



# Earnings Management and Gender Diversity in The Board of Directors and Audit Committee an Empirical Analysis

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Master in Economics track Accounting & Control

*Abstract:* The purpose of this thesis is to investigate the relation between earnings management and gender diversity in the board of directors and audit committee. Based on prior literature, hypotheses as support are formulated. Earnings management is investigated by both real and accrual-based earnings management. Running several multiple regressions find a relation between gender diversity in the audit committee and real earnings management. Further evidence suggests that having a chairwoman influence the level of earnings management. Consistent with prior research, this thesis find that board size is negative related to accrual-based earnings management. No support is found for the relation between gender diversity and both real and accrual-based earnings management.

*Keywords:* real earnings management; accrual-based earnings management; audit committee; board of directors; gender diversity.

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## Table of Contents

1. Introduction.....	3
2. Literature review .....	6
2.1 Earnings management.....	6
2.1.2 Audit committee and earnings management .....	7
2.1.3 Board of directors and earnings management .....	8
2.2 Hypothesis development.....	10
3. Method .....	13
3.1 Data and Sample description .....	13
3.2.1 Independent Variables .....	14
3.2.2 Dependent Variables .....	16
3.2.3 Control Variables .....	16
3.3 Empirical analysis .....	17
4. Results .....	19
4.1 Descriptive Statistics.....	19
4.1.1 General descriptive statistics audit committee.....	19
4.1.2 General descriptive statistics Board of Directors .....	20
4.1.3 Model specific statistics: Audit Committee.....	21
4.1.4 Model specific statistics: Board of Directors .....	22
4.2 Regression assumptions .....	23
4.2.1 Normality.....	23
4.2.2 Homoscedasticity .....	24
4.2.3 Multicollinearity .....	25
4.3 Empirical results .....	26
4.3.1 Audit committee.....	26
4.3.2 Board of directors.....	28
5. Conclusion and Discussion .....	31
References .....	34
Appendix 1: Homoscedasticity Board of directors .....	39
Appendix 2: Homoscedasticity Audit Committee .....	40

# 1.Introduction

Since the financial scandals, like Enron and Worldcom in the past, earnings management has gained more attention by regulators and popular press (Xie, Davidson & DaDalt, 2003). To prevent earnings management, the Security Exchange Commission (SEC) and Sarbanes Oxley Act (SOX), section 301, have tighten the requirements for the audit committee (Klein, 2002). SOX section 301 provides standards relating to the audit committee. First, “The audit committee is considered to be independent. A member of an audit committee may not accept any compensatory fee from the issuer or is an affiliated person of the issuer or any subsidiary thereof”. Second, “The audit committee shall establish procedures for the receipt, retention and treatment of complaints received by the issuers regarding accounting, internal accounting controls or auditing matters; and the confidential anonymous submission by employees of the issuer of concerns regarding questionable accounting or auditing matters” (SOX, 2002, section 301). These updated requirements must improve the effectiveness of corporate audit committees regarding the financial reporting process (Klein, 2002). An effective audit committee must have “qualified and well informed members, with a majority of independent members and have the authority and resources to protect stakeholders interests by ensuring reliable financial reporting, internal accounting controls, and risk management through its diligent oversight” (Lary & Taylor, 2012, p. 337).

Besides the audit committee, the board of directors plays an important role in managing earnings. As stated by Beasley (1996) the board of directors is the highest internal control mechanism that has the responsibility to monitor the actions of top management. Thereby, the CEO oversees to ensure that its firm meets the earnings expectations (Xie et al., 2003). Research by Sun, Liu and Lan (2011) show that female audit committee members may be more ethical than male audit committee members. Bruns and Merchant (1990) state that earnings management is an ethical issue, so the presence of female members in the audit committee could lead to lower incentives for earnings management.

Based on the literature above, female members can influence the decision-making process in a more ethical way for both the audit committee and the board of directors. To support the influence on gender diversity in the audit committee and board of directors, the following research question is formulated:

“Does gender diversity in the board and audit committee influence real and accrual-based earnings management?”

This study is relevant, because most of the existing literature focuses on female influences in top management, instead of the board of directors and audit committee (Sheridan & Milgate, 2005). Besides, female presence in the top of organizations gains more attention, for example by law makers. A new law in Norway states that at least 40% of the directors must be female directors (Ahrend & Dittmar, 2012). Therefore, research in this area is beneficial to gain new knowledge of the influence of female presence in top positions. Research by Adams and Funk (2012) shows that female directors compared to their male directors are more benevolent, but less power oriented. This makes investigating the influence of gender diversity in the board and audit committee interesting, especially with earnings management, because the choice to apply earnings management can be related to power relations in the board and audit committees.

This study has scientific relevance because most of the existing literature investigates characteristics as independency (Klein, 2002) or tenure and diligence (Xie, et al., 2003). There is less literature that investigates the relation of gender in both the board and the audit committee.

Contrary to prior research combines this study both real and accrual-based earnings management. According to Zang (2012) if you research earnings management, you have to research both real and accrual-based earnings management. Gunny (2008) makes this distinction as well. She classifies earnings management into accrual management and real activities manipulation. Making this distinction between real and accrual-based earnings management gains new insights between the choice for real or accrual-based earnings management.

The results of the empirical analysis indicate that gender diversity in the audit committee can influence the level of real earnings management. The results further do not indicate that there is a relation between the gender diversity in the board and earnings management. The data sample consists of 228 firms from four countries (France, Germany, the Netherlands and Belgium). This research runs four model specific regressions to measure the level of earnings management. Different variables indicate the influence of female audit committee members or female board members.

The structure for this thesis is as follows. In chapter 2 the literature review is elaborated. First, an overview of the existing literature regarding earnings management and the board of directors and audit committee is given. Second, the hypotheses are discussed. Chapter 3 explains the methodology. First the earnings management proxies are computed, followed by a brief explanation of the predictive variables. Chapter 4 highlights the results.

Starting with the descriptive statistics and the tests of the regression assumptions. This chapter ends with the results of the empirical analysis. Finally, chapter 5 summarizes the conclusion and limitations. At the end possible topics for future research are discussed.

## 2. Literature review

### 2.1 Earnings management

Most of the past earnings management concerns are attributed to a lack of monitoring by the board of directors and audit committee (Ghosh, Marra & Moon, 2010). This is curious because precisely these members are seen as the guardians of financial reporting (Grant, DePree & Grant, 2000; Ghosh et al., 2010). A widely used definition of earnings management is given by Healy & Wahlen (1999):

“Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the firm or to influence contractual outcomes that depend on reported accounting numbers” (Heay & Wahlen, 1999, p. 368).

Existing literature on earnings management focuses on accrual-based earnings management and less attention is given to real earnings management (Zang, 2012). Gunny (2010) makes the distinction between these two forms of earnings management. A firm that uses accrual-based earnings management makes choices based on generally accepted accounting principles (GAAP) in order to cover true economic performances (Gunny, 2010; Dechow & Skinner, 2000). Real earnings management happens when a manager changes the timing or structuring of financial transactions. The purpose is to change the output of the accounting systems (Gunny, 2010). Therefore, one of the differences between accrual-based earnings management and real earnings management is timing. Accrual-based earnings management usually occurs at the end of the fiscal year (Zang, 2012) while real earnings management takes place throughout the year (Cohen & Zarowin, 2010; Roychowdhury, 2006; Zang, 2012). Since the introduction of the SOX requirements a shift between real and accrual-based earnings management is shown. Before the SOX requirements, most firms engage in manipulating accruals, while after the SOX implementation more firms engage in real earnings management (Cohen, Dey & Lys, 2008). There are mainly two explanations for this shift; the process of detecting real earnings management is harder (Cohen & Zarowin, 2008) and preventing from control by auditors and regulators (Cohen et al., 2008).

According to Healy & Wahlen (1999), there are three categories of earnings management. First, incentive capital market motivation. This category is influencing short-term stock price performance. Second, contracting motivations. Earnings management occurs

here, when accounting data are used to monitor the relation between firms and stakeholders. Third, regulatory motives. Some industries are monitored based on accounting data. Therefore, Firms can manage financial reporting to receive subsidies.

