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Gender Diversity and Earnings Management: A study on Norwegian Firms

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Abstract

Due to the ethical and moral complexities associated with earnings management, the examination of gender differences has generated interest in relation to the quality of earnings reporting. However, the available studies examining the association between earnings management and gender diversity are limited, and the existing research has yielded different conclusions about whether gender has an impact on earnings management practices. In this study, we aim to investigate whether gender serves as an explanatory variable in earnings management practices, with a specific focus on Norwegian firms. Hence, our research question is: "*Is the gender of the CEO and the number of female directors linked to earnings management in Norwegian firms?*". Our objective is to enhance the understanding of the potential relationship between the gender of the CEO and earnings management. Further, we examine whether the number of female directors impacts earnings management practices. Based on a panel of Norwegian firms from the period 2009 to 2015, we utilize different versions of the Jones model to identify discretionary accruals as a measure of earnings management and to further examine the effect of female CEOs and directors on discretionary accruals. The structure of the empirical analysis and method is motivated by a study executed by Arun et al. (2015) who examines UK firms.

Our findings suggest a statistically significant association between the gender of the CEO and income-decreasing earnings management. This implies that female CEO engage in more conservative accounting practices. However, our findings do not indicate a statistically significant association between the number of female directors and income-decreasing earnings management, which implies that the association discovered is not robust enough to make definite conclusions. Further, we explore how the relationship between gender diversity and earnings management is impacted by the variations of different leverage levels. The findings indicate a potential relationship between both gender diversity measures and income-decreasing earnings management. However, lack of statistical significance on the main independent variables makes it hard to draw concrete conclusions.

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1.0 Introduction

Earnings management has received significant attention and has been considerably discussed in the accounting literature. It refers to either the manipulation of reported earnings or real changes in corporate behavior to achieve the desired reporting outcome (Healy & Wahlen, 1999; Jiang et al., 2018). However, as financial reporting of earnings has a central role in measuring firm performance, earnings quality is essential. It is crucial that the firms' earnings accurately reflect the underlying economic performance to make well-informed investment decisions and establish credibility with key stakeholders and minimize the cost of capital (Healy & Wahlen, 1999).

Various studies have been done to determine motives for earnings management, and the reasons differ depending on the situation's objectives and circumstances. Explanations frequently discussed are reaching financial targets, avoiding tax penalties and other financial consequences, market expectations, and maximizing compensation (Healy & Wahlen, 1999). Furthermore, Bergstresser and Philippon (2006) found that in firms where the chief executive officer's (CEO) potential compensation is tightly linked to the value of stock and option holdings exhibit more earnings management. This further suggests that one of the motives for earnings management is to manipulate reported earnings in a way that benefits the CEO's potential compensation (Bergstresser and Pilippon, 2006). Additionally, Efendi et al. (2007) investigated factors increasing the likelihood of manipulating earnings and found evidence suggesting that these factors were personal financial gain, firms subject to debt covenants, and firms obtaining new equity or debt.

In recent years, the impact of gender has received more attention in the accounting literature, and more studies have increased awareness and recognition of the value of balanced gender representation (Carter et al., 2003; Brahma et al., 2021). Furthermore, some emphasis has been placed on gender differences in decision-making, risk-taking, and firm performance. These differences might be linked to the

socialization process and gender roles, which potentially can carry over to the workplace and influence decision-making and risk-taking (Mittal & Vyas, 2011).

Previous research demonstrates that men and women have different risk preferences, and that females prefer low-risk investments, while males prefer high return-high-risk investments (Mittal & Vyas, 2011). Furthermore, a study conducted by Huang and Kisgen (2013) found evidence suggesting that men are more overconfident than females in corporate decision-making. Additional studies have also suggested a relationship between firm performance and gender diversity (Green & Homroy, 2018; Brahma et al., 2021). These findings indicate that gender diversity in corporate boards and top management can potentially enhance decision-making as diverse perspectives help to uncover biases and facilitate more informed decisions (Green & Homroy, 2018; Brahma et al., 2021).

As the issue of earnings management encompasses ethical and moral complexities, the perspective of gender differences has therefore generated some interest concerning earnings quality. Some previous studies of earnings management and gender diversity exist (Peni & Vähämaa, 2010; Kyaw et al., 2015; Wei & Xie, 2015). However, prior research has focused on the presence of females on the board of directors. The examination of whether the gender of the CEO affects earnings management is less explored.

