UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Master Degree Project in Accounting

# Earnings Management and Female Representation on the Board of Directors

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# University of Gothenburg

## School of Business, Economics and Law

### Master thesis in Accounting

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## ABSTRACT

In order for financial reporting to serve its purpose, the information conveyed needs to be correct. This paper addresses gender diversity on boards of directors, a factor argued to have a beneficial impact on corporate governance and thus in extension the correctness of presented corporate information. We look at this relationship by using the Modified Jones Model to proxy Earnings Management and find a negative association between this proxy variable and female representation on boards of directors in Norway. The exogenous shock, in the shape of a gender quota, that was introduced in Norway seriously mitigates problems with endogeneity. The implication of this is that we can establish the causal direction: that gender diversity affects earnings management and not the other way around.

**Keywords**: Earnings management, corporate governance, gender diversity, board composition, gender quota.

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# Contents

# 1 Introduction

Without information, there can be no decisions. Stakeholders of a company rely heavily on sound and good information in order to make decisions, a necessary condition threatened by management incentives to manipulate numbers and information to maximize their own wealth; a phenomenon described as the agency problem (Jensen and Meckling 1976). Managers could manipulate the information presented to stakeholders motivated by different incentives, such as bonus programs (Gaver et al. 1995; Bergstresser and Philippon 2006; Cheng and Warfield 2005), the stock market (Cohen and Zarowin 2010; Guthrie and Sokolowsky 2010), debt covenants (Franz et al. 2014) and regulatory motivations (Watts and Zimmerman 1978; Han and Wang 1998). Manipulation undertaken by the management in a firm is often referred to as earnings management, which can be explained as judgments made by managers to mislead stakeholders of a firm (Healy and Wahlen 1999). Thus, earnings management affects the stakeholders' ability to make well-informed decisions. For example, shareholders of a company need correct financial information to decide whether to hold, buy or sell securities on different capital markets (Xie et al. 2003). Biased information, due to earnings management, could lead to incorrect decisions having a real financial impact for the shareholders of a firm. To avoid this adverse effect, it is necessary to align the interests of shareholders and managers. This can be done by a number of monitoring activities and processes (Jensen and Meckling 1976), generally referred to as 'corporate governance'.

Earnings management and corporate governance are topics that have become frequently discussed in the aftermath of corporate scandals such as Enron and WorldCom. Corporate governance serves the purpose to control managers to ensure the alignment with shareholders (Lin and Hwang 2010), and one central component of corporate governance is the board of directors that has a monitoring function of the firm (Thomsen and Conyon 2012). Several studies have examined the relationship between the composition of the board (board independence, board size, CEO duality etc.) and corporate governance (e.g. Chen et al. 2015; Yermack 1996; Cornett et al. 2008). For example, independent directors rely less on and have less ties to the firm and its performance and are thus believed to exert a more objective and unbiased monitoring control of the firm.

More recently, an aspect of board composition receiving increasing attention is gender. Gender equality has been a political question for quite a while, leading to discussions whether gender quotas should be implemented (Dawson et al. 2014). Existing literature has tried to study the effect of gender, to measure the potential impact from more females being introduced to high positions in companies (e.g. Krishnan and Parsons 2008; Adams and Ferreira 2009). Part of this literature has examined whether there is a relationship between gender and earnings management. These studies presume that females have different characteristics in comparison to males (e.g. Srinidhi et al. 2011) affecting the reporting of financial information and thus the occurrence of earnings management (Krishnan and Parsons 2008). Several studies have found a negative association between gender diversity and earnings management (Krishnan and Parsons 2008; Srinidhi et al. 2011) while others find no such association (Ye et al. 2010). However, as gender equality has not been supported by legislation until recently, most of the performed studies in this field suffer from endogeneity (e.g. Gavious et al. 2012), questioning whether the findings are trustworthy and that gender diversity truly is a factor influencing earnings management. Among others, Post and Byron (2015) call for studies to investigate the effects of increased gender diversity in settings where endogeneity problems can be excluded, or at least limited.

The purpose of this paper is to investigate any relationship between gender diversity (female representatives) on boards of directors and earnings management. Based on previous

literature we hypothesize a negative association between the fraction of females on the board and the magnitude of earnings management. The study is performed on Norwegian companies listed on the Oslo Stock Exchange between 2006 and 2010. Norway was the first country in the world to implement a gender quota on the board of directors (Ahern and Dittmar 2012), as a result of a new law that was implemented in different phases from 2001 to 2008 (Wang and Kelan 2013), thus mitigating previously mentioned endogeneity problems. We also include a comparative study on Sweden, to be able to comment on the effect of the gender quota itself.

We find that there is a significant negative relation between fraction of females on the boards of directors and earnings management and that this is partly robust to the inclusion of additional tests. In our comparison with Sweden we find no significant association, while an interaction test between the countries shows that there is a significant difference in effect of the inclusion of females between Norway and Sweden, supporting the exogenous contribution of the study.

Our study contributes to the existing literature in two ways. First, by adding further evidence of the association between gender diversity on boards of directors and earnings management and thus supporting what most previous research has found. Second, it does so in an exogenous environment due to the Norwegian gender quota, which means that we with relative certainty can say that gender diversity affects earnings management, and not the other way around. The implication of this is valuable information on whether introducing more females is beneficial in other terms than equality. Other countries such as Belgium, Sweden, Canada and Finland have implemented or have considered implementing a similar legislation as in Norway (Nygaard 2011), and information regarding the effect of introducing more females is useful when making decisions about such legislation.

The paper will be structured as follows: Section 2 will provide an introduction to earnings management and corporate governance that is relevant to the study. Section 3 contains the institutional context of Norway with respect to corporate governance and previous studies examining the effects of the gender quota in Norwegian companies. Section 4 presents the method. Section 5 describes and discusses the main results. Section 6 concludes and provides implications for future research.

## 2 Theoretical Framework

### 2.1 Earnings Management

The occurrence of earnings management, to manipulate earnings in one way or another, can have a great impact on the decisions taken by stakeholders of a firm. In fact, it might counteract the very fundamental purpose of accounting, to supply stakeholders of a firm with valid and reliable information for decision-making. Earnings management was defined by Healy and Wahlen (1999) as:

*"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 company, or to influence contractual outcomes that depend on reported accounting numbers."* (p. 368)

The definition has been subject to criticism due to its one-sided focus on negative aspects of earnings management, that it is used to "mislead" or to "alter" for one's own gain. Earnings management could also include actions taken to enhance information provided to stakeholders in cases when what is prescribed by regulation differs from what would best depict the

4

true underlying economic performance of the firm, also called "white earnings management" (Beneish 2001; Ronen and Yaari 2008). However, relative consensus prevails about the fact that in order for the accounting anomaly to be defined as earnings management, it needs to be preceded by intentional manipulation, regardless of its intended outcome.

### 2.1.1 Incentives

Previous studies have outlined a number of incentives behind the manipulation. Focus here has been on incentives to engage in the more egoistic and fraudulent type of earnings management, also called "black earnings management" (Ronen and Yaari 2008).

The most frequently mentioned incentives are, (1) *Bonus plans*, which is a popular way to align managers interests with those of the owners (shareholders). Common ways to do this are to tie bonuses to different accounting based performance measures or the value of the stock via for example stock options. A motive for the manager thus arises to manipulate earnings in order to reach a certain level at which the bonus will be paid out, and, if performance is already above the bonus threshold, to defer income to subsequent periods (Gaver et al. 1995), or, in the presence of stock options, to increase the value of the stock (Bergstresser and Philippon 2006; Cheng and Warfield 2005). (2) *Stock market* incentives concern the issuing of new equity and a desire to boost the stock price before an IPO (initial public offering) or SEO (seasoned equity offering). Strong shareholders might put pressure on the management of the firm to boost the short term performance and thus the stock price. Guthrie and Sokolowsky (2010) found that these shareholders are then the ones that sell their shares at the new beneficial stock price, which means that current shareholders are privileged at the expense of new shareholders. This is further supported by Cohen and Zarowin (2010) and Rangan (1998) who find that stock returns and performance are depressed subsequent to a SEO since it suffers from the reversal of earnings as a consequence of market adjustment. However, Shivakumar (2000) argues that the market is well aware of the manipulation during equity offerings and adjusts for it contemporaneously. (3) *Debt covenants* are restraints often included in debt capital contracts. They can be critical levels of performance for which failure to maintain the firm is punished by higher interest rates or even a call-back of debt. Since these are costly consequences for a firm, an incentive arises to manipulate accounting numbers on which the debt covenants rely in order to avoid a breaching of it. This is usually called 'the debt covenant hypothesis' (Franz et al. 2014). It also reflects poorly on management if they breach a debt covenant, which in the worst case could result in dismissal. This gives managers a more personal reason to maintain the restraints (Jha 2013). (4) *Regulatory motivations* could arise from attention directed towards a firm as a consequence of size or financial performance. The attention could lead to monopoly accusations or demands from various stakeholders concerning, for example, societal responsibility (e.g. since the company is large or performs well, it should take responsibility beyond what is normal, since its impact is large or since it has the means to do so). Such demands could cause the company to manipulate its earnings in order to display a more moderate size or performance, thus avoiding costs associated with such attention (Watts and Zimmerman 1978; Han and Wang 1998). In contrast, Meek et al. (2007) argue that large companies are under more scrutiny from auditors and analysts, which would decrease the use of earnings management due to the increased supervision.

### 2.1.2 Accrual Earnings Management

Different motives for the engagement in earnings management will result in different methods in which it is undertaken. Here, one main distinction can be made within the area – between

real earnings management and accrual earnings management. Real earnings management is due to difficulties of identification (hard to separate from bad business decisions), less researched than accrual earnings management. It can be described as when management tries to influence the financial reporting via actions that have a real impact on the operations of the firm. For example, it could be to delay maintenance, ignore investments with positive net present value or reduce R&D expenditure. These actions will have an actual effect on the cash flows of the firm, which are seen as more harmful ways of engaging in earnings management (Cohen and Zarowin 2010; Stefano et al. 2016).

Accrual earnings management has been subject to more extensive research. In contrast to real earnings management it has no effect on the cash flows of the firm since it is merely a matter of shifting numbers around to obtain a desired result. For example, this could be to recognize revenue in an earlier period than what is advisable or to exaggerate provisions.