### **2.1.2 Audit committee and earnings management**

To prevent for corporate scandals, the role of audit committees increased significantly (Thiruvadi & Huang, 2011). Both the Blue Ribbon committee (Blue Ribbon Committee, 1999) and the section 301 of Sarbanes-Oxley Act (SOX 301) have as purpose to increase the effectiveness of the audit committee (Bradbury, Mak & Tan, 2006). The Blue Ribbon Panel (1999) argues: “The audit committee members should be financially sophisticated. An audit committee, without financially sophisticated members may indeed be largely ceremonial. (Xie et al., 2003, p.4). SOX 301 states: “The audit committee shall be directly responsible for the appointment, compensation, and oversight of the auditor” (Thiruvadi & Huang, 2011, p. 484). Thus, the audit committee must have several meetings with directors, outside auditors and financial managers to review the firm’s financial reporting process (Klein, 2002).

Prior research shows positive outcomes in corporate monitoring and oversight resulting in higher audit quality (Ittonen, Vähämaa & Vähämaa, 2013) Thiruvadi & Huang (2011) researched 320 firms. Their empirical research shows that when a firm as a female director in the audit committee, earnings management is constrained by increasing negative discretionary accruals. In line with the compensation task of the audit committee, Ittonen, Miettinen & Vähämaa (2011) find that firms that have a chairwoman for the audit committee, have significantly lower audit fees. Their findings suggest that the presence of a chairwoman lowers the need additional assurance provided by external auditors.

Sociology and psychology studies on gender differences show that women are more cautious, ethical and risk averse (Gold, Huntion & Gomma, 2009). Women have also more effective communication abilities, are better in group problem-solving (Thiruvadi & Huang, 2011) and are more people oriented and democratic than male leaders (Lämsä and Sintone, 2001; Sun et al., 2011). Sun et al. (2011) support the ethical findings by concluding that the presence of female members in the audit committee may be more ethical compared to male members of the audit committee. The level of earnings management is lower when there is at least one female director in the audit committee (Gul, Srinidhi & Tsui, 2007). Research focusing on female managers shows that female managers are more stable, competent, independent and emotional rational (Thiruvadi, 2012). Besides the ethical issue, gender diversity has a social issue as well, namely the glass ceiling concept. The glass ceiling concept

refers to the invisible barriers that prevent (e.g.) women to enter higher positions in a firm's hierarchy (Thiruvadi & Huang, 2011). The glass ceiling concept results in losing women with lots of potential and stagnating the equality process (Weiler & Bernasek, 2001). Burgess & Tharenou (2002) find that the low number of women in firms' board can be related to the glass ceiling concept. Findings regarding the composition of the audit committee are mixed. Ghosh et al., (2010) find that the composition and structure of the board of directors and audit committee has no influence on earnings management. They find that earnings management is related to board and audit committee size. According to Menon and Williams (1994) the reliance on the audit committee depends on the composition of the board of directors. Carter, D'Souza & Simkins (2010) find support that the composition of the important committees does influence a firm's financial performance.

Bruyneels and Cardinaels (2014) investigate the role of social ties between the board of directors and the audit committee. They state that firms that have social ties between the board of directors and the audit committee participate more in earnings management. As a side note, they find that if the social ties are from an 'advice network' it will not influence the quality of the audit committee.

### **2.1.3 Board of directors and earnings management**

The board of directors has to manage the business and affairs of the corporation. Thereby, they have to minimize the costs that arise between ownership and decision control (Beasley, 1996; Klein, 1998). Decision-rights are delegated by the shareholders to the board of directors in order to monitor managers' actions (Marra, Mazzola & Prencipe, 2011). To prevent certain risks, the board usually includes independent directors. Based on previous research, independent directors are effective in reducing agency costs (Marra et al., 2011; Patelli & Prencipe, 2007). Klein (2002) found a negative relation between the independency of the board and accrual-based earnings management. If there is a reduction in the board of directors, it will lead to a large increase in accrual-based earnings management. Sarkar, Sarkar and Sen (2008) find that it is not specific board independence that leads to lower earnings management. They find that board quality is more important in preventing earnings management. They also find that board diligence is associated with a lower level of earnings management.

Campbell & Migueiz-Vera (2008) investigate the gender composition of the board for a sample of Spanish firms. Their findings suggest that the composition of the board positively affect the monitoring role and thereby the financial performance of a firm. Adams and



Ferreira (2009) also find that gender-diverse boards put more effort in the monitoring function. However, they also find that gender diversity quota quotes negatively influences firm value. Erhardt, Werbel and Shrader (2003) measure firm performance by the financial indicators return on investment (ROI) and return on assets (ROA). They find a positive association between board diversity and the financial indicators. The research by Francoeur, Labelle and Sinclair-Desgagné (2008) show that firms with a high percentage female officers have higher abnormal returns. However they do not find that women in the board influences financial returns. Peni and Vähämaa (2012) find that firms with a female CEO engage in conservative earnings management strategies and thereby are associated with income-decreasing discretionary accruals. Kim, Al-Shammari and Kim (2009) find that both board structure as proposition are important for firm performance. However, Carter et al. (2010) do not find a significant relation between gender diversity and composition of the board on firm performance.

Singh and Vinnicombe (2004) investigate the presence of female directors by applying surveys, finding that only 61% of the top 100 firms in the UK had female directors. In total there were only 15 executive female directors. They find a small increase in the number of female directors, but the progress goes steadily up. Thereby, they find that the successful female directors have a strong background, and a lot of corporate experience. Shin (2012) examines the relation between the gender diversity and the compensation for female directors and did not find a significant relation between having a female CEO and the compensation of female non-CEO executives.

## 2.2 Hypothesis development

As stated, this research investigates the influence of gender diversity in the board and audit committee on earnings management. Therefore, the gender diversity is tested by formulating several hypotheses. A distinction between real and accrual-based earnings management is made as well.

Previous studies suggest a relationship between the board size and earnings management. Rahman and Ali (2006) find that accrual-based earnings management has a positive relation with board size. Marra et al. (2011) use board size as a control variable because of the suggestion that larger boards are less effective in performing their duties. They only find a relation between the board size and the size of the firm suggest that large firms have a lower level of abnormal accruals. This is in line with the results by Xie et al. (2011). They find that smaller boards are more effective in monitoring than larger boards. These larger boards are also related to a lower level of discretionary accruals. Ghosh et al., (2010) find that board size is associated with earnings management. Therefore hypotheses are formulated:

*H1: A positive relationship is expected between the size of the board of directors and real earnings management.*

*H2: A positive relationship is expected between the size of the board of directors and accrual-based earnings management.*

Not only board size has influence on earnings management. The size of the audit committee has influence on earnings management as well, however the results are contrary. Small audit committees are more efficient in monitoring the reporting processes. Thereby they could mitigate potential earnings management (Ghosh et al., 2010). Opposite, Beasley and Salterio (2001) argue that larger audit committees are more likely to mitigate earnings management, because they are adding more specialized knowledge to the audit committee. This knowledge is needed because the questions the audit committee has to deal with are technical and complex (McDaniel, Martin & Maines , 2002). Xie et al., (2003) investigate the relation between the audit committee size and accrual-based earnings management. They did not find a significant relationship. As the audit committees have less members compared to the board of directors, a relatively larger audit committee benefits from knowledge, and thus is expected to be more effective in reducing earnings management. Therefore the following hypotheses are formulated:

*H3: A negative relation exists between the size of the audit committee and real earnings management.*

*H4: A negative relation exists between the size of the audit committee and accrual-based earnings management.*

Existing literature regarding the composition of the board focusses on experience, independence and frequent meetings (Klein, 2002; Xie et al., 2003), less attention is given to the presence of female members. Ahrend and Dittmar (2012) did research to the presence of female members in the board of directors in Norway. As result of new laws and regulation, at least 40 percent of the Norwegian firms, should have a woman as director. As result of the quota, they find that the members of the board become younger and less experienced. They also state that firms choose their board structure to maximize firm performance. The effect of gender differences is also investigated by Thiruvadi and Huang (2011). They find positive outcomes for monitoring and oversight of the firm. The following hypotheses are formulated to test the influence of female members in the board of directors:

*H5: A negative relation is expected between the presence of a female member in the board of directors and real earnings management.*

*H6: A negative relation is expected between the presence of a female member in the board of directors and accrual-based earnings management.*

As well, the presence of a female member in the audit committee can influence the level of earnings management in a firm. Supported by findings of Burgess and Tharenou (2002), the slow growth of the female minority in boards has a positive effect on firms performance. Huang, Yan & Fornaro (2011) hypothesize that female presence in the audit committee can strengthen the corporate governance of firms specifically for both the ethical as the conservatism qualities. Thiruvadi and Huang (2011) find consistent results that female presence in the audit committee lowers earnings management. Therefore the next hypotheses are formulated:

*H7: A negative relation is expected between the size of the audit committee and real earnings management.*

*H8: A negative relation is expected between the size of the audit committee and accrual-based earnings management.*

As noted earlier, Ittonen et al. (2011) find that firms with a chairwoman have lower audit fees, because of the higher effectiveness of the audit committee. Sun et al., (2011) find no direct evidence that support the relation between a female director of the audit committee and the level of earnings management. Thus a negative relation will be expected between a chairwoman and earnings management resulting in the following hypotheses:

*H9: A negative relation is expected between a chairwomen of the audit committee and accrual-based earnings management.*

*H10: A negative relation is expected between a chairwomen of the audit committee and real earnings management.*

The last testing the relation between directors of the board and having shares of their own firm. This relation is expected because manipulating of reported earnings of discretionary accruals is found to take place in firms when the compensation of the CEO's is valued in stock or options they hold (Bergstresser and Philippon, 2006). Therefore the next hypotheses are formulated.