Our study extends this field of research by additionally concentrating on the impact of the gender of the CEO in relation to earnings management. Moreover, it complements the literature by focusing on Norwegian companies. Norway is recognized as one of the most gender-equal countries globally (*Global Gender Gap Report 2022*, 2022, p. 5). Furthermore, by incorporating gender quota regulations at the corporate board level, Norway became a global leader in gender equality policies (Kandal, 2020). The process of the gender balance law (GBL) started in 2002, when it was suggested that every listed and unlisted Norwegian public firm should have a minimum of 40 percent of each gender on their corporate board (Bøhren & Staubo, 2014). The law became mandatory in 2008 and has also inspired the European Union set a target

where all sizable firms should meet the same initiatives by 2026 (European Parliament, 2022).

Despite the considerable progress toward gender equality in Norway, substantial inequalities still exist, specifically concerning pay, working hours, and employment positions (Regjeringen, 2021, p. 65). Particularly, the progress of women reaching top positions of Norwegian corporate leadership has been gradual, with only 14 percent of CEOs in the country's largest companies being women in 2021 (Regjeringen, 2021, p. 64). Considering the gender inequality in the Norwegian labor market, exploring gender diversity and earnings management in Norwegian firms is both relevant and captivating. Furthermore, our curiosity in investigating gender diversity and earnings management in Norwegian firms is partially based on the idea that women tend to be more ethical and less risk-averse in business, potentially influencing their engagement in earnings management (Betz et al., 1989; Mittal & Vyas, 2011).

Based on a panel of Norwegian firms from the period 2009 to 2015 we will examine the relationship between gender diversity and earnings management. The primary objective is to analyze whether the gender of the CEO is linked to earnings management. Additionally, we aim to assess the influence of female board directors on earnings management. Hence, our research question is: "*Is the gender of the CEO and the number of female directors linked to earnings management in Norwegian firms?*".

The purpose of this study aims to enhance the understanding of the potential relationship between gender diversity and earnings management. More specifically, the paper seeks to investigate how having a female CEO and the presence of females in the boardroom affects earnings management practices in Norwegian companies. Through this research our objective is to uncover whether gender diversity can be a explanatory variable for the variation in earnings management engagement. By utilizing different versions of the Jones model, we aim to identify discretionary accruals as a measure for earnings management to further examine the effect of female CEOs and female directors. The results of our research are in general

consistent with some previous literature. However, there is limited research conducted on the subject regarding Norwegian companies.

The paper unfolds as follows. Section 2 contains a comprehensive literature review discussing earnings management's different approaches and motives. It encompasses previous literature considering gender differences in relation to corporate decision-making and risk aversion. Moreover, it provides insight into how prior research has found that gender potentially influences earnings management. Section 3 contains the methodology for our research, explaining our hypothesis, selection sample, application of the Jones models, and OLS regression. Thereafter, section 4 highlights the empirical findings of our analysis. Finally, section 5 includes a discussion and conclusion of our results.

2.0 Literature review

2.1 Gender diversity

Over the last decade, gender diversity has received increasing attention, and the importance of balanced gender representation in companies is becoming more recognized. Several studies suggest that a higher representation of females in top management and on the board could positively impact firm performance. For example, Flabbi et al. (2019) established that the effect of female leadership on firm performance improves with the proportion of female workers. These results are consistent with Conyon and He (2017) who found evidence indicating that having females on the board has a positive impact on firm performance although the impact differs across sections of performance distribution.

Despite moderate improvement in gender diversity, women continue to be underrepresented in many countries in leadership positions. In 2021, woman made up only 20 percent of board positions globally, demonstrating a minimal increase of approximately 2 percent since 2018 (Deloitte, 2022). Additionally, the proportion of female CEOs in 2021 was only 5 percent worldwide (Deloitte, 2020). However, to address the lack of gender diversity in leadership, multiple firms have taken steps to increase female representation in top leadership and in the boardroom. These initiatives encompass fostering gender diversity in recruitment and creating employee source support groups for women in the workplace. Additionally, in recent years more countries have authorized regulations requiring firms to report on measures of gender equality to increase accountability and transparency[1].