Accrual earnings management can be divided into four subcategories depending on the underlying circumstances and motives that are causing it (Stefano et al. 2016). (1) *Income smoothing* means that the firm, in case performance is low, shifts accruals from other periods to the present period, and in case performance is high, shifts accruals to subsequent periods. This gives stakeholders of the firm a perception that the firm is stable and thus, the risk of bankruptcy is low, hence reducing the firm's cost of capital. The reason for trying to avoid displaying high performance is that this would increase stakeholders expectations for the next period and that this might be hard to live up to, which increases the risk of a negative earnings surprise in subsequent periods (Milgrom and Roberts 1992; Trueman and Titman 1988). (2) *Income maximization* is usually connected with bonus plans. When performance is lower than a certain bonus threshold, management will manipulate earnings so that the threshold is reached (Healy 1985). However, due to its inevitable adverse effects in the long run, Stefano et al. (2016) argue that income maximization is an action undertaken only in severe conditions, for example when the firm is close to breaching a debt covenant. (3) *Income minimization* is the opposite of income maximization and is a measure taken to avoid overshooting targets by too much (Beneish 2001), to avoid political attention (Watts and Zimmerman 1978) and is also closely related to the fourth category "big bath accounting". (4) *Big bath accounting* means that management during a year with poor performance decreases earnings even more to take all the bad hits in one year. The reason for this is seemingly that they will not be punished proportionately for taking extra losses when performance is already poor. In this way, they will save future years from displaying poor performance (Stefano et al. 2016; Kirschenheiter and Melumad 2002). The phenomenon is also researched in connection with a change in management. The new management will, by carrying out a 'big bath', be able to portray themselves as high performers in subsequent years while blaming this year's poor performance on the old management (Jordan and Clark 2004).

## 2.2   Corporate Governance

Earnings management could potentially affect the decision-making by stakeholders of a company, as the information given to them is biased due to earnings management. For example, shareholders to a large extent rely on financial information to make decisions whether to hold, buy or sell securities on different capital markets. If the information given to them is false, a correct valuation of securities is hard to make, which could potentially result in a loss for the shareholder (Xie et al. 2003). As aforementioned, managers of a company could have certain incentives for engaging in earnings management leading to a misalignment of interest between shareholders and managers. In accordance with agency theory, misaligned interests between the agent (managers) and the principal (shareholders) are likely to result

in suboptimal actions taken by the agent in order to maximize its own wealth at the expense of the principal. In order to align the interests and avoid disadvantageous actions taken by the agent, the principal can engage in monitoring activities (Jensen and Meckling 1976).

The monitoring activities and processes in a company are usually referred to as corporate governance. Similar to earnings management, no generally accepted definition of corporate governance exists (Lin and Hwang 2010). Ahmad et al. (2016) use the following definition of corporate governance:

*"[Corporate governance refers to] the set of rules and incentives by which the management of a company is directed and controlled. It refers to the way rights and responsibilities are distributed among the board, company management, shareholders and other stakeholders. However, while policies and documentation are of undeniable importance, these are not enough to ensure good governance. The actions of companies toward promoting corporate transparency and accountability speak louder than words."* (p. 74)

Corporate governance is necessary in order to control and supervise managers and thus ensure that managers do not increase their own welfare at the expense of shareholders (Lin and Hwang 2010). Previous literature has examined the effect of different variables related to corporate governance leading to a quite extensive research field, for example including institutional investors (e.g. Gillan and Starks 2003), CEO compensation (e.g. Core et al. 1999) and various board characteristics (e.g. Klein 2002) to mention a few. In a company, the board and related subcommittees play a vital role in the management supervision (Lin and Hwang 2010) as the board has a monitoring function in order to protect the interests of shareholders (Xie et al. 2003; Park and Shin 2004), which is the reason why board characteristics and subcommittees have been the center of attention in a number of studies.

### 2.2.1  Board and Audit Committee Independence

Independent directors are considered to enhance the monitoring activities of a company since they are believed to be less biased and have less ties to the company (Park and Shin 2004), and thus have a negative correlation to earnings management (Cornett et al. 2008; Park and Shin 2004). Klein (2002) concluded that reductions in board or audit committee independence increased earnings management in terms of abnormal accruals. Chen et al. (2015) studied U.S. firms affected by the introduction of the Sarbanes-Oxley Act (SOX) in 2002 and found that board and audit committee independency reduced earnings management to a larger extent in an environment characterized by rich information. A rich environment in terms of information is important, as independent directors do not know as much about the firm as dependent directors do. Thus, the cost of information is crucial in order to provide independent directors with relevant information to optimize the monitoring function. Environments already characterized as being informative are beneficial, as the cost is lower. In other words, merely increasing board independence might not be enough. If directors do not have access to information that improves their governance, their role on the board might only amount to 'window-dressing' in order to comply with the regulation.

Related to characteristics of the audit committee, Bertrand et al. (2014) found that financial expertise and involvement from the audit committee in the monitoring process, in addition to independent members, have a negative association with aggressive earnings management. However, the findings suffer from some limitations including a difficulty to measure earnings management and from failure to establish a causal link but only an association between the variables.

7

### 2.2.2 Board Size

The board size can have a determining effect on the boards monitoring efficiency. Results are inconclusive, and it has been argued that a larger board is less efficient (Yermack 1996) due to a focus on "politeness and courtesy" (Jensen 1993, p.863) and suffers from bureaucratic problems (Xie et al. 2003). In contrast, a large board could also be more efficient due to the increased possibility to have both inside directors (who facilitate experience and in-depth knowledge) and outside directors (who facilitate independence) represented on the board (Dalton et al. 1999). Coles et al. (2008) provide a more complex view of the matter by stating that board size and its relation to monitoring efficiency is dependent on the level of complexity[1] in the firm. A complex firm might benefit from a larger board and a simple firm from a smaller board, thus the optimal board size could vary depending on firm complexity.

### 2.2.3 CEO Duality

CEO duality refers to when the CEO of a company also serves as the chairman of the board. It has been argued that CEO duality decreases the effectiveness of governance as the board is being hindered to supervise the management in the company (Dey et al. 2011). CEO duality concentrates the power to the CEO, who could control the flow of information to the remaining board members, making the control function of the board less effective. Also the chairman of the board is responsible for the evaluating process of the CEO, which in case of CEO duality is hard to do in an objective way (Jensen 1993). Cornett et al. (2008) state that if CEO duality is considered to lower the quality of controls, the use of discretionary accruals is expected to increase.

## 2.3 Gender

More recently, gender has gained attention in the corporate governance literature as a crucial board characteristic. It has been argued that certain female characteristics enhance the oversight function of a company and thus have a negative association with earnings management (e.g. Lakhal et al. 2015) and improve the quality of earnings[2].

### 2.3.1 Characteristics

The literature regarding gender presumes that men and women have different characteristics affecting their work life behavior (Vähämaa 2014). Srinidhi et al. (2011) argue that female directors have different experiences in comparison to males, which could improve the decision making in the board as new views are being introduced. Females also tend to facilitate better discussions, leading to better communication and thus a better ability to monitor and improve the monitoring process of the company. Adams and Ferreira (2009) emphasize that companies with gender-diverse boards tend to put more effort into monitoring activities and Arun et al. (2015) describe females as more ethical, less aggressive and more risk-averse in comparison to males. Matsa and Miller (2012) state that females are more independently thinking and have a greater concern for others, in contrast to males who are characterized as more confident, aggressive and objective. Also, Betz et al. (1989) found that males to a larger extent tend to violate existing regulation and policies in order to increase their own wealth. Post and Byron (2015) summarize this in a good way by saying that males and females have different "cognitive frames" (p.1548), which affect the decision making.

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[1]Complex = high debt and Simple = low debt.
[2]Defined as current earnings ability to predict future cash flows (Srinidhi et al. 2011).

Gender-based differences could potentially affect the corporate governance of a company and thus the occurrence of earnings management. In other words, these gender-based differences may affect the reporting of financial information (Krishnan and Parsons 2008).

### 2.3.2  Previous Research and Hypothesis Development

The relationship between earnings management and gender diversity on the board of directors is a rather new topic; hence previous literature and findings are somewhat sparse. Krishnan and Parsons (2008) use five different measures (earnings skewness, accrual, smoothness, loss avoidance and persistence) to test whether there is a connection between earnings quality and gender diversity in Fortune 500 companies and find that this is true and robust for all the used measures. The finding is further supported by Srinidhi et al. (2011) in a study using the McNichols regression on US companies.

Adams and Ferreira (2009) argue that women on the board have a better attendance and also improve upon the attendance of their colleagues. Their findings indicate that when a company has poor governance, the inclusion of females will have a positive effect on governance performance while in a case where governance is already good, the enforcement of females on the board might actually decrease shareholder value. In addition to the already existing governance mechanisms, the complexity of the firm might be a factor to consider and Arun et al. (2015) find, by looking at simple and complex firms[3], that the addition of females to the board will have a constraining effect on the level of manipulation in simple firms.

Gavious et al. (2012) discuss the importance of homogeneity and that earnings management levels can differ between industries. They study Israeli high tech companies listed in the US between 2002 and 2009, by using the Modified Jones Model and find a negative correlation between earnings management and the proportion of females on the board. In addition they find the same relation between females on the audit committee and earnings management. They also highlight the problem of endogeneity. It might be that firms that hire females are more attentive to needs or demands of a balanced gender representation, and that this would be correlated with a higher ethical standing, and that a higher ethical standing, in turn, prevents earnings management. Thus casting doubt on which is the independent variable. In an attempt to mitigate the problems with endogeneity Lakhal et al. (2015) extends the study by Krishnan and Parsons (2008) by looking at firms in the French context, where certain regulatory pressure is exercised concerning gender diversity and a 'comply or explain' policy is in place, which means that it is not legislative in nature and that it is possible to stray from it as long as a sufficient explanation for this is disclosed. They find that females on the board reduce earnings management. Further they introduce the critical mass theory, which incorporates the notion that a small shift in the heterogeneity of a group might result in big shifts in its behavior (Granovetter 1978), and that when female representation reaches a certain level the effects of it will be amplified (Kramer et al. 2006). On the basis of this, they test if the presence of at least three females further reduces earnings management. A negative correlation with earnings management is found, indicating that by increasing the number of females even further, governance efficiency is increased. However, they highlight the problems of introducing legislation on gender quotas since it might temporarily create a shortage of competent females, which might be harmful for performance as demonstrated by Ahern and Dittmar (2012).