*H11: A positive relation is expected between members of the board having shares of their own firm and accrual-based earnings management.*

*H12: A positive relation is expected between members of the board having shares of their own firm and real earnings management.*

## 3. Method

### 3.1 Data and Sample description

The data for this research is gathered from the database Orbis, by Bureau van Dijk. The base year for this research is 2015. This year is taken as base year because this year provides the most recent, full information.

The original data sample consists of 839 firms from four West-European firms (Germany, France, Netherlands or Belgium). This research uses firms out different countries to increase the data sample. As the number of observations is limited, estimations are unreliable (Marra et al., 2011). The 839 have all information available, that is needed to calculate the earnings management proxies for both real and accrual-based earnings management. Collecting data for gender diversity for both the board of directors as the audit committee had to be done manually. Based on gender statistics in the Orbis database, first the gender of directors in the board are assigned. Selecting first on available gender information for the board results in a reduction of 199 firms. As second step the gender is determined for the audit committee members. As this process was harder due the available gender information, 365 firms are deleted from the original data set. As a large part of the data was selected hand-collected, the likelihood of human errors exists (Thiruvadi, 2012). To prevent for human errors, the remaining 275 are compared with firm specific data as total assets, total sales and cash flow. 30 suspicious firms are deleted to ensure the validity of the data. As some values are not available for calculating the proxies of earnings management, 17 firms are deleted that have at least 2 proxies missing. So finally the final data sample consists of 228 firms.

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**TABLE 1: Sample selection 2015**

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Firms from the Orbis BvD database based on selection of earnings management variables	839
Less: missing gender data board of directors	-199
Less: missing gender data audit committee	-365
Less: Board of directors and audit committees with unreliable gender values	-30
Less: at least 2 proxies for earnings management are missing	-17
Total	228

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### 3.2.1 Independent Variables

#### *Accrual-based Earnings Management*

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This research uses the modified cross-sectional Jones model. The choice for the modified cross-sectional Jones model is based on prior research by Dechow, Sloan and Sweeney(1995). In their paper they evaluate several accrual-based models for detecting earnings management. They find that the modified cross-sectional Jones model is most powerful in detecting earnings management. More recent literature uses the modified cross-sectional Jones model as well (Zang, 2012; Roychowdhury, 2006; Cohen & Zarowin, 2010; Klein, 2002). The modified Jones model is estimated as follows:

$$\frac{Acc_t}{TA_{t-1}} = \alpha_0 + \alpha_1 \left( \frac{1}{TA_{t-1}} \right) + \alpha_2 \left( \frac{\Delta Sales_t}{TA_{t-1}} \right) + \alpha_3 \left( \frac{PPE_t}{TA_{t-1}} \right) + \varepsilon_t \quad (1)$$

With  $Acc_t$  as equitation for the total accruals in 2015,  $TA_{t-1}$  the total assets in 2014.  $\Delta Sales_t$  is defined as the difference in sales volume in 2015 compared with the sales volume in 2014. PPE stands for the plant, property and equipment in 2015. The non-discretionary accruals are measured as follows:

$$NDA_t = \alpha_0 + \alpha_1 \left( \frac{1}{TA_{t-1}} \right) + \alpha_2 \left( \frac{\Delta Sales_t - \Delta AR_t}{TA_{t-1}} \right) + \alpha_3 \left( \frac{PPE_t}{TA_{t-1}} \right) + \varepsilon_t \quad (2)$$

$NDA_t$  stands for the non-discretionary accruals in 2015.  $\Delta AR_t$  is the change in accounts receivable in 2015 compared with the accounts receivable in 2014. Combining equitation (1) and (2), the equitation (3) is computed to measure the level of accrual earnings management:

$$DA_t = \left( \frac{Acc_t}{TA_{t-1}} \right) - NDA_t \quad (3)$$

where  $DA_t$  is discretionary accruals in year 2015.

#### *Real Earnings Management*

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This research rely on prior studies to develop the proxies for real earnings management. The proxies provided by proxies provide by Roychowdhury (2006) and Cohen et al. (2008) are used. These three proxies are the abnormal levels of cash flow from operations (CFO), production costs (PROD) and discretionary expenses(DISC). To further explain these three proxies:

1. The cash flow proxy: This proxy measures the level of earnings management with a view on acceleration of the timing of sales based on an increased price discount or other sales terms. This form of earnings management results in a temporary increase of the amount of goods sold. Both strategies lead to lower cash flows in the current period (Cohen et al., 2008).
2. Production costs: Managers can decide to increase the production more than needed. Overproduction will lower the average fixed costs per product, resulting in declining of total costs per product. For reporting purpose, cost of goods sold will fall and the firm can report higher operating margins (Cohen et al., 2008).
3. Discretionary expenses: These expenses involves advertising-, research and development- and selling, general and administrative expense (SG&A). A manager can easily postpone or bring these expenses to the current period. These policies highly influence the cash flows in the current period (Cohen et al., 2008).

Translating these earnings management proxies into measurable models, the first proxy is the cash flow proxy. Following Roychowdhury (2006) by first running the following regression to determine the coefficients and the intercept of the model.

$$\frac{CFO_t}{TA_{t-1}} = \alpha_0 + \alpha_1 \left( \frac{1}{TA_{t-1}} \right) + \alpha_2 \left( \frac{Sales_t}{TA_{t-1}} \right) + \alpha_3 \left( \frac{\Delta Sales_t}{TA_{t-1}} \right) + \varepsilon_t \quad (4)$$

Where  $TA_{t-1}$  is the total assets at the end of the year 2014.  $Sales_t$  the sales volume in 2015 and  $\Delta Sales_t$  is the difference in sales volume in 2015 compared to the sales volume in 2014.

The second proxy production, is a combination of two models. The first model measures the level of cost of goods sold (5), while the second model measures the growth in inventory (6).

$$\frac{COGS}{TA_{t-1}} = \alpha_0 + \alpha_1 \left( \frac{1}{TA_{t-1}} \right) + \alpha_2 \left( \frac{Sales_t}{TA_{t-1}} \right) + \varepsilon_t \quad (5)$$

$$\frac{\Delta INV_t}{TA_{t-1}} = \alpha_0 + \alpha_1 \left( \frac{1}{TA_{t-1}} \right) + \alpha_2 \left( \frac{\Delta Sales_t}{TA_{t-1}} \right) + \alpha_3 \left( \frac{\Delta Sales_{t-1}}{TA_{t-1}} \right) + \varepsilon_t \quad (6)$$

Combining these two models results in the following model that is suitable for measuring the level of production earnings management:

$$\frac{Prod_t}{TA_{t-1}} = \alpha_0 + \alpha_1 \left( \frac{1}{TA_{t-1}} \right) + \alpha_2 \left( \frac{Sales_t}{TA_{t-1}} \right) + \alpha_3 \left( \frac{\Delta Sales_t}{TA_{t-1}} \right) + \alpha_4 \left( \frac{\Delta Sales_{t-1}}{TA_{t-1}} \right) + \varepsilon_t \quad (7)$$

Where  $TA_{t-1}$  is the total assets in 2014,  $Sales_t$  is the sales volume in 2015,  $\Delta Sales_t$  the difference between sales volume in 2015 the sales volume in 2014.  $\Delta Sales_{t-1}$  is the difference in sales volume for 2014 compared to the sales volume in 2013. As done for the cash flow proxy, first running the regression to determine the coefficients for the model. Followed by computing the level of earnings management for the production proxy.