During the last few decades, the effect of females in top management positions or on boards has acquired increased attention, and various researchers have conducted studies in this field. However, the relationship between gender diversity and firm performance remains inconclusive. Brahma et al. (2021) conducted a study regarding

[1] Norway introduced new legislation in 2003 requiring 40% of board members to be female. More European countries, such as Spain, Belgium and France have also implemented gender quotas on boardroom representation following Norway (*Gender Quotas on Boardroom Representation in Europe*, 2013, p. 1).

the influence of board gender diversity on firm performance in UK companies and found evidence suggesting a positive association between firm performance and gender diversity. Additionally, it was documented that the positive effect on financial performance was notable when three or more females were present on the board, compared to lower levels (Brahma et al., 2021). Another study by Green and Homroy (2018) on large European firms also provided findings suggesting that gender-diverse boards are related to higher firm profitability.

While these studies suggest a positive impact of gender diversity on firm performance, other previous research has discovered the association between firm performance and gender diversity to be negative or non-existent. Adams and Ferreira (2009) found evidence suggesting gender diversity negatively impacted firm performance. Similarly, Carter et al. (2010) did not identify a significant association between firm performance and the gender of the board members when examining a sample of US firms. These findings indicate that the relationship between gender diversity and firm performance is complex and may depend on various factors.

Throughout the years, research has emphasized managerial characteristics in decision-making, particularly concerning behavioral gender differences. Studies by Mittal and Vyas (2011) and Huang and Kisgen (2013) have demonstrated the significance of these differences in previous literature. Mittal and Vyas (2011) examined the relationship between gender and risk preferences, finding evidence suggesting that males and females tend to have different attitudes toward risk. The study's results indicate that women prefer low-risk investments, while men prefer high return-high-risk investments (Mittal & Vyas, 2011). Furthermore, the study shed light on gender differences in overconfidence levels, where men display greater levels of confidence in their abilities than women (Mittal & Vyas, 2011). This difference might help determine why men often show greater tolerance for risk than women. Furthermore, these findings highlight the potential importance of considering behavioral gender differences in managerial decision-making (Mittal & Vyas, 2011).

Additionally, a more recent study by Grimm (2019) demonstrated the considerable effect of social context on financial decision-making. The study suggests that gender-specific norms may contribute to gender differences in risk-taking behavior (Grimm, 2019). However, other recent research challenges this perspective that women are naturally more risk-averse than men and proposes that other factors might influence the gender difference in risk tolerance. For instance, Cupples et al. (2013) found that including education as a mediator reduced the total effect of gender on risk tolerance. Furthermore, Fisher and Yao (2017) executed a study investigating if gender differences in financial risk tolerance arise from individual factors that affect risk tolerance rather than gender itself. Specifically, it suggests that men and women might have different levels of financial risk tolerance because of their unique financial circumstances rather than being entirely dependent on their gender (Fisher & Yao, 2017). Additionally, Filippin and Crosetto (2016) performed a meta-analysis on gender differences in risk attitudes and their analysis suggest that less than 10 percent of the studies reviewed reported a significant difference between men and women.

2.2 Gender diversity in Norway

In recent years, the representation of females on boards in Norway has observed a significant increase. According to the latest Equileap global report, Norway is one of the top nations for gender diversity in boardrooms, with an average representation of 39 percent women (*GENDER EQUALITY GLOBAL REPORT & RANKING*, 2023, p. 16). To encourage gender diversity on boards, Norway made the Gender Balance Law (GBL) mandatory in 2008. Women made up only 6 percent of board members prior to the passage of this regulation. Since then, there has been consistent growth. However, only 14 percent of the CEOs of the 200 largest Norwegian firms are female, demonstrating the persistence of gender imbalance in corporate leadership (Regjeringen, 2021, p. 64). Therefore, it is still essential to focus on gender equality in corporate leadership and the boardroom.

Whether the GBL has successfully promoted diversity within corporate boards, and its overall impact, has been subject to varying perspectives and research findings.

Seierstad and Huse (2017) explore the long-term effects of the GBL concerning gender diversity. Their findings indicate that the law has effectively promoted gender balance within boards, as evidenced by a greater representation of women in board positions. Furthermore, the implementation of this law has been instrumental in the emergence of quota trends observed in Europe, which is unlikely to have occurred without the enactment of this legislation (Seierstad & Huse, 2017).