Ye et al. (2010) find no association between gender diversity and earnings quality while studying companies in China. They explain this by emphasizing the cultural difference be-

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[3]Again, where high debt = complex firms and low debt = simple firms.

tween China and Western countries. Ethical homogeneity among top executives eliminates the benefits attributed to female characteristics, since the characteristics are similar. Kyaw et al. (2015) continue the discussion by stating that in order for the introduction of females on boards to be beneficial, it is necessary that gender equality in the country is already high.

The discussion above leads to the following main hypothesis for firms operating in a context already exhibiting high gender equality:

**H1:** There is a negative relation between the fraction of females on the board of directors and the magnitude of earnings management.

# 3   Norwegian Context

## 3.1   Institutional Setting

Several studies have highlighted the importance of the institutional setting as a determinant of good corporate governance. Aguilera and Jackson (2003) describe corporate governance as being dependent on the way the institutions are shaped and that different shapes support different forms of corporate governance. Hence, there is no universal model of corporate governance that fits with each institutional context. Further Leuz et al. (2003) study the relation between institutional setting and the level of earnings management by categorizing geographical regions into three levels. Norway would be placed in the second category due to its similarities with Sweden, and hence categorized as being an insider economy with a less developed stock market, concentrated ownership (Ferreira and Kirchmaier 2013), weak investor rights, but strong legal enforcement. According to them, these are characteristics that would generate a medium level of earnings management, compared to the other categories, for example UK and US (category 1) and Italy and India (category 3). Post and Byron (2015) highlight that different contexts (i.e. gender parity and shareholder protection) might serve as moderators and that the effect of female representation can differ between these. This will have implications for the generalizability of our study and its relevance in other conditions, since it might be misleading to compare results across different institutional contexts. Further, Norway is considered a country with high gender equality (UN, 2015), which is a condition for our hypothesis.

The corporate governance practices in Norway are influenced by the Norwegian Public Limited Liability Companies Act (in the following called 'public companies act') and the Norwegian Code of Practice for Corporate Governance. It lies outside the scope of this paper to describe these frameworks in detail. This is why shorter descriptions of relevant parts will be provided. The public companies act stipulates among other things the general meeting, its role and authority, the remuneration, elections, obligations and the roles of the board of directors, the general manager and the auditor. It also includes the paragraph concerning gender representation on the board, which will have a dedicated section later in this paper due to its high relevance for our study. The ultimate authority lies with the general meeting, which appoints the board of directors (or corporate assembly) and decides on its remuneration. The board has a monitoring role of the company, including appointment, evaluation, remuneration and if necessary, dismissal of the general manager.

The Norwegian Code of Practice for Corporate Governance is an addition to the public companies act and describes in more detail the components of corporate governance that should be implemented or described in a company listed on Oslo Bors or Oslo Axess. The code follows a 'comply or explain' policy and during the timeframe of our study, the code was amended or revised four times (2006, 2007, 2009 and 2010). The changes are usually small

and the only relevant change enough to mention here was that in 2009 the code included a requirement that the company should establish an audit committee with a majority of independent directors. The requirement is also included in the public companies act, making it legislative. Further, the code contains guidelines for the inclusion of independent directors on the board and states that at least half of the directors should be independent of the executive management and material business contacts and at least two directors should be independent of the major shareholders.

When comparing the Norwegian corporate governance to an international context, one should pay attention to certain specific recommendations and requirements. In a company with more than 200 employees the company must elect a corporate assembly containing at least one-third employee-elected representatives. The role of the corporate assembly is to appoint the board of directors and serve as an additional monitoring body. If the company has less than 200 but more than 30 employees, the employees have a right to be represented on the board of directors serving as employee representatives. Executive personnel should not be a part of the board of directors but is subject to the 'comply or explain' policy and might be present as the result of an argument that he/she adds valuable information to the board. However, the general manager (CEO) may not serve as the chairman of the board, as is often the case in, for example, US firms.

## 3.2   Regulation

The Norwegian regulation regarding the gender quota was introduced in several phases from 2001 to 2008. Wang and Kelan (2013) divide the regulatory procedure into four different steps: "the introduction phase; the voluntary compliance phase; the compulsory compliance phase and the post-compliance phase" (p. 453). The introduction phase took place in the period 2001-2003, when the Norwegian government introduced the discussion of gender representation of corporate boards of at least 40 per cent. The proposal was introduced in June 2003 and finally accepted by the parliament in December 2003. The voluntary compliance phase refers to the period 2004-2005, when the gender quota was mandated and at first only applied to all state-owned companies. Between 2006 and 2008, the compulsory compliance phase, the new regulation started to apply for all public limited liability companies and the implementation needed to be in place before the 1st of January 2008. The post-compliance phase includes all years after 2008.

It took several years for the regulation to be taken fully in action, since it met resistance from the private sector. When the gender quota was mandated in 2004, it first only applied to state-owned companies. These companies, to a great extent, already met the requirements of the new regulation, so no big changes took place. The regulation would imply more changes for public limited liability firms and thus the gender quota received more resistance from these companies. Therefore, the law was adopted with a reservation stating that if the public limited liability companies on voluntary basis had 40 per cent of each gender on the board, the regulation would not be adopted. These requirements were supposed to be fulfilled during the summer of 2005 but were far from accomplished, leading to the introduction of the regulation in 2006 with a two year implementation phase for existing public limited liability companies. New companies needed to follow the gender quota immediately in order to be introduced at the stock exchange (Teigen 2011). The new regulation was accompanied by a threat of liquidation if a company failed to comply with it (Wang and Kelan 2013). The paragraph from the Norwegian Public Limited Liability Companies Act is outlined in detail below:

[§ 6-11a. Requirement regarding the presentation of both sexes on the board of directors

(1) On the board of directors of public limited liability companies, both sexes shall be represented in the following manner:

1. If the board of directors has two or three members, both sexes shall be represented.
2. If the board of directors has four or five members, each sex shall be represented by at least two members.
3. If the board of directors has six to eight members, each sex shall be represented by at least three members.
4. If the board of directors has nine members, each sex shall be represented by at least four members, and if the board of directors has more members, each sex shall represent at least 40 percent of the members of the board.
5. The rules in no. 1 to 4 apply correspondingly for elections of deputy members of the board of directors.]

The development of female representation in Norwegian corporate boards[4] since the compulsory compliance phase started in 2006, is shown in Figure 1.
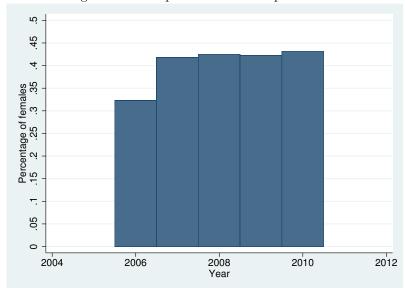
Figure 1: Development of female representation



## 3.3 Previous Studies

There has been an ongoing discussion regarding the effects of the Norwegian gender quota since its introduction. A quota could be beneficial as it introduces an opportunity for talented women to reach qualified positions, but could also be negative if it forces unqualified women into high positions. This has lead to studies examining the effect of the quota in terms of, for example, stock market valuation and accounting performance (Bertrand et al. 2014). Ahern

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[4]Based on our manually collected data.

and Dittmar (2012) studied the effect of the gender quota on stock price and Tobin's Q[5]. They observed a significant drop in both parameters and showed that the characteristics of the board changed as the newly introduced women had less experience and were younger in comparison to their male counterparts. However, the study does not investigate whether gender and associated characteristics have any isolated effect on these results. Nygaard (2011) states that the outcome of the gender quota is mixed. Firms that had a rather poor governance structure and low information asymmetry before the quota experienced beneficial results from the introduction of females in terms of stock returns. Low information asymmetry made it easier for the directors to use their knowledge in a beneficial way for the specific firm and the introduction of more females led to more monitoring activities, which were positive for firms experiencing a rather poor governance structure. However, firms having a high information asymmetry experienced a negative effect. It is important to add that the negative results were not supported by significant statistical results. Matsa and Miller (2012) found that the short-term profitability decreased in comparison to unlisted companies unaffected by the new regulation. Part of the explanation is that fewer employees were terminated in the listed companies, which increased the costs of employees due to fewer terminations. However, other variables such as revenue and costs not related to employees did not change when comparing listed and non-listed companies. Overall, the existing literature examining the gender quota in Norway is scarce.

# 4    Research Design

## 4.1    Sample Selection

The sample has been generated through the Orbis database, where publicly listed, non-financial companies on the Oslo Stock Exchange during the time frame 2006-2010, have been included. Financial companies were excluded from the sample, as measures of earnings management could be problematic to use for these companies (Chen et al. 2015). We also decided not to include any years prior to 2006 as the companies of interest (companies listed on the Oslo stock exchange) had to follow the new accounting regulation IFRS from 2005. A new accounting regulation could lead to biased results in the year of introduction (Cimini 2015), and two different accounting regimes during the period of investigation introduce problems when using a proxy for earnings management. The proxy is based on accounting numbers, and the numbers could differ because of different treatments in different regulations. Another reason for the specific measurement period concerns endogeneity. Endogeneity implies that unobservable omitted variables affect the correlation between two variables, or that it is hard to know whether a variable is dependent or independent, referred to as reverse causality (Adams and Ferreira 2009). For example, studies examining the correlation between female directors and earnings management might find it problematic to conclude whether a low level of earnings management is the result of more female directors or if female directors are the result of low earnings management. Thus, the endogeneity problem casts doubt on whether the correlations and results found in studies that suffers from it, are trustworthy. The Norwegian context provides an environment characterized by an exogenous shock, in the form of a gender quota. Thus, mitigating problems with endogeneity.

In order to alleviate problems with the manual data collection in annual reports, only companies still operational and listed (with 2014 as the latest available date of information)

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[5]They define Tobin's Q as "the sum of total assets and market equity less common book equity divided by total assets" (p. 148).

were included, since possibilities of finding reports from companies after being delisted, liquidated or merged with other companies, decrease drastically. This might result in survival bias[6]. However, since only four years have passed since the last included observation, problems should not be too big. Also, only companies that had been listed during the whole time span were included, although some years have missing observations. Foreign companies (companies not registered in Norway) were excluded from the sample since the Norwegian ASA-companies are the only ones that are subject to the gender quota regulation. This resulted in an original sample consisting of 82 firms, but due to missing information the number of observations in some years decreased to 66. Table 1 presents an overview of the number of observations collected each year and Table 2 classifies the observations into different industries (1-digit icb).