For measuring the third and last proxy of real earnings management the next model (5) is used.

$$\frac{DisExp_t}{TA_{t-1}} = \alpha_0 + \alpha_1 \left( \frac{1}{TA_{t-1}} \right) + \alpha_2 \left( \frac{Sales_{t-1}}{TA_{t-1}} \right) + \varepsilon_t \quad (8)$$

Where  $TA_{t-1}$  is the total assets in 2015 and  $Sales_{t-1}$  is the sale volume in 2014.

### 3.2.2 Dependent Variables

#### *Board of Directors*

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Two dependent variables are used to measure earnings management for the board. The first variable is the percentage female members (%FEM<sub>BOD</sub>). This is the percentage of the female members divided by the total number of the board of director members. The second variable is shareholder (SHARE). This dummy variable indicates that the directors of the board have also shares in their own firm. Therefore a dummy is computed with a value of 1 when there is a director with shares in their own firm, and 0 other.

#### *Audit Committee*

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The first variable measures the influence of female presence in the audit committee. Therefore, the variable ‘percentage female (%FEM<sub>AC</sub>) is computed, as the number of female members divided by the total number audit committee members. The second model specific variable is a dummy variable, indicating that the chairperson of the audit committee is a woman (CHAIR<sub>AC</sub>). The value 1 indicates that the chairperson of the audit committee is a women, if the chairperson is a men value 0 is assigned.

### 3.2.3 Control Variables

This research includes several control variables. The first control variable is the number of employees (#EMP). This control variable is added to this research as a variable to measure the size of the firm, as size can influence the use of earnings management (Beatty and Harris,



1999). This control variable is measured as the number of employees in the year 2015.

The second control variable is Return on Assets (ROA). This control variable is an indicator for firm performance. The ROA variable is already computed by Orbis, based on the net income divided by the total assets. Firm performance is added as control variable because firms that have poor performance have more incentives to engage in earnings management (Rahman & Ali, 2006). The third control variable is the solvency ratio (SOL). This ratio is added because the solvency ratio measures the ability of an enterprise to meet its debt and other obligations. This ratio indicates if the cash flow is sufficient to meet both the short-term and the long-term liabilities.

The fourth control variable is country (COUNTRY). A country based control variable is added because the data contains 4 countries, that have different rules for compositing the board of directors and the audit committee (Gosh et al., 2010).

The fifth control variable is Auditor (BIG4). High quality auditors are more successful in recognizing earnings management (Ghosh et al., 2010) and have better knowledge and understanding of following managements accounting practices and accounting standards (Rahman & Ali, 2006). Therefore, a dummy variable indicates if a firm has a big 4 auditor (value 1) or other (value 0).

For the audit committee the percentage of financial advisors (%ADV) is used as control variable. Expecting that if a firm has more financial advisors, they engage less in earnings management. This variable percentage advisors (%ADV<sub>AC</sub>) is computed by dividing the number of financial advisors in the firm by the total members of the audit committee.

### 3.3 Empirical analysis

First, the descriptive statistics are evaluated. Concentrating on the minimum and maximum values, mean and standard deviation, for both the board as the audit committee. Tests for normality, Homoscedasticity and multicollinearity are performed to ensure that regression analysis is possible. To determine normality, tests for both Skewness and Kurtosis are performed. Homoscedasticity will be tested by analysing scatterplots. Finally, multicollinearity is tested by measuring the correlations of Pearson and Spearman.

Based on the prior variables, the following multiple regressions are performed:

The audit committee model as follow:

$$EM = \beta_0 + \beta_1 SIZE_{AC} + \beta_2 CHAIR_{AC} + \beta_3 \%FEM_{AC} + \beta_4 \%ADV_{AC} + \beta_5 BIG4 \\ + \beta_6 COUNTRY + \beta_7 \#EMP_{LOG} + \beta_8 \%ROA_{LOG} + \beta_9 \%SOL + \varepsilon$$

The board of directors model as follow:

$$EM = \beta_0 + \beta_1 SIZE_{BOD} + \beta_2 SHARE_{BOD} + \beta_3 \%FEM_{BOD} + \beta_4 BIG4 \\ + \beta_5 COUNTRY + \beta_6 \#EMP_{LOG} + \beta_7 \%ROA_{LOG} + \beta_8 \%SOL + \varepsilon$$

Where:

$SIZE_{AC}$  = number of members in the audit committee;

$SIZE_{BOD}$  = number of directors in the board;

$CHAIR_{AC}$  = dummy variable indicating a value that there is a chairwomen and 0 if otherwise;

$SHARE_{BOD}$  = dummy variable with value 1 if a director of the board has shares in their own firm, otherwise 0;

$\%FEM_{AC}$  = the number of female members in the audit committee divided by the total number of members in the audit committee;

$\%ADV_{AC}$  = the number of advisors for the firm divided by the total number of members in the audit committee;

$\%FEM_{BOD}$  = the number of female directors in the board divided by the total number of members in the board of directors;

$BIG4$  = dummy variable equal to 1 for Big 4 auditor, and 0 otherwise;

$COUNTRY$  = dummy variable equal 1 for firm from France, and 0 otherwise;

$\#EMP_{LOG}$  = log transformation for the number of employees for the firm;

$\%ROA_{LOG}$  = log transformation for the variable return on assets;

$\%SOL$  = percentage solvability

## 4. Results

### 4.1 Descriptive Statistics

Table 2 presents the descriptive statistics of the main variable for calculating the earnings management proxies, total assets, total sales and cash flow in the year 2015. The data sample is sorted by audit committee with at least one female member (N =142) and audit committee with only male members (N = 86). This distinction is there for the board as well. There are 181 boards with at least one female directors, and 47 boards with only male directors.

#### 4.1.1 General descriptive statistics audit committee

The firms with an audit committees having at least one female member have relatively more total assets (total assets €17.901.601) compared to the audit committees consisting of only male members (€10.447.492). The largest firm with at least one female member has more than 3 times the total assets compared to the audit committees with only male members. Also for the variables total sales and cash flow, the average is higher for firms with female members in the audit committee. Total assets is €10.340.667 compared to €6.914.543 for audit committees with only male members and for cash flow €1.210.044 to €728.805. For both total sales and cash flow, the largest firm with at least one female member has twice the total sales/cash flow of the largest firm with only male members.

More to the control variables, the firms with female members in the audit committee have more employees both the mean (49.258 against 22.649 employees) as largest firm (610.076 against 238.162 employees) indicating that the firms in the data sample with at least one female member have larger firms compared to the firms in the data sample consisting of audit committees with only male members. The average Return on asset (ROA) is 3,84% compared to 2,35% for firms with only male members in the audit committee. As this variable gives an indication of how well a firm performs, shows this average that firms with at least one female member in the audit committee perform better and have higher net income relative to the average of total assets. The average solvability is for both categories almost the same (41.54% against 41,91%). The minimum value of a firm with at least one female member in the audit committee is negative (-9,40%) indicating that a firm has more outstanding debts relative to equity, what could be a concern.

#### 4.1.2 General descriptive statistics Board of Directors

The part of the data sample that includes the firms that have at least one female director have relatively lower total assets compared to firms that have only male directors in the board. The statistics regarding total sales imply that the boards with only male members have higher sales. The sales volume compared with firms with at least one female in the board is €16.481.199 against €7.450.472. So the average sales volume is twice the volume for boards with fully male directors. There are also differences in the statistics of the cash flow. The average cash flow is lower for firms with at least one female director. Thereby the minimum value of one of the firms is much lower compared to the minimum value of the firm from the board with only male members (€-2.003.000 against €-21.761).

Comparing the control variables, the first control variable employees indicates that firms that have only male directors, have relatively more employees (35.116 against 55.033 employees). The return on assets (ROA) is higher on average for firms having a board with at least one female director (3,53% against 2,33%). The maximum value of ROA is higher for boards with at least one female director (49,47%) while the maximum ROA value for a firm with only male directors is much lower (17,06%). The last control variable solvability (SOL) is almost identical for both data samples. For firms having a board with at least one female director is the solvability 41,81%, while this percentage is 41,18% for firms with only male directors.