In a much-cited study, Ahern and Dittmar (2012) revealed that introducing the required quota in Norway significantly decreased stock prices. In addition, the quota resulted in fewer experienced boards, higher leverage, and weaker operating performance (Ahern & Dittmar, 2012). Furthermore, the mandatory quota has received some criticism, with some arguing that it has made the boards more inefficient and that many firms altered their organizational structures to avoid the law (Bøhren & Staubo, 2014). As a result, some firms became less effective by changing their organizational forms (Bøhren & Staubo, 2014).

However, Eckbo et al. (2022a) revisit the impact of the GBL on firm value. Adjusting for statistical properties of the event study, the authors conclude that the quota had no impact on firm value. Their evidence suggests that there were sufficient qualified female executives to prevent the negative effects of the GBL quota. Accordingly, the authors document a positive effect on firm value when firms voluntarily increase women's board representation. Furthermore, another study by Eckbo et al. (2022b) observed that the law positively impacted the performance and valuation of companies affected by the quota. The study discovered that firms can rebalance their boards by employing qualified female executives without significantly losing market value.

2.3 Earnings management

In the accounting literature, the topic of earnings management has received substantial consideration. It refers to the manipulation of reported earnings using judgement and includes strategies for altering income in a manner that is beneficial to both the managers and the firm (Healy & Wahlen, 1999). Various researchers with

diverse perceptions have defined earnings management in multiple forms using different descriptions. According to Schipper (1989), earnings management is the deliberate action of managers to achieve a personal benefit. Further, Dechow and Skinner (2000) indicate that practitioners and authorities frequently view earnings management as detrimental, prevalent, and in need of remedial action.

The issue of earnings management has been widely discussed in prior literature and is of high interest to stakeholders. Financial reporting assesses the degree to which a firm's reported outcomes provide accurate information to stakeholders about its financial position (Healy & Wahlen, 1999). However, an investor's resource allocation may be improper if the reported income level deceives the financial data user (Healy & Wahlen, 1999). Stakeholders only benefit from financial statements when the financial report is reliable. Therefore, managers must inform stakeholders of high-quality earnings as part of their ethical responsibility (Healy and Wahlen, 1999). To further specify, Healy and Wahlen (1999) proposed a broadly recognized definition of earnings management. Earnings management emerges when managers use their discretion to alter financial reports, either to share the outcome that depend on reported numbers or deceive stakeholders (Healy & Wahlen, 1999).

According to Efendi et al. (2007), when the CEO holds a significant amount of in-the-money stock options, the possibility of inaccuracy of the financial statements increases. This implies that the CEO could be motivated to manipulate earnings, creating a perception as though the company has a stronger financial performance, which could lead to higher stock prices and enhance the value of stock options (Efendi et al., 2007). Furthermore, their research suggests that managers might manipulate earnings to boost stock prices and prevent decline in value of overvalued equities (Efendi et al., 2007). Overall, it indicates that personal financial gain and overvalued equity are potential motives for manipulating earnings.

In addition, Gastón et al. (2014) observed that numerous studies have explored diverse topics on earnings management which are related to the current market conditions. The discussed subject involved are motives for earnings management, the identification of earnings management, and corporate financial standards with regard

to earnings management (Gastón et al., 2014). Additionally, previous research has discussed different incentives for engaging in earnings management, and various factors have been examined. According to Healy and Wahlen (1999), earnings management occurs to affect stock market perceptions, boost management compensation, and prevent regulatory involvement. Furthermore, a study executed by Bergstresser and Philippon (2006) suggests that firms with incentivized CEOs demonstrate elevated levels of earnings management.

Two main strategies exist for earnings management: real earnings management and accrual-based earnings management. The major distinction between the two approaches concerns the effect on operations and direct cash flow (Cohen & Zarowin, 2010). Accrual-based earnings management encompasses adjusting accounting entries without necessarily having an impact on cash flow, while real earnings management incorporates altering the underlying operations of the firm (Cohen & Zarowin, 2010).

2.3.1 Accrual based earnings management

A substantial amount of research in earnings management has employed the notion of discretionary accruals as a measure to assess the extent to which earnings have been manipulated (Schipper, 1989; Jones, 1991; Dechow et al., 1996). The definition of accruals suggests that their utilization causes a temporary improvement or reduction of reported earnings because their nature is not instantly reflected in cash flows and relies on manager's discretion (Bergstresser & Philippon, 2006). Furthermore, a majority of the studies in accrual-based management literature propose models to measure such practices (Dechow et al., 1995; Kothari et al., 2005; Pae, 2005).