Table 1: Obs. per Year

| Year | Freq. | Cum. | Perc. |
|------|-------|------|-------|
| 2006 | 66 | 17.6 | 17.6 |
| 2007 | 75 | 37.9 | 20.3 |
| 2008 | 77 | 58.8 | 20.9 |
| 2009 | 79 | 80.2 | 21.4 |
| 2010 | 73 | 100.0 | 19.8 |
| Total | 370 | 100.0 | 100.0 |

Table 2: Obs. per icb

| icb | Freq. | Cum. | Perc. |
|-----|-------|------|-------|
| 1 | 98 | 26.5 | 26.5 |
| 1000 | 23 | 32.7 | 6.2 |
| 2000 | 109 | 62.2 | 29.5 |
| 3000 | 43 | 73.8 | 11.6 |
| 4000 | 27 | 81.1 | 7.3 |
| 5000 | 17 | 85.7 | 4.6 |
| 6000 | 4 | 86.8 | 1.1 |
| 7000 | 10 | 89.5 | 2.7 |
| 8000 | 0 | 89.5 | 0 |
| 9000 | 39 | 100.0 | 10.5 |
| Total | 370 | 100.0 | 100.0 |

Industry names are given in table 6.

## 4.2 Data Collection

The manual data collection of the variables composed of total board members, females on the board, board independence, presence of audit committee, employee representatives, CEO duality and CEO turnover was made from annual reports published on the companies' websites. All variables were easy to identify and collect except board independence. To determine whether a board member was independent or not, we followed the guidelines in the Norwegian Code of Practice for Corporate Governance concerning shareholdings, independence from relations to executive management and material business relations of the company. The code however, has an approach taking more into account the whole composition of the board with respect to the different aspects, while we were more interested in generating an overall ratio of independence. For example, the code prescribes that at least two directors should be independent from major shareholders and at least half of the board is to be independent from the executive management. This could mean that in a board consisting of four board members, two can be independent in regard to executive management but not to major shareholders and the other two independent in regard to major shareholders but not to executive management. This situation would comply with the code, but since we were more interested in the total number of independent directors we would, in a case like this, classify all members of the

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[6]Survival bias could affect the accrual based earnings management proxies since firm performance might be negatively or positively associated with earnings management.

board as dependent since they are all dependent in some aspect. In some cases information about the independence of directors is hard to find, especially in earlier years when emphasis on this seems to be low among report preparers, resulting in additional problems and causing this variable to be the most unreliable one. The manually collected board specific control variables are further described in Table 3.

Table 3: Board-Specific Control Variables

| Variable | Definition |
| --- | --- |
| tot_b | The absolute number of board members, excl. employee representatives. A large board could decrease the efficiency (Yermack 1996) and suffer from bureaucratic problems (Xie et al. 2003), but could also be more efficient due to the increased possibility of having both inside and outside directors on the board (Dalton et al. 1999). Therefore the correlation to earnings management could be positive or negative. |
| fem_per | The percentage of females on the board, excl. employee representatives. Certain characteristics of female directors are suggested to decrease the occurrence of earnings management (Matsa and Miller 2012), and therefore affect the reporting of financial information (Krishnan and Parsons 2008). Thus, a negative correlation to earnings management is hypothesized. |
| ceo_t | Dummy variable for CEO turnover. A new CEO could increase the likelihood of earnings management (Jordan and Clark 2004) due to a phenomena described as Big Bath Accounting (Stefano et al. 2016). A positive correlation between CEO turnover and earnings management is therefore hypothesized. |
| ceo_b | Dummy variable for CEO on board. CEO duality could decrease the effectiveness of governance (Dey et al. 2011) as the evaluation of the CEO is hard to do in an objective way (Jensen 1993). CEO duality, meaning that the CEO also is the chairman of the board, is forbidden in accordance with Norwegian law. Therefore we collected information about whether the CEO is a board member, with the assumption that this could affect the corporate governance in a similar way as CEO duality. A positive correlation to earnings management is therefore hypothesized. |
| ind_per | The percentage of independent board members, excl. employee representatives. Reductions in board independence are suggested to increase the occurrence of earnings management (Klein 2002) as independent directors are considered to enhance the monitoring activities of a company (Park and Shin 2004). Thus a negative correlation to earnings management is hypothesized. |

| aud_c | Dummy variable for audit committee. The audit committee could affect earnings management in a similar fashion as independent directors (Klein 2002). We have not collected data regarding the members of the audit committee, in terms of being independent or not, due to lack of information. But we expect that an audit committee enhances the monitoring function of a company and thus have a negative correlation to earnings management. |

The firm-specific control variables and variables used for the Modified Jones Model were collected from the database Datastream. All firm-specific control variables are presented in Table 4 as well as a description of the components used to construct them (beneath the line in Table 4), as defined in Datastream. In Table 5 the hypothesized impact of the control variables is shown and they have also been matched with the incentives for earnings management described in Section 2.1.1. of the paper. Other control variables, not specifically related to the motivations mentioned above, have also been included to control for certain characteristics of a company often being used in previous literature to predict and explain earnings management.

Table 4: Firm-Specific Control Variables

| Variable | Definition |
|----------|------------|
| leverage | Defined as Long-Term Debt [WC03251] divided by Total Assets [WC02999]. |
| mtb | Defined as Market Value for Company [MVC] divided by Common Equity [WC03501]. |
| size | The natural logarithm of Total Assets [WC02999] will be the proxy for company size. |
| roa | Return on assets [WC08326]. (Net Income - Bottom Line + ((Interest Expense on Debt-Interest Capitalized) * (1-Tax Rate))) / Average of Last Year's and Current Year's Total Assets * 100. |
| ext_fin | External Financing [WC04500] scaled with Total Assets [WC02999]. |
| cf_ass | Standard Deviation of Cash Flow [WC04201], scaled with Total Assets [WC02999]. |
| *Long-term debt* | [WC03251] Consists of all interest bearing financial obligations, excluding amounts due within one year. It is shown net of premium or discount. For example includes mortgages, bonds and convertible debt. |
| *Total Assets* | [WC02999] Represent the sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets. |

| | |
|---|---|
| *MVC* | [MVC] Market Value for Company. Includes the consolidated market value of a company displayed in millions of units of local currency. Certain types of shares are not counted as separate equity issues. These include all foreign quoted shares, ADRs, GDRs, EDRs, foreign certificates and foreign board shares. These shares will not be included in the calculation of MVC but will return a value for MVC converted into the appropriate local currency. |
| *Common Equity* | [WC03501] Represents common shareholders' investments in a company. |
| *Cash Flow* | [WC04201] Also called Funds from Operations. The sum of net income and all non-cash charges or credits. It is the cash flow of the company. If the cash flow of a company have not been disclosed, it has been estimated based on net profit before preferred dividends plus depreciation and reserves charges. |
| *External Financing* | [WC04500] Represents company financing from outside sources. It includes the issuance and retirement of stock and debt. |

Table 5: Motivations for Firm-Specific Control Variables

| Variable | Definition |
|---|---|
| roa | [Incentive 1] Return on assets is used as a proxy for performance. Poor performance could increase the probability of earnings management as management is more likely to manipulate earnings in order to reach bonus thresholds (Healy 1985). But high performance could also be an incentive for earnings management, in line with [Incentive 4]. Therefore the correlation between performance and earnings management could be both a positive and negative one. |
| ext_fin | [Incentive 2] External financing could impact the degree of earnings management, due to debt or stock issuance (Cohen and Zarowin 2010; Guthrie and Sokolowsky 2010). Thus a positive correlation between external financing and earnings management is expected. |
| leverage | [Incentive 3] Leverage could be used as a proxy for violating a debt covenant (Chen et al. 2015). Closeness to violate debt covenants could be a reason to engage in earnings management as described by Franz et al. (2014). A positive correlation between earnings management and leverage is expected. |

| size | [Incentive 4] Size could increase the likelihood of attention and thus the occurrence of earnings management due to regulatory motivations (Watts and Zimmerman 1978; Han and Wang 1998), but large companies could also be under close scrutiny from auditors and analysts, decreasing the use of earnings management (Meek et al. 2007). Therefore, the association to earnings management could be positive or negative. |
|---|---|
| mtb | The market-to-book ratio serves as a proxy for a firms potential to grow. Growing firms are more sensitive to earnings forecasts, and thus a high mtb-ratio is expected to increase the use of earnings management (Chen et al. 2015). |
| cf_ass | The standard deviation of cash flow control for operating volatility which is hypothesized to be negatively correlated to earnings management (Chen et al. 2015). |

## 4.3 The Modified Jones Model

In order to establish if there is a connection between earnings management and gender representation on boards of directors, we needed to define earnings management and create an earnings management variable. In this section we describe one of the most commonly used models within this field, the Modified Jones Model as suggested by Dechow et al. (1995) to detect earnings management.

The model is an accrual-based measure of earnings management which separates accruals into nondiscretionary and discretionary. It looks at total accruals rather than at a separate accrual account. Total accruals are calculated from changes in working capital and depreciation expenses. Non-discretionary accruals are normal accruals that are assumed to be unaffected by manipulation and that are adjusted for changes in the economic circumstances for the firm, which is what relaxes the Modified Jones Model compared to previous models that have underlying assumptions of lagged accruals being considered normal accruals (for example the DeAngelo model[7]). Non-discretionary accruals are estimated according to the model below and subtracted from total accruals in order to generate the error term, also called discretionary accruals. With the underlying assumption being that discretionary accruals are the result of manipulation, and can therefore be seen as a proxy variable for earnings management. The modified model is based on the original Jones Model (Jones 1991), but since the original model assumes that revenues are not subject to manipulation, the Modified Jones Model attempts to mitigate this problem by adjusting a change in revenue for a change in receivables by subtracting the change in receivables from the change in revenue. This would reduce errors resulting from a decrease or increase in revenue that is not appropriate, assuming that the manipulation is made via receivables, which is likely, since this item is easier to manipulate than cash sales.