**TABLE 2: General descriptive statistics**

			Minimum	Maximum	Mean	Std. Deviation
<b>Total assets</b>	<i>Audit Committee<sub>Female</sub></i>	142	2.943	381.935.000	17.901.601	3.804.074
<b>2015 in €</b>	<i>Audit Committee<sub>Male</sub></i>	86	9.877	105.782.000	10.447.492	2.499.144
	<i>Board of Directors<sub>Female</sub></i>	181	2.943	278.941.000	12.724.664	2.179.616
	<i>Board of Directors<sub>Male</sub></i>	47	31.017	381.935.000	24.198.881	9.090.946
<b>Total sales</b>	<i>Audit Committee<sub>Female</sub></i>	142	1.473	202.458.000	10.340.667	1.922.943
<b>2015 in €</b>	<i>Audit Committee<sub>Male</sub></i>	86	3.481	110.595.000	6.914.543	1.807.251
	<i>Board of Directors<sub>Female</sub></i>	181	1.288	75.636.000	7.450.472	1.035.112
	<i>Board of Directors<sub>Male</sub></i>	47	12.084	213.292.000	16.481.199	5.554.648
<b>Cash flow</b>	<i>Audit Committee<sub>Female</sub></i>	142	-2.003.000	14.611.000	1.210.044	222.407
<b>2015 in €</b>	<i>Audit Committee<sub>Male</sub></i>	86	-45.915	7.393.000	728.805	1.570.917
	<i>Board of Directors<sub>Female</sub></i>	181	-2.003.000	13.696.000	902.819	149.842

	<i>Board of Directors<sub>Male</sub></i>	47	-21.761	14.611.000	1.512.624	464.847
#EMP	<i>Audit Committee<sub>Female</sub></i>	142	24	610.076	49.258	8.061
	<i>Audit Committee<sub>Male</sub></i>	86	21	238.162	22.649	5.034
	<i>Board of Directors<sub>Female</sub></i>	181	24	422.844	35.116	4.988
	<i>Board of Directors<sub>Male</sub></i>	47	21	610.076	55.033	17.980
ROA%	<i>Audit Committee<sub>Female</sub></i>	142	-26,31	40,54	3,84	,63
	<i>Audit Committee<sub>Male</sub></i>	86	-36,86	49,47	2,35	9,56
	<i>Board of Directors<sub>Female</sub></i>	181	-26,31	49,47	3,53	,61
	<i>Board of Directors<sub>Male</sub></i>	47	-36,86	17,06	2,33	1,32
SOL%	<i>Audit Committee<sub>Female</sub></i>	142	-9,40	97,14	41,54	1,48
	<i>Audit Committee<sub>Male</sub></i>	86	4,97	93,85	41,91	2,13
	<i>Board of Directors<sub>Female</sub></i>	181	-9,40	97,14	41,81	1,34
	<i>Board of Directors<sub>Male</sub></i>	47	4,98	93,85	41,18	2,94

Explanation variables:

#EMP<sub>LOG</sub> = log transformation for the number of employees for the firm;

%ROA<sub>LOG</sub> = log transformation for the variable return on assets;

%SOL = percentage solvability

Table 2 presents the descriptive statistics of the main variable for calculating the earnings management proxies, total assets, total sales and cash flow in the year 2015. The data sample is sorted by audit committee with at least one female member (N =142) and audit committee with only male members (N = 86). This distinction is there for the board as well. There are 181 boards with at least one female directors, and 47 boards with only male directors.

### 4.1.3 Model specific statistics: Audit Committee

Table 3 shows the specific audit committee specific statistics. The average size of the audit committees with at least one female member is 4 (3,94). Thereby the smallest audit committee exists of 3 members. The largest audit committee has 8 members. For audit committees with only male members is the average size lower, namely 3 (3,24). The minimum number of members is for both 3. The maximum number of members in the audit committee is 5. On average for the firms with an audit committee with at least one female member, the audit committee exists for 39,6% percent of female members, with a minimum of 17 percent, and a maximum of 100 percent. The CHAIR<sub>AC</sub> is a dummy variable, with a minimum value of 0 and maximum value is 1. The average of 0,43% indicates that in 43 percent of the 142 firms the chairperson is a female member.

**TABLE 3: Audit committee specific descriptive statistics**

<b>SIZE<sub>AC</sub></b>	<i>Audit Committee<sub>Female</sub></i>	142	3	8	3,94	,093
	<i>Audit Committee<sub>Male</sub></i>	86	3	5	3,24	,530
<b>%FEM<sub>AC</sub></b>	<i>Audit Committee<sub>Female</sub></i>	142	,17	1,00	,396	,014
	<i>Audit Committee<sub>Male</sub></i>	86	0	0	,00	,00
<b>%ADV<sub>AC</sub></b>	<i>Audit Committee<sub>Female</sub></i>	142	,25	2,67	1,369	,0393
	<i>Audit Committee<sub>Male</sub></i>	86	,33	2,33	1,4461	,44693
<b>CHAIR<sub>AC</sub></b>	<i>Audit Committee<sub>Female</sub></i>	142	0	1	0,43	0,042
	<i>Audit Committee<sub>Male</sub></i>	86	0	0	,00	,000

SIZE<sub>AC</sub> = number of members in the audit committee;

#FEM<sub>AC</sub> = The number female members in the audit committee

%FEM<sub>AC</sub> = the number of female members in the audit committee divided by the total number of members in the audit committee;

%ADV<sub>ac</sub> = The number of advisors for the firm divided by the total number of members in the audit committee

CHAIR<sub>AC</sub> = dummy variable indicating a value that there is a chairwomen and 0 if otherwise;

#### 4.1.4 Model specific statistics: Board of Directors

The size of the board of directors for firms with at least one female director is 12,50, varying with a size of a minimum of 2 and maximum of 45 directors. The average board size is lower for firms with only male directors, where they have an average board of 5 (4,57) directors with at least 2 male directors and a maximum of 12 male directors. As a percentage, the firms with at least one female director exists of 32% of female directors, whereby the minimum proportion female directors is 4% and maximum of 54%. The dummy variable (minimum value 0, maximum value 1) SHARE indicates of a member of the board has shares of the own firm. For the firms with at least one female director is the average 0,34 and for the boards with only male directors 0,23.

**TABLE 4: Board of director specific descriptive statistics**

<b>SIZE<sub>BOD</sub></b>	<i>Board of Directors<sub>Female</sub></i>	180	2	45	12,50	,471
	<i>Board of Directors<sub>Male</sub></i>	47	2	12	4,57	2,69
<b>SHARE</b>	<i>Board of Directors<sub>Female</sub></i>	181	0	1	,34	,035
	<i>Board of Directors<sub>Male</sub></i>	47	0	1	,23	,428
<b>%FEM<sub>BOD</sub></b>	<i>Board of Directors<sub>Female</sub></i>	181	,04	,54	,32	,008
	<i>Board of Directors<sub>Male</sub></i>	47	,00	,00	,00	,000

SIZE<sub>BOD</sub> = number of directors in the board;

SHARE<sub>BOD</sub> = dummy variable with value 1 if a director of the board has shares in their own firm, otherwise 0;

%FEM<sub>BOD</sub> = the number of female directors in the board divided by the total number of members in the board of directors;

## 4.2 Regression assumptions

This section provides the results for testing the regression assumptions. The following tests are discussed; Normality, Homoscedasticity and multicollinearity.

### 4.2.1 Normality

First step in determining of the data sample is suitable for regression analysis is testing for normality. Therefore both skewness and kurtosis are tested. Table 5 displays the values of skewness, kurtosis and the standard error of both. The value of skewness and kurtosis is acceptable if the value is less than three times the standard error (Field, 2011). Analyzing the skewness results, percentage female members in the audit committee, percentage advisors, percentage female directors in the board, size of the audit committee, size of the board of directors and number of employees have problematic values. For kurtosis, the variables percentage advisors, percentage female members in the board, size of audit committee, size of board of directors, return on assets and number of employees have to high values. An option given by Field (2011) to improve the skewness and kurtosis values is by applying a log transformation. Therefore these variables are log transformed.

**TABLE 5: Skewness and Kurtosis**

	Skewness	Standard error	Kurtosis	Standard error
		Skewness		Kurtosis
<b>%FEM<sub>AC</sub></b>	,645	,161	,021	,321
<b>%ADV<sub>AC</sub></b>	2,455	,162	8,359	,322
<b>%FEM<sub>BOD</sub></b>	,838	,161	2,761	,321
<b>SIZE<sub>AC</sub></b>	1,627	,161	2,459	,321
<b>SIZE<sub>BOD</sub></b>	1,123	,161	2,395	,321
<b>%ROA</b>	,196	,161	9,197	,321
<b>%SOL</b>	,387	,161	,559	,321
<b>#EMP</b>	3,714	,161	17,338	,321

%FEM<sub>AC</sub> = The number of female members in the audit committee divided by the total number of members in the audit committee;

%ADV<sub>AC</sub> = The number of financial advisors for the firm divided by the total number of members in the audit committee;

%FEM<sub>BOD</sub> = The number of female directors in the board divided by the total number of members in the board of directors;

SIZE<sub>AC</sub> = Number of members in the audit committee;

SIZE<sub>BOD</sub> = Number of directors in the board;

#EMP = Number of employees;

%ROA = Percentage return on assets;

%SOL = Percentage solvability.