The Jones model is a frequently employed method to identify earnings management (Jones, 1991). The model was established when Jones (1991) studied whether firms that obtained benefits from import relief tried to manipulate earnings. The initial purpose of the Jones model was to determine whether managers managed accounting figures to influence reported earnings, which resulted in a new proxy to measure earnings management (Jones, 1991). Ultimately, the model distinguishes between total and discretionary accruals by comparing expected accruals based on a regression

to the actual accruals reported (Jones, 1991). Since discretionary accruals are financial items subject to the manager's discretion, they have the opportunity to adjust the amount or timing of these items in order to increase the firm's reported income. Consequently, through the Jones model, discretionary accruals can be estimated which enables the identification of potential earnings management.

The modified Jones model was introduced by Dechow et al. (1996) as an improved version of the original Jones model (Jones, 1991). The primary aim of the modified Jones model is to improve the estimation of discretionary accruals by considering adjustments for changes in accounts receivable (Dechow et al., 1996). The modification offers a more subtle understanding of earnings management and helps address the potential mechanical correlation between revenue changes and total accruals observed in the original Jones model. As a result, the modified Jones model enables a potentially more accurate examination of discretionary accruals.

2.3.2 Real earnings management

In contrast to accrual-based earnings management, real earnings management impacts firm operations rather than accounting figures. For example, some previous studies suggest managers use earnings management through real activities manipulations (Graham et al., 2005; Roychowdhury, 2006).

According to Roychowdhury (2006), firms employ a variety of real earnings management tactics to prevent revealing losses. More specifically, the research focuses on the effect of manipulation on three variables; reduced prices to boost sales, restricted discretionary expenditure to enhance margins and accelerated production to lower the cost of goods sold (Roychowdhury, 2006). Furthermore, Roychowdhury (2006) research the three methods that companies employ to avoid disclosing losses through real manipulations. The first tactic presented is to lengthen credit terms or increase price discounts to improve sales (Roychowdhury, 2006). The second is overproducing and allocating additional overhead to inventory to reduce cost of goods sold and enhance operating margins (Roychowdhury, 2006). The third method revealed is to boost profits by lowering all discretionary spending (Roychowdhury,

2006). A different study, by Cohen and Zarowin (2010) suggests that seasoned equity-offering firms participate in real activities manipulations. Furthermore, their findings show that operational decisions to manage earnings, rather than just accrual reversals, lead to post-SEO operating underperformance (Cohen & Zarowin, 2010).

The choice between accrual-based and real earnings management might depend on different factors, inducing the firm's objective, the industry sector, and other situation-specific circumstances. Therefore, it can be claimed that both earnings management strategies can be applied in different scenarios. However, managers' preference regarding the various tactics of earnings management has been subject to conflicting previous research (Graham et al., 2005; Cohen & Zarowin, 2010; Zang, 2012). For example, Graham et al. (2005) reveal that managers prefer real earnings management over accrual-based since it can be eligible as optimal business decisions, making it more difficult to detect. Although the costs associated with real earnings management can have a substantial economic effect on the firm, it may still prove difficult to detect (Graham et al., 2005). Despite this, Zang (2012) explored the association between the costs related to accrual-based and real manipulation and found evidence suggesting that managers switch between the two earnings management methods. Further, he reaches the conclusion that managers substitute the two approaches (Zang, 2012).

2.3.3 Accounting earnings management and managerial compensation

Managerial compensation concerns the various forms of payment managers obtain from their companies, such as salaries or bonuses. Several studies have investigated the relationship between managerial compensation and earnings management, and evidence suggests that bonus schemes can substantially impact managers' behavior and foster the manipulation of earnings (Healy, 1985; Gaver et al., 1995; Guidry et al., 1999).

Healy (1985) explored the effect of bonus schemes on accounting decisions when managers have discretion over accounting choices. He proposes that having bonus programs can create incentives for managers to manipulate accounting figures to

enhance their bonus payments (Healy, 1985). Further, Healy (1985) observed that firms were more prone to manipulate earnings if they obtained bonus schemes based on earnings per share (EPS) in comparison to those with alternative bonus schemes. This finding suggests that managers' accounting decisions might be impacted by the structure of the bonus scheme (Healy, 1985). Specifically, it demonstrates that managers might have incentives to make accounting decisions that optimize their bonus payouts (Healy, 1985). Healy's (1985) studies emphasize the relevance of taking the potential influence of bonus schemes on accounting choices into account.