Further, the Modified Jones Model has been criticized for dividing accruals into discretionary and nondiscretionary ones. It has been argued that part of the accruals classified as discretionary in fact are to be considered nondiscretionary as a result of the economic environment the company operates in (McNichols 2002). Therefore, the measured level of

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[7]The DeAngelo model to calculate the nondiscretionary accruals is described by Dechow et al. (1995) as $NDA_t = TA_{t-1}$ where last years total accruals are simply assumed to be normal accruals.

earnings management could differ between industries as a result of different economic environments, creating noise in the model. Even with highly competent management with the best of intentions, there will be estimation errors related to accruals in volatile industries (Dechow and Dichev 2002). It is sound to at least question the appropriateness of regarding the whole error term as earnings management, since part of it might be a result of such noise or of other factors that do not fit the definition of earnings management. However, we have tried to mitigate this problem by running regressions year-by-year and industry-by-industry, argued to produce sufficient data if at least eight observations are included for each year and industry (Doukakis 2014).

Below, we describe the model in detail:

The following expression (1) is used to estimate the firm-specific parameters (coefficients), $\alpha_1$, $\alpha_2$ and $\alpha_3$ of the model for nondiscretionary accruals (NDA$_{it}$). $\Delta REV_{it}$ is the change in revenue between t and t-1 and PPE is the gross property plant and equipment. All variables have been scaled by lagged total assets ($ta_{it-1}$).

$$
\begin{aligned}
TA_{it}/ta_{it-1} = a_1(1/ta_{it-1}) + a_2((\Delta REV_{it} - \Delta REC_{it})/ta_{it-1}) \\
+ a_3(PPE_{it}/ta_{it-1}) + \varepsilon_{it}
\end{aligned}
\tag{1}
$$

Total accruals is calculated according to the equation (2) below.

$$
\begin{aligned}
TA_{it} = ((ca_{it} - ca_{it-1}) - (cash_{it} - cash_{it-1})) \\
- ((cl_{it} - cl_{it-1}) - (std_{it} - std_{it-1})) - dep_{it}
\end{aligned}
\tag{2}
$$

The estimated coefficients are then used in the expression for nondiscretionary accruals (3) to obtain the estimated nondiscretionary accruals. This is where the Modified Jones Model differs from the original Jones Model by adjusting for REC.

$$
\begin{aligned}
NDA_{it} = \alpha_1(1/ta_{it-1}) + \alpha_2((\Delta REV_{it} - \Delta REC_{it})/ta_{it-1}) \\
+ \alpha_3(PPE_{it}/ta_{it-1})
\end{aligned}
\tag{3}
$$

The difference between total accruals and nondiscretionary accruals (difference between observed and predicted y values) is the error term; this is the discretionary accruals ($DA_{it}$) for firm i in period t, and what can be used as a proxy for earnings management.

$$
\varepsilon_{it} = TA_{it}/ta_{it-1} - NDA_{it}
\tag{4}
$$

A full description of the variables (as defined in Datastream) and their code for identification in Datastream are given in Table 6.

Table 6: Variables - Modified Jones Model

| Variable | Definition |
| --- | --- |
| $ca_{it}$ | Current assets [WC02201]. Consists of cash and other assets that are reasonably expected to be realized in cash, sold or consumed within one year or one operating cycle for firm i in year t. Generally, it is the sum of cash and equivalents, receivables, inventories, prepaid expenses and other current assets. |
| $cash_{it}$ | Cash Generic [WC02005]. Represents cash and short-term investments for firm i in year t. |
| $cl_{it}$ | Current liabilities [WC03101]. Includes debt or other obligations that the company expects to satisfy within one year for firm i in year t. |
| $std_{it}$ | Short-term debt [WC03051]. The portion of debt payable within one year including current portion of long term debt and sinking fund requirements of preferred stock or debentures for firm i in year t. |
| $dep_{it}$ | Depreciation, depletion and amortization [WC01151]. Depreciation represents the process of allocating the cost of a depreciable asset to the accounting periods covered during its expected useful life to a business for firm i in year t. Depletion refers to cost allocation for natural resources such as oil and mineral deposits. Amortization relates to cost allocation for intangible assets such as patents and leasehold improvements. |
| $\Delta REV_{it}$ | Revenue [WC01001]. The change in gross sales and other operating revenue less discounts, returns and allowances for firm i in year t. |
| $\Delta REC_{it}$ | Receivables [WC02051]. Represent the change of amounts due to the company resulting from the sale of goods and services on credit to customers (after applicable reserves) for firm i in year t. These assets should reasonably be expected to be collected within a year within the normal operating cycle of a business. |
| $PPE_{it}$ | Property, plant and equipment [WC02501]. Represents gross property, plant and equipment less accumulated reserves for depreciation, depletion and amortization for firm i in year t. |
| $ta_{t-1}$ | Total assets [WC02999]. Represent the lagged sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets for previous year. |
| $DA_{it}$ | Discretionary accruals (error term) for firm i in year t. Used as a proxy for Earnings Management. |
| $NDA_{it}$ | Non-discretionary accruals for firm i in year t. |

| | |
|---|---|
| $TA_{it}$ | Total accruals for firm i in year t. |
| icb | Industry classification benchmark [ICBIC]. Includes ten industries. 0001=Oil & Gas, 1000=Basic Materials, 2000=Industrials, 3000=Consumer Goods, 4000=Health Care, 5000=Consumer Services, 6000=Telecommunications, 7000=Utilities, 8000=Financials, 9000=Technology. |

## 4.4    Model Specification

The specified regression model is displayed below, where fem_per is the variable of interest, $x$ is the control variable, $\beta$ is the coefficient and $DA$ is the discretionary accruals:

$$DA = \alpha + \beta_1 fem\_per + \sum \beta_n x_n + \varepsilon \qquad (5)$$

We used OLS regression techniques to analyze the data. In order to enhance the robustness of the regression we have also used fixed effects, which was found to be the most appropriate choice in a Hausman test[8]. This allows us to control for variation within different categories, in this case for firms, since variation between firms might be affected by variables that are not included in the model (omitted variables). Fixed effects will remove biased correlations stemming from omitted variables that do not vary over time. We have also used the robust standard error[9] to control for heteroskedasticity. In order to examine the distribution of the variables, we used histogram plots to discover skewness, which resulted in that market-to-book and size are expressed in the natural logarithm of those variables. Further, the firm-specific control variables leverage, standard deviation of cash flow and external financing have been winsorized at the 0.01 level to remove outliers, as is common when using financial data in accounting studies (Matsa and Miller 2012). All the analyses were made in STATA 14.

## 4.5    Additional Tests

In order to provide robust results with respect to earnings management, we have included two other measures of earnings management, described by Kothari et al. (2005) and McNichols (2002). Kothari et al. (2005) argue that a firm's discretionary accruals are related to its current and past performance, and therefore suggest a "modified" Modified Jones Model including return on assets as a proxy for performance. Further, they show that a "performance-matched approach" (p.166) including ROA when calculating the discretionary accruals is a better alternative than including ROA as an independent variable in a linear regression. As often in these cases, opposing views have been put forth, such as Keung and Shih (2014), who argue that the performance matched approach used by Kothari et al. (2005) only works better when performance is abnormal. Disregarding performance in such an instance will misclassify some non-discretionary accruals as discretionary accruals. However, if performance is normal the discretionary accruals will be underestimated using the Kothari model. The only difference between the Kothari Model and the Modified Jones Model is the inclusion of

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[8]With a chi2-value of 37.08 and a p-value of 0.0002 we can reject the null hypothesis that there are no differences between random effects and fixed effects. The test is performed on panel data.

[9]For OLS regression that means we use Huber standard errors. Robust standard errors with fixed effects mean that the standard errors are clustered by firm.

ROA in equation (1) when estimating the firm-specific coefficients and thus when predicting the nondiscretionary accruals in equation (3).

McNichols (2002) combines the model by Dechow and Dichev (2002)[10] and the Jones (1991) model. Dechow and Dichev (2002) define earnings as the sum of cash flow and accruals, focusing on working capital accruals since they are normally realized within one year and capture a great portion of the variation in total accruals. A cash flow in a given period consists of three different parts, due to the timing of the recognition of the cash flow in earnings. The cash flow could be recognized in earnings before, at the same time or after the real cash is being accepted or paid. When recognition of the cash flow does not appear in the same period as the realization of it, opening and closing accruals are created. Opening accruals refer to situations where cash is either received or paid before revenue or expense is recognized or when revenue or expense is accounted for before cash is received or paid. The closing accrual could be explained as the reversion of the opening accrual. In situations where the cash will be received after the recognition of a revenue or expense, an estimation of the amount of cash to be received or paid in the future has to be made. If the estimation differs from the actual cash transaction, an estimation error in the opening accrual will occur, later being realized and corrected by the closing accrual. The error in the opening accrual as well as the correction by the closing accrual decrease the quality of earnings, and the difference between the estimation error in the opening accrual and the realized error in the closing accrual is being used to measure earnings quality, as shown in equation (6).

McNichols (2002) argues that the model by Dechow and Dichev (2002) suffers from some limitations, for example, related to the model being misspecified for growing firms as the cash flow in a future period may exceed the accruals in the current period due to growth in sales. Therefore, McNichols (2002) suggests that by including the change in sales and PPE from the Jones (1991) model (as displayed in equation 8) into the Dechow and Dichev (2002) model using cash flows, the ability to explain the change in accruals increases. The combination of the two models (equation 9) is shown to be more efficient than the models apart and is outlined in more detail below:

The first part is the Dechow and Dichev (2002) model (6) where cash flow from operations ($CFO$) as lagged, current and forward values are used to predict the change in working capital ($\Delta WC$):

$$\Delta WC_t = b_0 + b_1 CFO_{t-1} + b_2 CFO_t + b_3 CFO_{t+1} + \varepsilon_t \tag{6}$$

Where the change in working capital is calculated as (7):

$$\Delta WC_t = ((ca_{it} - ca_{it-1}) - (cash_{it} - cash_{it-1})) - ((cl_{it} - cl_{it-1}) - (std_{it} - std_{it-1})) \tag{7}$$

The second part is the original Jones Model from 1991 (8):

$$\Delta WC_t = b_0 + b_1 \Delta REV_t + b_2 PPE_t + \varepsilon_t \tag{8}$$

These are combined into one model that is the McNichols (2002) Model (9), again where the absolute value of the residual $\varepsilon$ is used to proxy earnings management (Vähämaa 2014). All

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[10]Popularly referred to as the "DD-model".

variables have been scaled by average total assets[11].

$$\Delta WC_t = b_0 + b_1 CFO_{t-1} + b_2 CFO_t + b_3 CFO_{t+1} + b_4 \Delta REV_t + b_5 PPE_t + \varepsilon_t \qquad (9)$$

## 4.6 Comparison with Sweden

We have performed the same study on Swedish firms, to be able to make comparisons and comment on the effects of the gender quota itself. Sweden is a suitable country for comparison due to its political, historical and cultural similarities with Norway. Further, the institutional context and a focus on stakeholder rights are examples of corporate governance-influencing factors that the two countries share. There are differences that might affect the comparison, such as the great dependency on natural resources in the Norwegian economy contrasted with the outward directed and classical industry-oriented Swedish economy (Randøy and Nielsen 2002). We acknowledge these differences and their potential effect on the comparison.