The results of the log transformation are presented in table 6. The kurtosis of the percentage female members in the audit committee became worse, while the skewness improved. Therefore the log variable will not be used further. All other variables improved for both skewness and kurtosis and are now in the range of three times the standard error, except the variable audit committee size and the size of the board of directors. Despite the values for audit committee size (1,627 / 1,161) and board of director size (1,123 / - ,555) are improved are they still too high. Another option given by Field (2011) is deleting outliers, but removing variables is risky because of losing potential information. Therefore no other variables are deleted.

**TABLE 6: Normality results after log transformation**

	<b>Skewness</b>	<b>Standard error</b>	<b>Kurtosis</b>	<b>Standard error</b>
		<b>Skewness</b>		<b>Kurtosis</b>
<b>%FEM<sub>AC_LOG</sub></b>	-,488	,161	-1,774	,321
<b>%ADV<sub>AC_LOG</sub></b>	,005	,162	1,012	,322
<b>%FEM<sub>BOD_LOG</sub></b>	,282	,162	,646	,322
<b>SIZE<sub>AC_LOG</sub></b>	1,161	,161	,446	,321
<b>SIZE<sub>BOD_LOG</sub></b>	-,555	,161	-,157	,321
<b>#EMP<sub>LOG</sub></b>	-,328	,161	-,404	,321
<b>%ROA<sub>LOG</sub></b>	-,549	,169	,692	,336

%FEM<sub>AC\_LOG</sub> = Log transformation of the percentage female members in the audit committee;

%ADV<sub>AC\_LOG</sub> = Log transformation of the percentage financial advisors in the firm;

%FEM<sub>BOD\_LOG</sub> = Log transformation of the percentage female directors in the board;

SIZE<sub>AC\_LOG</sub> = Log transformation of the audit committee size;

SIZE<sub>BOD\_LOG</sub> = Log transformation of the board size;

#EMP<sub>LOG</sub> = log transformation for the number of employees for the firm;

%ROA<sub>LOG</sub> = log transformation for the variable return on assets;

## 4.2.2 Homoscedasticity

As a second assumption for regression analysis, the data sample is tested for homoscedasticity. To determine homoscedasticity, scatterplots are performed, and added to the appendix 1 and 2. According to Field (2011) variables that have the same variance are homoscedastic. If variables are homoscedastic they show a line in their plots. Analysing the plots in appendix 1 and 2, both models for the board and the audit committee show an up going line in their plots. Therefore all dependent variables are homoscedastic.



### 4.2.3 Multicollinearity

As last concern, tests are performed to prevent for multicollinearity between independent (predictor) variables in the model. According to Field (2011) multicollinearity can be detected by scanning a correlation matrix of the predictor variables and control for very high values. Field (2011) states that values higher than 0.80 are problematic. The spearman correlation coefficient is useful to minimize the effects of extreme scores. While the Pearson correlation coefficient is a standardized measure of the strength of relationship between two variables (Field, 2011). Table 7, panel a displays the correlation matrices for the audit committee model, while panel b presents the correlation matrices of the board model.

For the audit committee model, the highest Pearson correlation is the correlation between the variables CHAIR<sub>AC</sub> and %FEM<sub>AC</sub> (.558). The highest Spearman correlation is between the variables SIZE<sub>AC\_LOG</sub> and %ADV<sub>AC</sub> (-.543). As these values are below the 0.80 there are no multicollinearity problems for the audit committee model.

Analysing the correlation values for the board model, there are no concerning values that are indicators of multicollinearity, as both the Spearman correlation between the variables %SOL and #EMP<sub>LOG</sub> (-.338) and Pearson correlation %FEM<sub>BOD\_LOG</sub> and SIZE<sub>BOD\_LOG</sub> (.344) is lower than 0,8.

**TABLE 7: Correlation matrices**

**Panel A: Pearson (Upper Triangle) and Spearman (Lower triangle) Correlations Audit Committee model**

AC	SIZE <sub>AC_LOG</sub>	CHAIR <sub>AC</sub>	%FEM <sub>AC</sub>	%ADV <sub>AC</sub>	BIG4	COUNTRY	#EMP <sub>LOG</sub>	%ROA <sub>LOG</sub>	%SOL
SIZE <sub>AC_LOG</sub>	1	-.006	,226**	-.469**	,147*	-.031	,116	-.085	,087
CHAIR <sub>AC</sub>	-.006	1	,558**	,044	-.028	-.034	,049	,185**	-.015
%FEM <sub>AC</sub>	,248**	,535**	1	-.070	,105	-.106	,204**	-.072	-.098
%ADV <sub>AC</sub>	-.543**	,052	-.097	1	-.006	-.327**	,040	-.015	-.056
BIG4	,147*	-.028	,098	-.008	1	,008	,236**	-.042	-.133*
COUNTRY	,020	-.056	-.123	-.334**	,027	1	-.102	,192**	,085
#EMP <sub>LOG</sub>	,170*	,052	,186**	,022	,236**	-.079	1	-.058	-
%ROA <sub>LOG</sub>	-.071	,182**	-.086	-.048	-.032	,182**	-.059	1	,277**

%SOL	,061	-,013	-,061	-,067	-,120	,067	-,338**	,283**	1
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**Panel B: Pearson (Upper Triangle) and Spearman (Lower triangle) Correlations Board of Director model**

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BOD	SIZE <sub>BOD_LOG</sub>	SHARE	%FEM <sub>BOD_LOG</sub>	BIG4	COUNTRY	#EMP <sub>LOG</sub>	%ROA <sub>LOG</sub>	%SOL
SIZE <sub>BOD_LOG</sub>	1	,004	,344**	,135*	-,097	,189**	-,071	-,090
SHARE	-,033	1	,016	-,136*	-,205**	-,069	-,003	,067
%FEM <sub>BOD_LOG</sub>	,283**	,034	1	,078	-,275**	,052	,064	-,023
BIG4	,150*	-,136*	,074	1	,008	,236**	-,042	-,133*
COUNTRY	-,181**	-,218**	-,332**	,027	1	-,102	,192**	,085
#EMP <sub>LOG</sub>	,211**	-,096	,080	,236**	-,079	1	-,058	-,379**
%ROA <sub>LOG</sub>	-,098	-,007	,073	-,032	,182**	-,059	1	,277**
%SOL	-,075	,065	-,036	-,120	,067	-,338**	,283**	1

\*, \*\* Represent significance at the level of 10 percent and 5 percent.

SIZE<sub>AC\_LOG</sub> = The log transformation of the number of members in the audit committee;

SIZE<sub>BOD\_LOG</sub> = The log transformation of the number of directors in the board;

%FEM<sub>BOD\_LOG</sub> = the log transformation of the percentage female members in the board of directors;

CHAIR<sub>AC</sub> = dummy variable indicating a value that there is a chairwomen and 0 if otherwise;

SHARE<sub>BOD</sub> = dummy variable with value 1 if a director of the board has shares in their own firm, otherwise 0;

%FEM<sub>AC</sub> = the number of female members in the audit committee divided by the total number of members in the audit committee;

%ADV<sub>AC</sub> = the number of advisors for the firm divided by the total number of members in the audit committee;

%FEM<sub>BOD\_LOG</sub> = The log transformation of the percentage of female members divided by board size;

BIG4 = dummy variable equal to 1 for Big 4 auditor, and 0 otherwise;

COUNTRY = dummy variable equal 1 for firm from France, and 0 otherwise;

#EMP<sub>LOG</sub> = log transformation for the number of employees for the firm;

%ROA<sub>LOG</sub> = log transformation for the variable return on assets;

%SOL = percentage solvability.

## 4.3 Empirical results

This section provides the results of the multiple regression analysis for both the board of directors model as the audit committee model. First the model specific statistics are developed, following by an analysis of the control variables and ending with testing the formulated hypotheses.

### 4.3.1 Audit committee

As well for the audit committee regression model, All F-values are significant. For the real earnings management proxies cash flow and production costs the F-value is highly significant at a level of 1%, while the discretionary expenses proxy is significant at 5%. The last proxy accrual-based earnings management has the lowest significant F-value and is significant at

10%. The control variable return on assets is highly significant at a level of 1% and have a negative relation with all earnings management proxies. A weak significant positive relation is found between the proxy REM production costs and BIG4 as well a positive significant relation is found between the proxy REM discretionary expenses and Country. Solvency is significant at 5% for the proxy REM cash flow.

