level of 10 per cent and 5 per cent, respectively.

Continued Table A2: Pearson Correlations of suspect sample

List of abbreviations

AEM	Accrual-based earnings management
REM	Real earnings management
R&D	Research and Development expenditures
SG&A	Selling, general and administrative expenditures
$\mathbf{NOA_{t-1}}$	Lagged net operating assets
CD	Cash flow-to-total debts
ENG	Firm that is situated in a country of British origin
GER	Firm that is situated in a country of German origin
SCA	Firm that situated in a country of Scandinavian origin
FR	Firm that situated in a country of French origin
ENF	The enforcement level a country's faces
MKT	Market share which proxies for the level of industry competition
TAX	Effective tax rate
CYCLE	Lagged operating cycle
NOA7	Net operating assets of a firm in 2007
LOGTA8	Logarithm of a firm's total assets in 2008 which proxies for firm size
MTB8	Market-to-book ratio of a firm in 2008 which proxies for a firm's growth opportunities
EARN	Earnings before extraordinary items of a firm in 2008 minus working capital accruals and production costs plus Research and Development expenditures plus Selling, General and Administrative expenditures
$\mathbf{RD_t}$	Research and Development expenditures in year t
$\mathbf{TA_{t-1}}$	Lagged total assets
INT	Internal funds
Q	Tobin's Q which reflects the market value of total assets scaled by book value of total assets
CX	Capital Expenditures
LogMV	Logarith of a firm's market value of equity

$\Delta \mathbf{S_t}$	Sales in year_t – sales in year_{t-1}
$\Delta \mathbf{S_{t-1}}$	Sales in year_{t-1} – sales in year_{t-2}
$\mathbf{DD_t}$	Dummy variable equal to if revenue in year_t increases in comparison to year_{t-1}
$\mathbf{DD_{t-1}}$	Dummy variable equal to if revenue in year_{t-1} increases in comparison to year_{t-2}
$\mathbf{Prod_t}$	The level of production costs a firm faces in year_t
PREDRM	The level of real activities manipulation a firm is expecting to apply during the fiscal year
RMtot	The real level of real activities manipulation applied during the fiscal year
UNPREDRM	The difference between RMtot and PREDRM
RMsga	The level of real earnings management applied through the reduction of selling, general and administrative expenditures
RMprod	The level of real earnings management applied through production
RMrd	The level of real earnings management applied through the reduction of research and development expenditures
AM	The level of accrual-based earnings management
AWCA	Abnormal working capital accruals that proxies for the level of accrual-based earnings management
WC	The level of working capital accruals
ROA2008	Return on assets in 2008 that proxies for a firm's current performance

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