The methodology concerning this part is identical to the one used on Norway, except for the manual collection of the board-specific variables. The board-specific variables have in this case been obtained as secondary data, and for this reason the variables CEO turnover and Audit Committee are missing. Further the variable of independent board members may differ in terms of definition.

To further validate the exogenous effect of the quota and test the robustness of our comparison, we have also performed a test where the Swedish and Norwegian data are combined and used in the same model with an interaction term. In this test each country is designated a dummy variable (0 for Sweden and 1 for Norway) and the variables from each dataset are combined and tested in the same regression. The interaction term, which is calculated as the dummy*fem_per (our variable of interest), is also included in the regression, and significant results would indicate that the effect on earnings management of inclusion of females in Norway is different from that in Sweden.

# 5 Empirical Results and Discussion

## 5.1 Norway

The summary statistics related to the board and firm specific control variables are displayed in Table 7. The "w" in front of the variable name implies that the variable has been winsorized and "l" entails that the variable is expressed as the natural logarithm.

The mean value of discretionary accruals equals 24.2 % of total assets with a maximum stretching to 154.5 % of total assets for the Modified Jones Model. The discretionary accruals obtained from the Kothari Model display almost similar numbers, although the mean value is somewhat lower at 20.6 % and a maximum of 184.8 % of total assets. It may seem odd that the discretionary accruals in a company exceed the total assets, but it could be the case in, for example, a consultancy company without a large amount of assets but high earnings. Another explanation could be the limited number of observations when performing the regressions for the Modified Jones Model and the Kothari Model. As argued by Doukakis (2014), at least eight observations per industry and year are needed in order to control for differences between industries in a sufficient way. In our case the observations to estimate discretionary accruals are sometimes as low as six. The mean value of discretionary accruals obtained from the McNichols Model is substantially lower and equals 0.7 % of total assets. This might be

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[11]Average total assets is calculated for each fiscal year for all firm observations in that year.

explained by that the variables added in the McNichols Model to a larger extent explain the dependent variable, and thus the size of the residuals decreases.

Further, the board size in the sample is ranging from three to ten members, with a mean of 5.46 members. The main variable of concern, the percentage of females on the board, is ranging from 0 to 66.7 % with a mean of 40.6 %. On average the companies included in the sample have a size of 17028 million Norwegian kronor, leverage of 21 %, market-to-book ratio of 2.597, return on assets of 2.035 % and external financing on almost 10 % of total assets.

Table 7: Summary statistics

| Variables | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|
| wjones | 0.242 | 0.302 | 0 | 1.545 |
| wkothari | 0.206 | 0.283 | 0 | 1.848 |
| wnichols | 0.007 | 0.01 | 0 | 0.057 |
| tot_b | 5.459 | 1.049 | 3 | 10 |
| fem_per | 0.406 | 0.092 | 0 | 0.667 |
| ind_per | 0.639 | 0.251 | 0 | 1 |
| aud_c | 0.497 | 0.501 | 0 | 1 |
| ceo_b | 0.076 | 0.265 | 0 | 1 |
| ceo_t | 0.168 | 0.374 | 0 | 1 |
| size | 17028.378 | 60771.914 | 10.186 | 641130 |
| lsize | 14.681 | 2.01 | 9.229 | 20.279 |
| wleverage | 0.21 | 0.189 | 0 | 0.635 |
| wcf_ass | 0.106 | 0.159 | 0.007 | 1.151 |
| mtb | 2.597 | 3.734 | -18.479 | 48.1 |
| lmtb | 0.574 | 0.861 | -2.147 | 3.873 |
| roa | 2.035 | 24.212 | -161.5 | 89.930 |
| wext_fin | 0.098 | 0.271 | -0.394 | 1.525 |

**tot_b** = size of board; **fem_per** = percentage of females on the board; **ind_per** = percentage of independent board members; **aud_c** = dummy for audit committee; **ceo_b** = dummy for CEO on board; **ceo_t** = dummy for CEO turnover; **size**=total assets; **wleverage** = long-term debt/total assets; **wcf_ass** = std. dev. of cash flow/total assets; **mtb** = market value for company/common equity; **roa** = return on assets; **wext_fin** = external financing/total assets

Before running the regressions we tested the variables for multicollinearity. In Table 8 the correlation between the variables is displayed. Except for the correlation between roa and wext_fin (-0.654), none of the correlation coefficients exceed 0.5, which indicates that the variables do not suffer from multicollinearity (Baccouche et al. 2013). We also used Variance Inflation Factors (VIFs) to assess whether there was any multicollinearity in our data[12].The variable lsize had the highest VIF score at 2.13, a score that according to Baccouche et al. (2013) do not indicate any problems with multicollinearity as the score does not exceed 5.

---

[12]An index measuring the impact of multicollinearity on the variance of the estimated regression coefficients.

Table 8: Cross-correlation table

| Variables | wjones | tot_b | fem_per | ind_per | aud_c | ceo_b | ceo_t | lsize | wleverage | wcf_ass | lmtb | roa | wextfin |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| wjones | 1.000 | | | | | | | | | | | | |
| tot_b | 0.127 | 1.000 | | | | | | | | | | | |
|  | (0.019) | | | | | | | | | | | | |
| fem_per | -0.223 | 0.066 | 1.000 | | | | | | | | | | |
|  | (0.000) | (0.208) | | | | | | | | | | | |
| ind_per | 0.000 | 0.096 | 0.256 | 1.000 | | | | | | | | | |
|  | (0.993) | (0.068) | (0.000) | | | | | | | | | | |
| aud_c | -0.143 | 0.116 | 0.186 | 0.150 | 1.000 | | | | | | | | |
|  | (0.008) | (0.026) | (0.000) | (0.004) | | | | | | | | | |
| ceo_b | 0.194 | -0.038 | -0.146 | -0.111 | -0.121 | 1.000 | | | | | | | |
|  | (0.000) | (0.470) | (0.005) | (0.033) | (0.020) | | | | | | | | |
| ceo_t | -0.041 | 0.024 | -0.007 | -0.016 | 0.033 | 0.035 | 1.000 | | | | | | |
|  | (0.448) | (0.649) | (0.887) | (0.757) | (0.532) | (0.497) | | | | | | | |
| lsize | -0.077 | 0.330 | 0.237 | 0.209 | 0.289 | -0.015 | -0.051 | 1.000 | | | | | |
|  | (0.142) | (0.000) | (0.000) | (0.000) | (0.000) | (0.768) | (0.331) | | | | | | |
| wleverage | -0.047 | 0.000 | -0.052 | 0.016 | -0.066 | 0.005 | -0.041 | 0.353 | 1.000 | | | | |
|  | (0.369) | (0.994) | (0.324) | (0.759) | (0.208) | (0.917) | (0.434) | (0.000) | | | | | |
| wcf_ass | 0.179 | -0.021 | -0.063 | 0.048 | 0.016 | -0.007 | 0.034 | -0.429 | -0.298 | 1.000 | | | |
|  | (0.001) | (0.692) | (0.226) | (0.357) | (0.759) | (0.888) | (0.520) | (0.000) | (0.000) | | | | |
| lmtb | 0.067 | -0.042 | -0.133 | -0.047 | -0.076 | 0.024 | -0.022 | -0.295 | -0.260 | 0.369 | 1.000 | | |
|  | (0.215) | (0.430) | (0.013) | (0.384) | (0.157) | (0.660) | (0.676) | (0.000) | (0.000) | (0.000) | | | |
| roa | 0.044 | 0.003 | 0.075 | 0.078 | -0.059 | -0.053 | -0.173 | 0.389 | 0.139 | -0.260 | -0.220 | 1.000 | |
|  | (0.395) | (0.954) | (0.152) | (0.140) | (0.261) | (0.314) | (0.001) | (0.000) | (0.003) | (0.000) | (0.000) | | |
| wextfin | 0.145 | 0.089 | -0.174 | -0.093 | -0.137 | 0.061 | 0.027 | -0.359 | -0.011 | 0.323 | 0.161 | -0.654 | 1.000 |
|  | (0.007) | (0.096) | (0.001) | (0.084) | (0.011) | (0.255) | (0.620) | (0.000) | (0.819) | (0.000) | (0.001) | (0.000) | |

Significance level within parentheses

The results from the regression on the Norwegian data are displayed in Table 9.