The third and fourth hypotheses stated that there is a negative relation between the audit committee size ( $SIZE_{AC\_LOG}$ ) and real or accrual-based earnings management. Between audit committee size and the real earnings management are only positive relations. The regression result for the accrual-based earnings management proxy suggest that there is a negative relation between accruals and the size of the audit committee. These three proxies suggest that there is a positive relation between audit committee size and real earnings management, and a negative relation between audit committee size and accrual-based earnings management.

For testing the influence of female members in the audit committee, percentage female members in the audit committee ( $\%FEM_{AC}$ ) is important. As hypothesized a negative relation is expected. The proxies REM production costs and REM discretionary expenses found a negative relation. Only the proxy REM production costs has a significant relation (significant at 5 percent). Therefore, these results support the seventh hypothesis, that there is a negative relation between the presence of female members on real earnings management. This indicates that if a firm has female members in the audit committee, they will less engaged in earnings management by overproducing.

The relationship between  $CHAIR_{AC}$  and the proxies REM production costs and REM discretionary expenses is significant. In contrast with the expectation of the ninth and tenth hypotheses, the relation is positive. This indicates that if the chairperson of the audit committee is a female, the firm is more engaged in earnings management by overproducing and have higher discretionary expenses.

**TABLE 9: regression results; Audit Committee model**

	REM_CFO	REM_PROD	REM_DISC	ACCRUALS
<b>SIZE<sub>AC</sub>_LOG</b>	.446 (.764)	.336 (.964)	.426 (.798)	.813 (-.237)
<b>CHAIR<sub>AC</sub></b>	.289 (1.063)	.000 *** (3.550)	.003 *** (2.990)	.450 (.757)
<b>%FEM<sub>AC</sub></b>	.961 (.049)	.043 ** (-2.040)	.140 (-1.484)	.270 (1.105)
<b>%ADV<sub>AC</sub></b>	.225 (1.218)	.486 (-.698)	.289 (-1.063)	.615 (-.504)
<b>BIG4</b>	.887 (.142)	.093 * (1.691)	.820 (-.228)	.485 (.700)
<b>COUNTRY</b>	.103 (-1.637)	.324 (.988)	.050 * (1.971)	.959 (-.052)
<b>#EMP<sub>LOG</sub></b>	.203 (1.276)	.595 (.533)	.507 (-.664)	.348 (.941)
<b>%SOL</b>	.036 ** (-2.115)	.802 (-.252)	.591 (-.539)	.330 (.977)
<b>%ROA<sub>LOG</sub></b>	.000 *** (-7.694)	.000 *** (-3.939)	.039 *** (-2.077)	.003 *** (-3.003)
<b>(Constant)</b>	.729 (.347)	.480 (-.708)	.557 (.588)	.779 (.281)
<b>N</b>	228	228	280	280
<b>Adjusted R<sup>2</sup></b>	0.336	0.097	0.053	0.033
<b>F-value</b>	12.035 ***	3.432 ***	2.260 **	1.782 *

\*, \*\*, \*\*\* Represent significance at the level of 10 percent, 5 percent and 1 percent levels.

The following regression model is used for REM\_CFO, REM\_PROD, REM\_DISC and ACCRUALS :

$$EM = \beta_0 + \beta_1 SIZE_{AC} + \beta_2 CHAIR_{AC} + \beta_3 \%FEM_{AC} + \beta_4 \%ADV_{AC} + \beta_5 BIG4 + \beta_6 COUNTRY + \beta_7 \#EMP_{LOG} + \beta_8 \%ROA_{LOG} + \beta_9 \%SOL + \varepsilon$$

Explanation variables:

SIZE<sub>AC</sub>\_LOG = The log transformation of the number of members in the audit committee;

CHAIR<sub>AC</sub> = dummy variable indicating a value that there is a chairwomen and 0 if otherwise;

%FEM<sub>AC</sub> = the number of female members in the audit committee divided by the total number of members in the audit committee;

%ADV<sub>AC</sub> = the number of advisors for the firm divided by the total number of members in the audit committee;

BIG4 = dummy variable equal to 1 for Big 4 auditor, and 0 otherwise;

COUNTRY = dummy variable equal 1 for firm from France, and 0 otherwise;

#EMP<sub>LOG</sub> = log transformation for the number of employees for the firm;

%ROA<sub>LOG</sub> = log transformation for the variable return on assets;

%SOL = percentage solvability.

### 4.3.2 Board of directors

Table 8 presents the results for the board of directors model. All real earnings management (REM) proxies have an F-statistic that is significant at 1 percent, while the accrual-based earnings management proxy is significant at 10 percent. In line with Peni & Vähämaa (2010) there is a relative low adjusted R<sup>2s</sup> for accruals. In the REM cash flows proxies, three control

variables are significant. Only one control variable is significant for the REM production costs proxy, as no control variable is significant for the proxy REM discretionary expenses. The accrual-based earnings management has only the return on assets as significant control variable.

The variables relevant for this research are board size ( $SIZE_{BOD\_LOG}$ ), percentage female directors ( $\%FEM_{BOD\_LOG}$ ) and if the directors have shares in their own firm ( $SHARE$ ). As hypothesized a positive relation between board size and real earnings management is expected. Only the REM cash flow proxy shows a negative relation, while the REM production costs and REM discretionary expenses show a positive relation. However there is no significant relation, so there is no empirical support for the first hypothesis. The results show a weak significant relation between board size and accrual-based earnings management at 10 percent. This result supports the findings by Rahman and Ali (2006) and Xie et al. (2011) who find a positive association between accrual-based earnings management and board size. When a board has more members, it becomes harder to coordinate and process problems, while when a board is smaller there is a lower chance that directors act in their own interests, and there is more control and therefore it increases the accountability (Rahman & Ali, 2006).

The second variable interesting for this research is percentage female directors in the board ( $\%FEM_{BOD\_LOG}$ ). For both real as accrual-based earnings management a negative relation is predicted. For most proxies, a negative relation is found, suggesting that there is a negative relation between the presence of female directors in the board and lower earnings management. Nevertheless, these results did not find significant support.

The last hypothesis formed for the board hypothesized that there is a negative relation between directors that have shares in their own firm and real and accrual-based earnings management. As shown in table 8 all proxies show a negative relation, and thereby a strong significant relation is found for the proxy REM discretionary expenses (significant at 1%) and a significant relation is found for the REM production costs (significant at 5%). So these results show that when directors have shares of their own firm, they are less engaged in earnings management by lowering production costs or increasing discretionary expenses. As a possible explanation, directors that are shareholders could engage less in earnings management to prevent for scrutiny.

**Table 8: Regression results board of directors model**

	REM_CFO	REM_PROD	REM_DISC	ACCRUALS
<b>SIZE<sub>BOD_LOG</sub></b>	.183 (-1.335)	.736 (.337)	.800 (.254)	.083 * (1.743)
<b>%FEM<sub>BOD_LOG</sub></b>	.912 (.110)	.212 (-1.253)	.193 (-1.306)	.808 (-.243)
<b>SHARE</b>	.577 (-.558)	.034 ** (-2.140)	.000 *** (-3.799)	.853 (.185)
<b>BIG4</b>	.818 (.230)	.229 (1.207)	.465 (-.732)	.518 (.648)
<b>COUNTRY</b>	.033 ** (-2.144)	.685 (.407)	.217 (1.239)	.927 (.092)
<b>#EMP<sub>LOG</sub></b>	.193 (1.307)	.799 (.255)	.377 (-.886)	.376 (.888)
<b>%SOL</b>	.022 ** (-2.303)	.814 (-.236)	.757 (-.310)	.318 (1.001)
<b>%ROA<sub>LOG</sub></b>	.000 *** (-7.431)	.003 *** (-2.965)	.187 (-1.323)	.005 ** (-2.807)
<b>(Constant)</b>	.026 ** (2.237)	.650 (.454)	.030 ** (2.180)	.600 (-.525)
<b>N</b>	280	280	228	228
<b>Adjusted R<sup>2</sup></b>	.319	.063	.075	.029
<b>F-value</b>	12.475 ***	2.719 ***	3.050 ***	1.772 *

\*, \*\*, \*\*\* Represent significance at the level of 10 percent, 5 percent and 1 percent levels.