Table 9: Regression table Norway

| Variables | OLS Jones | FE Jones | OLS Kothari | FE Kothari | OLS McNichols | FE McNichols |
|---|---|---|---|---|---|---|
| tot_b | 0.0238 | -0.00143 | 0.0322 | -0.0293 | 0.000906 | 0.000292 |
| | (0.0187) | (0.0330) | (0.0214) | (0.0279) | (0.000587) | (0.000801) |
| fem_per | -0.669*** | -0.874*** | -0.0713 | -0.354 | -0.0134** | -0.0130 |
| | (0.184) | (0.244) | (0.199) | (0.263) | (0.00647) | (0.00832) |
| ind_per | 0.0882 | 0.114 | 0.0834 | 0.195* | 0.00181 | 0.00987** |
| | (0.0606) | (0.120) | (0.0576) | (0.114) | (0.00213) | (0.00405) |
| aud_c | -0.0318 | -0.00287 | -0.0627* | 0.0110 | 0.00120 | -0.00111 |
| | (0.0313) | (0.0403) | (0.0355) | (0.0369) | (0.00103) | (0.00121) |
| ceo_b | 0.193** | 0.0830 | 0.0233 | -0.0619 | 0.00338* | -0.000679 |
| | (0.0751) | (0.0992) | (0.0483) | (0.100) | (0.00184) | (0.00269) |
| ceo_t | -0.0146 | -0.0194 | -0.0527 | -0.0266 | -0.00251** | -0.00270 |
| | (0.0386) | (0.0340) | (0.0348) | (0.0351) | (0.00127) | (0.00170) |
| lsize | 0.00437 | -0.339*** | 0.0173 | -0.423*** | 0.00128*** | 0.000634 |
| | (0.0138) | (0.0928) | (0.0133) | (0.0869) | (0.000467) | (0.00277) |
| wleverage | -0.105 | -0.350* | -0.0687 | -0.115 | 0.00170 | -0.00943 |
| | (0.0874) | (0.193) | (0.0884) | (0.184) | (0.00354) | (0.00600) |
| wcf_ass | 0.296* | -0.503 | 0.607** | -1.882*** | -0.00442 | 0.00282 |
| | (0.162) | (0.417) | (0.262) | (0.351) | (0.00603) | (0.0113) |
| lmtb | 0.000145 | -0.00296 | 0.0282 | 0.0240 | 0.00120 | 0.000715 |
| | (0.0221) | (0.0252) | (0.0276) | (0.0315) | (0.000731) | (0.000685) |
| roa | 0.00206** | 0.000796 | | | 0.000000662 | -0.0000639 |
| | (0.000888) | (0.00132) | | | (0.0000358) | (0.0000444) |
| wextfin | 0.137 | 0.395** | 0.0277 | 0.439** | -0.00227 | -0.000508 |
| | (0.111) | (0.173) | (0.120) | (0.191) | (0.00334) | (0.00368) |
| Constant | 0.226 | 5.626*** | -0.269 | 6.802*** | -0.0138* | -0.00211 |
| | (0.174) | (1.374) | (0.215) | (1.285) | (0.00712) | (0.0409) |
| Observations | 304 | 304 | 299 | 299 | 297 | 297 |
| Adjusted $R^2$ | 0.121 | 0.207 | 0.095 | 0.242 | 0.089 | 0.043 |

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

In the ordinary least square regression analysis, including robust standard errors, the relationship between the fraction of females on the board (fem_per) and discretionary accruals from the Modified Jones Model is significant at the 0.01 level, with a coefficient of -0.669. This indicates a negative relationship between female representation (fem_per) and the level of discretionary accruals (which we use to proxy earnings management), meaning that if female representation increases, this would lead to a decrease in discretionary accruals and vice versa. Since they are both expressed as ratios and fem_per only varies between 0 and 1, interpreting a 1-unit change does not make sense. Instead, the coefficient can be interpreted as that a change of 1 percentage point in fem_per would result in a decrease in discretionary accruals, on average, of 0.00669 percentage points, all other variables held constant. The results are robust to the inclusion of fixed effects and are in line with the previously stated main hypothesis. Adjusted r-square for the model is 0.207, which means that approximately

20% of the variation in the dependent variable is explained by the variation in the independent variables. The fit of the model can therefore be said to be relatively good. The result indicates that a more gender diverse board has positive effects on corporate governance, in terms of decreasing accrual based earnings management. However, in the additional tests, fem_per is only significant with OLS McNichols on the 0.05 level. When using fixed effects in this regression, there is no significance, which could be explained by that fixed effects remove the influence of time invariant factors. The reason for absence of significance in the Kothari Model regarding fem_per might be explained by the critique of, among others, Keung and Shih (2014), who argue that the model is only appropriate when performance is abnormal. The mean ROA for Norway is close to 2%, which have to be considered quite normal as a mean for a country, considering it represents the whole spectrum of performance among firms. This might lead to an underestimation of discretionary accruals by the model, causing a type II error.

Independent directors (ind_per) shows no significance in the Modified Jones Model but is significant at the 0.1 level in the Kothari Model with fixed effects and at the 0.05 level using the McNichols Model with fixed effects. The coefficient is positive, which contradicts our hypothesis of a negative relationship. This might indicate what some previous research suggest, that more independent directors with poor knowledge of the company will not be efficient in terms of governing (Chen et al. 2015) and we argue, cautiously, that the effect could be the opposite of what was intended since the firm might have the appearance of good corporate governance, but in fact, the board is "run" by a core of dependent directors with independent directors serving the purpose of 'window-dressing'. This means that even if the Norwegian Code of Practice for Corporate Governance has clear guidelines on the inclusion of independent directors, perhaps additional controls are necessary to support the influence of said directors. As mentioned before, this is also our most unreliable variable, which could be another explanation of the confusing results.

Total assets (lsize) is significant with a coefficient of -0.339 at the 0.01 level with fixed effects in the Modified Jones Model and also significant in the Kothari Model with fixed effects. Since the variable is expressed as the logarithm of total assets, the interpretation of the coefficient is different from an interpretation of total assets expressed in absolute terms. If total assets increase by 1 percent, it will generate a $1/100 * \beta(-0.339)$ effect on the dependent variable. One could argue that the effect is due to the fact that larger firms are subject to more scrutiny from stakeholders, and that they therefore have less flexibility in managing their accounting numbers (Meek et al. 2007). The variable is somewhat confusing since the sign of the coefficient changes in the McNichols Model.

The control variables CEO on the board of directors (ceo_b) and ROA have significant positive coefficients in the OLS Jones model, which is in line with previously stated hypotheses. However, the results are not robust to the inclusion of fixed effects or when tested in conjunction with any of the other models, provided we disregard significance levels above 0.05. External financing (wext_fin) is significant with fixed effects on the 0.05 level in both Kothari and Jones with a positive coefficient, indicating that firms tend to manage their earnings while increasing their external financing through stock or debt issuance. Hence, the impact of the variable is in line with our hypothesized impact, but not robust to all used models. The variables market-to-book (lmtb) and standard deviation of cash flows (wcf_ass) are significant in varying degree among the additional tests but show no interesting significance in the Modified Jones Model. The remaining variables total board members (tot_b) and leverage (wleverage) shows no interesting significance in any of the applied models.

## 5.2 Sweden

The summary statistics for Sweden are displayed in Table 10. On average, the discretionary accruals obtained from the Modified Jones Model, the Kothari Model and the McNichols Model were lower for Sweden in comparison to Norway, at 18.4 %, 17.1 % and 0.3% of total assets respectively. Further, the board size is stretching from 3 to 35 members, with a mean of 6.57 members, which is higher than the average board size in Norway. The percentage of females on the board is ranging from 0 % to 80 %, where the mean is substantially lower in Sweden on 20.9 % in comparison to Norway.

On average the companies included in the Swedish sample have a size of 53456 million Swedish kronor, leverage of 13.8 %, market-to-book ratio of 2.731, return on assets of 3.266 % and external financing on 6.3 % of total assets. In comparison to Norway, the Swedish companies included in the sample, on average, were larger, more profitable and had a higher market-to-book ratio but lower leverage and external financing.

Table 10: Summary statistics

| Variables | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|
| wjones | 0.184 | 0.229 | 0 | 1.421 |
| wkothari | 0.171 | 0.208 | 0 | 1.242 |
| wnichols | 0.003 | 0.006 | 0 | 0.038 |
| tot_b | 6.566 | 1.664 | 3 | 35 |
| fem_per | 0.209 | 0.13 | 0 | 0.8 |
| ind_per | 0.539 | 0.284 | 0 | 1 |
| ceo_b | 0.458 | 0.498 | 0 | 1 |
| size | 53456.099 | 365440.627 | 0.641 | 6397937.413 |
| lsize | 14.39 | 2.248 | 6.463 | 22.579 |
| wleverage | 0.138 | 0.165 | 0 | 0.656 |
| wcf_ass | 0.084 | 0.14 | 0.002 | 1.104 |
| mtb | 2.731 | 5.072 | -81.368 | 87.343 |
| lmtb | 0.637 | 0.854 | -5.253 | 4.47 |
| roa | 3.266 | 19.262 | -140.93 | 75.98 |
| wext_fin | 0.063 | 0.202 | -0.32 | 0.967 |

**tot_b** = size of board; **fem_per** = percentage of females on the board; **ind_per** = percentage of independent board members; **ceo_b** = dummy for CEO on board; **size**=total assets; **wleverage** = long-term debt/total assets; **wcf_ass** = std. dev. of cash flow/total assets; **mtb** = market value for company/common equity; **roa** = return on assets; **wext_fin** = external financing/total assets

Also the variables obtained from Sweden were tested for multicollinearity before running the regressions. The correlation between the variables is displayed in Table 11, and neither the correlation coefficients nor the performed VIF test indicates any bigger problems with multicollineariy. There is only one correlation coefficient that exceeds 0.5 (the coefficient between lsize and tot_b) and the highest VIF score is 2.69 for the variable lsize.

Table 11: Cross-correlation table

| Variables | wjones | tot_b | fem_per | ind_per | ceo_b | lsize | wleverage | wcf_ass | lmtb | roa | wext_fin |
|---|---|---|---|---|---|---|---|---|---|---|---|
| wjones | 1.000 | | | | | | | | | | |
| tot_b | -0.147 | 1.000 | | | | | | | | | |
| | (0.000) | | | | | | | | | | |
| fem_per | -0.020 | 0.148 | 1.000 | | | | | | | | |
| | (0.562) | (0.000) | | | | | | | | | |
| ind_per | -0.088 | 0.008 | 0.240 | 1.000 | | | | | | | |
| | (0.010) | (0.720) | (0.000) | | | | | | | | |
| ceo_b | -0.066 | 0.313 | -0.085 | -0.128 | 1.000 | | | | | | |
| | (0.056) | (0.000) | (0.000) | (0.000) | | | | | | | |
| lsize | -0.282 | 0.602 | 0.178 | 0.150 | 0.288 | 1.000 | | | | | |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | | | | | | |
| wleverage | -0.077 | 0.104 | -0.040 | 0.062 | 0.138 | 0.364 | 1.000 | | | | |
| | (0.017) | (0.000) | (0.117) | (0.025) | (0.000) | (0.000) | | | | | |
| wcf_ass | 0.271 | -0.189 | -0.048 | -0.012 | -0.103 | -0.480 | -0.196 | 1.000 | | | |
| | (0.000) | (0.000) | (0.061) | (0.665) | (0.000) | (0.000) | (0.000) | | | | |
| lmtb | 0.103 | 0.017 | 0.120 | -0.086 | -0.022 | -0.185 | -0.153 | 0.212 | 1.000 | | |
| | (0.007) | (0.567) | (0.000) | (0.005) | (0.451) | (0.000) | (0.000) | (0.000) | | | |
| roa | -0.252 | 0.096 | 0.046 | -0.035 | 0.109 | 0.241 | 0.027 | -0.329 | -0.008 | 1.000 | |
| | (0.000) | (0.000) | (0.076) | (0.210) | (0.000) | (0.000) | (0.274) | (0.000) | (0.778) | | |
| wext_fin | 0.369 | -0.086 | -0.084 | -0.069 | -0.013 | -0.235 | 0.048 | 0.274 | 0.010 | -0.416 | 1.000 |
| | (0.000) | (0.001) | (0.001) | (0.014) | (0.622) | (0.000) | (0.046) | (0.000) | (0.734) | (0.000) | |

Significance level within parentheses

The results from the regression on the Swedish data are displayed in Table 12.

Table 12: Regression table Sweden

| Variables | OLS Jones | FE Jones | OLS Kothari | FE Kothari | OLS McNichols | FE McNichols |
|---|---|---|---|---|---|---|
| tot_b | -0.00495 | -0.0196 | -0.00338 | -0.0206 | 0.000189 | 0.000287 |
| | (0.00673) | (0.0163) | (0.00661) | (0.0147) | (0.000276) | (0.000214) |
| fem_per | 0.0745 | 0.225 | 0.0600 | 0.139 | 0.0000529 | 0.00420 |
| | (0.0685) | (0.158) | (0.0620) | (0.141) | (0.00212) | (0.00334) |
| ind_per | -0.0570* | -0.0853 | -0.0427 | -0.0600 | -0.00170** | -0.00121** |
| | (0.0321) | (0.0553) | (0.0296) | (0.0430) | (0.000797) | (0.000598) |
| ceo_b | 0.0192 | 0.0146 | 0.0192 | 0.0368 | 0.00127*** | -0.000901 |
| | (0.0184) | (0.0483) | (0.0169) | (0.0370) | (0.000421) | (0.000745) |
| lsize | -0.0113** | 0.148 | -0.0150*** | 0.164* | 0.00144*** | -0.000284 |
| | (0.00545) | (0.116) | (0.00548) | (0.0951) | (0.000271) | (0.00102) |
| wleverage | -0.00978 | -0.0929 | 0.000338 | -0.138 | -0.00454** | 0.0106** |
| | (0.0619) | (0.190) | (0.0539) | (0.165) | (0.00209) | (0.00435) |
| lmtb | 0.00852 | 0.0390** | 0.0113 | 0.0430*** | 0.000609*** | 0.000376 |
| | (0.0104) | (0.0151) | (0.00908) | (0.0135) | (0.000234) | (0.000244) |
| roa | -0.000737 | -0.000695 | | | -0.0000371*** | 0.00000848 |
| | (0.000871) | (0.00200) | | | (0.0000137) | (0.0000155) |
| wcf_ass | 0.108 | 0.592 | 0.0940 | 1.111 | -0.00315 | -0.00130 |
| | (0.162) | (1.085) | (0.129) | (0.691) | (0.00275) | (0.00607) |
| wext_fin | 0.481*** | 0.422*** | 0.549*** | 0.561*** | -0.000425 | 0.000283 |
| | (0.131) | (0.145) | (0.108) | (0.107) | (0.00156) | (0.00135) |
| Constant | 0.339*** | -1.934 | 0.365*** | -2.201 | -0.0179*** | 0.00436 |
| | (0.0667) | (1.721) | (0.0595) | (1.403) | (0.00298) | (0.0148) |
| Observations | 607 | 607 | 608 | 608 | 587 | 587 |
| Adjusted $R^2$ | 0.165 | 0.125 | 0.204 | 0.194 | 0.189 | 0.013 |

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

In the Swedish setting, female representation (fem_per) is not significant on any conventional level in any of the applied models. The finding is quite interesting, given the results from the Norwegian context. An explanation could be that females, as a consequence of the lack of legislation regarding their positions on boards of directors, need to adapt their behavior to their male counterparts in order to be appointed and re-appointed as directors on the board. The characteristics we have previously outlined as making a difference in terms of improved corporate governance would then, with this line of thinking, diminish as female behavior converge with male behavior. As pointed out by Ye et al. (2010), ethical homogeneity eliminates the potential benefits from gender diversity because of the convergence of characteristics.

The Norwegian gender quota implied that a large amount of females needed to be introduced on the board of directors in a short amount of time, in order to avoid liquidation. A short time span and a high pressure to introduce more females might affect the selection process and thus result in the appointment of female directors that actually differ from their male equivalents in terms of characteristics. That a large number of females were introduced at the same time might also have contributed to a conservation of those differences as the

newly appointed female directors could find support in each other, a reasoning in line with Lakhal et al. (2015) and the critical mass theory.

Total assets (lsize) displays the same pattern as in the Norwegian context, but is not robust to the inclusion of fixed effects. External financing (wext_fin) is highly significant in both the Modified Jones Model and the Kothari Model, but not in the McNichols Model. The coefficients are all positive and therefore in line with the hypothesized impact on discretionary accruals. In the McNichols Model independent directors (ind_per), CEO on board of directors (ceo_b), leverage (wleverage) and market-to-book (lmtb) are all significant on at least a 0.05 level. The coefficients display direction in line with hypotheses for all variables except leverage, which shows a negative correlation.

## 5.3   Interaction Test

The results from the model with the Swedish and Norwegian data combined are presented in Table 13.

Table 13: Interaction regression

| Variables | OLS Jones | FE Jones |
|---|---|---|
| tot_b | -0.00436 | -0.00864 |
|  | (0.00777) | (0.0106) |
| norway | 0.290*** | 0.448*** |
|  | (0.0859) | (0.111) |
| intfem_per | -0.563*** | -0.966*** |
|  | (0.202) | (0.290) |
| fem_per | 0.0206 | 0.101 |
|  | (0.0704) | (0.158) |
| ind_per | -0.0163 | -0.0140 |
|  | (0.0295) | (0.0380) |
| ceo_b | 0.0392* | 0.0654* |
|  | (0.0200) | (0.0344) |
| lsize | -0.00667 | -0.000374 |
|  | (0.00611) | (0.0116) |
| wleverage | -0.0394 | 0.0117 |
|  | (0.0513) | (0.0967) |
| wcf_ass | 0.251** | 0.300*** |
|  | (0.119) | (0.115) |
| lmtb | 0.00328 | 0.0192* |
|  | (0.00970) | (0.0110) |
| roa | 0.000951 | 0.000391 |
|  | (0.000714) | (0.000774) |
| wext_fin | 0.306*** | 0.383*** |
|  | (0.100) | (0.103) |
| Constant | 0.243*** | 0.124 |
|  | (0.0685) | (0.147) |
|  |  |  |
| Observations | 912 | 912 |
| Adjusted R-squared | 0.099 | 0.121 |

Robust standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

The interaction term (intfem_per) is significant on the 0.01 level[13]. The result serves as further support for that there is a significant difference between the effects of inclusion of

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[13]Only results from the Modified Jones Model are displayed here since no significance was found in the other models.

females on boards of directors in Norway and in Sweden, most probably due to the introduced gender quota in Norway.

# 6   Conclusion

Since our study of Norwegian firms is made on a small sample and regressions to estimate discretionary accruals are sometimes made with as little as six observations, the results serve merely as an indication of the reality, and must be interpreted with caution. Bearing that in mind, by looking at Norwegian firms between 2006 and 2010 we find a significant negative association between gender diversity and earnings management. In other words, as the fraction of females on boards of directors increases, discretionary accruals estimated with the Modified Jones Model, which we use to proxy earnings management, decrease. The exogenous environment, due to the legislated gender quota, in which the study was made serves as an important factor in limiting problems with endogeneity. This means that we with great certainty, can say that gender diversity, in this case, affects earnings management and not the other way around. The results are partly robust to the inclusion of other proxies for earnings management such as the McNichols Model. Lending some support to the finding is the fact that most previous research has found a similar relationship, and our study is an addition to the increasingly compelling evidence on the beneficial effects of gender diversity on boards of directors. This will, in the long run, amount to useful information when passing legislation and developing practices for corporate governance.

It seems as if females possess certain characteristics that enhance the governing effects of the board. However, it is important to emphasize the fact that this is not a study of the characteristics themselves, but of a variable believed to exhibit the characteristics. The result may therefore have other explanations, for example that the inclusion of a person(s) who breaks the homogeneity in a group might be enough to change the ways in which the group is acting, regardless of the new person's characteristics. A phenomenon closely related to the critical mass theory.

The additional study of Sweden stands in grave contrast to the Norwegian study. It shows no association between earnings management and the fraction of females on the boards. The interaction test where the Swedish and Norwegian datasets are combined in one regression shows that there is a significant difference in the effect of the inclusion of females on boards of directors between Norway and Sweden, which supports the argument of an exogenous shock. Further, the Swedish study is performed on a much larger sample, but also in an environment that is less exogenous in regard to female representation on boards of directors. The reason for the results may therefore have several explanations. For example, a convergence of male and female characteristics when female positions are not protected by legislation, or, that the small sample size in Norway reduces the validity of the study.

*Future research*

Increasing female representation on the board of directors seems to have an effect on earnings management, but is most likely limited and affected by several factors. Most definitely, it can not be considered a universal remedy for earnings management. More research is required to determine the effects of gender diversity on boards of directors in general, and gender quotas as a mean of achievement in particular. Ahern and Dittmar (2012) and Lakhal et al. (2015) express concern about that a gender quota might lead to a shortage of competent female directors and a solution to this might be an increasing amount of board positions held by

each female. To hold many directorships can have positive effects in terms of competence and influences from other sources, but could also be negative as the effort directed to each firm and its governing activities might decrease. Therefore it would be interesting to extend the study to include 'busy directors' as an explanatory variable. A director is often defined as 'busy' when he or she holds three or more directorships. Further, since our study suffers from limitations regarding sample size it would be interesting to see if our conclusions hold in a study made on a larger sample and perhaps in a different context.

# References

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