The following regression model is used for REM\_CFO, REM\_PROD, REM\_DISC and ACCRUALS:

$$EM = \beta_0 + \beta_1 SIZE_{BOD} + \beta_2 SHARE_{BOD} + \beta_3 \%FEM_{BOD} + \beta_4 BIG4 + \beta_5 COUNTRY + \beta_6 \#EMP_{LOG} + \beta_7 \%ROA_{LOG} + \beta_8 \%SOL + \varepsilon$$

Explanation variables:

SIZE<sub>BOD\_LOG</sub> = The log transformation of the number of directors in the board;

%FEM<sub>BOD\_LOG</sub> = The log transformation of the percentage female members in the board of directors;

SHARE<sub>BOD</sub> = dummy variable with value 1 if a director of the board has shares in their own firm, otherwise 0;

BIG4 = dummy variable equal to 1 for Big 4 auditor, and 0 otherwise;

COUNTRY = dummy variable equal 1 for firm from France, and 0 otherwise;

#EMP<sub>LOG</sub> = log transformation for the number of employees for the firm;

%SOL = percentage solvability;

%ROA<sub>LOG</sub> = log transformation for the variable return on assets;

## 5. Conclusion and Discussion

As a growing topic, gender diversity in the board and audit committee gain more attention as women are expecting to be more conservative, risk averse and ethical (Peni & Vähämaa, 2010). More understanding of the influence by female members in the audit committee or directors in the board of directors is favourable for directors, shareholders, managers and regulators as well. Thereby, investigating this relation gives more insights in the effectiveness of board and audit committee. The effectiveness should increase after implementing the new requirements of SOX section 301 and the Blue Ribbon Committee Report. There is need for an effective board and audit committee as most of the recent earnings management problems are attributed to a lack of monitoring by the audit committee and the board of directors. Thereby the board of directors is the highest internal control mechanism that has the responsibility to monitor the actions of top management. Contrary to existing literature, this research investigates both real as accrual-based earnings management. Accrual-based earnings management exists when a manager makes his choice based on other general accepted accounting principles while real earnings management occurs when a manager changes the timing of a financial transaction in order to change the output of the accounting system (Gunny, 2010). Prior research find that gender diversity in the board and audit committee influences earnings management. Firms with female members in the audit committee have higher audit quality and are less likely to engage in earnings management. Firms with female directors apply more in conservative earnings management strategies and put more effort in their monitoring task.

To investigate the association between both real as accrual-based earnings management and the influence of gender diversity in the audit committee and the board of directors, a data sample of 228 listed firms is used. For indicating the relation between earnings management and gender diversity four regression models are computed based on the real earnings management proxies developed by Roychowdhury (2006). The modified cross-sectional Jones model (Dechow et al., 1995) is used to determine the level of the accrual-based earnings management proxy. Opposite to prior research and as a contribution to the existing literature, this research focuses on both real and accrual-based earnings management.

The results show support for the presence of female members in the audit committee and real earnings management. This implies that if the audit committee has more female members, firms engage less in managing production costs. While there is no empirical support for the relation between female presence in the audit committee and accrual-based earnings

management. There is strong support for the relation between the chair person and real earnings management. Contrary to the findings of Ittonen (2009) is this relation positive implying that firms with a chairwoman engage more in real earnings management.

In line with Rahman and Ali (2006) and Xie et al (2002) this research find similar results between the board size and accrual-based earnings management. Finding a positive relation indicate that larger boards are ineffective in controlling accrual-based earnings management. An explanation for this is that it is harder to coordinate and process problems when there are more members in the board of directors. There is a relation between having shares of their own firm and being director in the board. This may imply that directors having shares of their own firm have less incentives to engage in earnings management. The findings in this research do not support the relation of gender diversity in the board of directors and engaging in earnings management. They imply that there is a negative relation between the presence of female members and earnings management indicating that firms with female members in the board of directors engage less in earnings management, although there is no significant evidence found.

This research has a few limitations. First the data sample is relatively small. In the process of manually adding the gender variables a lot of firms are deleted. In addition to that, the data sample is lower because only firms with gender values for both of the audit committee and the board are used. Results of a larger data sample might find different results. Second, based on the data available in Orbis by Bureau van Dijk was it not possible to determine the gender of the board of directors president. So it is not possible to investigate the relation between having a female president of the board and earnings management. Third, two dependent variables have skewness even after applying a log transformation. Despite the skewness values are improved, could the skewness influence the results. Fourth, the proxies for measuring earnings management are static. While this research only uses one year in determining the level of earnings management, firms can be assigned as 'applying in earnings management' while it was only one bad year.

Further research can be done in the area of these limitations. Investigating gender diversity for the board and audit committee, first based on a larger data sample. Second, investigating the influence of gender diversity in the board and audit committee for several years. Since there is a significant relation between chairwoman and earnings management it can be interesting in analysing these results further, by investigating the difference by a change of gender for the chairperson. More research can be done in the area of the gender of



the board of directors, possibly combined with the gender of the chairperson of the audit committee. As last suggestion, the cultural gender differences and the effect of the audit committee and board on earnings management can be investigated. In line with Ghosh et al., who already investigated various audit committees and board of directors by institutional differences.

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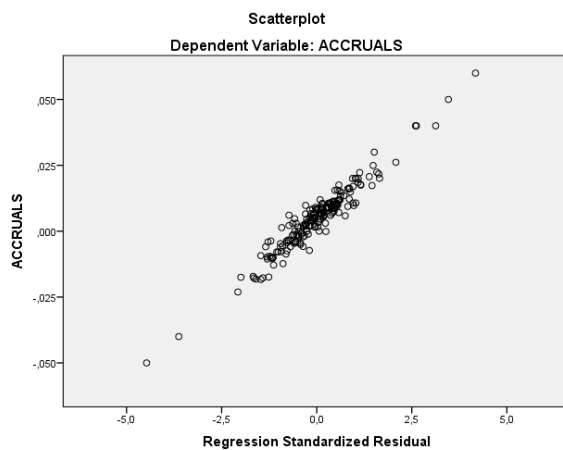
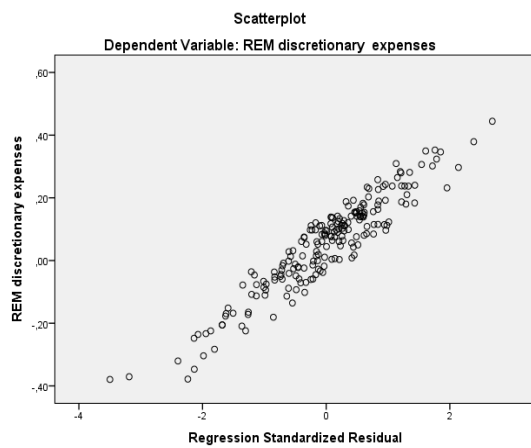
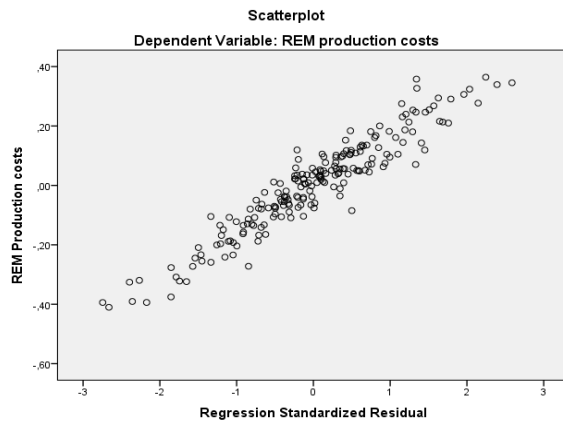
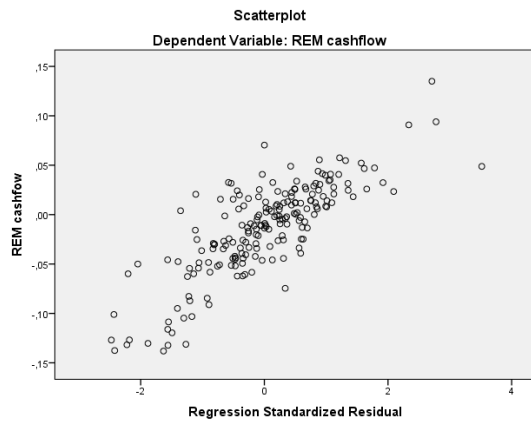
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# Appendix 1: Homoscedasticity Board of directors



## Appendix 2: Homoscedasticity Audit Committee