Furthermore, Guidry et al. (1999) explored the association between earnings-based bonus plans and earnings management by business-unit managers. According to the findings, business units with higher bonus payout levels are more inclined to earnings management practices (Guidry et al., 1999). Moreover, the results suggest that the link between earnings management and bonus plans is enhanced in firms with bonus payouts more sensitive to earnings performance (Guidry et al., 1999). This indicates that managers are more likely to manage earnings when the potential benefits are heightened.

Additionally, Gaver et al. (1995) examined whether the structure of bonus plans impacts the degree of income manipulation by managers. The findings suggest that bonus plans tied to earnings per share (EPS) generate increased earnings management incentives compared to alternative bonus plans (Gaver et al., 1995). Additionally, the study displays that companies demonstrate a greater association between earnings management and bonus plans when they possess increased levels of managerial ownership (Gaver et al., 1995). This implies that managers with a greater ownership interest in the company are more inclined to manipulate earnings to enhance their bonus payouts.

2.3.4 Accounting earnings management and corporate financing and investment decisions

Besides comprehending the motivations behind earnings management, it is essential to understand the potential impacts of earnings management on corporate decision-

making. The practice of earnings management can potentially have implications for financing decision-making, leading to misallocation of capital and overinvestment. Correspondingly, earnings management can influence corporate investment decisions, resulting in direct cost for investors in form of inefficient investments (McNichols & Stubben, 2008). Furthermore, by considering how earnings management affects corporate decision-making, investors can more effectively comprehend the associated risks and minimize any potential negative repercussions (McNichols & Stubben, 2008). Several researchers have documented the impact of earnings management on corporate decisions (McNichols & Stubben, 2008).

Bzeouich et al. (2019) investigate the association between earnings management and the efficiency of French firm's investments. The findings of this study suggest that firms participating in earnings management are more inclined to encounter difficulties in relation to information asymmetry, which might cause issues of overinvestment or underinvestment (Bzeouich et al., 2019). Further, Alzoubi (2018) conducted an earnings management study on firms in Jordan. The results from this study suggest a relation between low levels of debt financing and low probability of earnings management (Alzoubi, 2018). These findings imply that companies with lower leverage are less prone to pursue earnings management.

McNichols and Stubben (2008) explored the association between earnings management and investment behavior of firms. The findings suggest that companies utilizing earnings management over-invest substantially during the misreporting period (McNichols & Stubben, 2008). These results indicate that earnings management potentially also can influence internal investment decisions, and earnings management could potentially lead to ineffective investments (McNichols & Stubben, 2008). Thus, the study claims that earnings management may greatly impact a firm's investment decisions.

2.3.5 Accounting earnings management and debt covenants

Debt covenants are contractual agreements between a borrower and a lender that specify detailed financial and operational performance requirements (Christensen & Nikolaev, 2012). These requirements often include a minimum level of profitability, liquidity, and leverage ratios. The consequences of breaching a covenant may include penalties, increased interest rates, or accelerated repaying obligations. Therefore, businesses may practice earnings management to avoid breaking these debt covenants.

Bond covenants that restrain actions such as asset sales or dividend amounts are voluntary contracts that can reduce the cost of debt since it restricts a levered firm's ability to follow a policy that deviates from maximizing its value (Smith, 1993). The cost-reducing benefits of covenants accrue to the company's owners through the higher price the bonds command when issued. Therefore, in structuring an optimal debt contract, the firm's executives face a trade-off between increased proceeds from the debt issue and reduced flexibility concerning future policy choices.

Several studies have investigated the relationship between earnings management and debt covenants. As early as 1994, DeFond and Jiambalvo (1994) analyzed cross-sectional and time-series models of normal accruals to examine unusual accruals of companies that violated debt covenants. They found evidence suggesting that firms violating debt covenants had positive manipulation in the prior year to the violation. Further, Franz et al. (2014) discovered that firms with high debt levels are more likely to engage in earnings management than those with low debt levels. Other studies are also consistent with these findings, whereas violating debt covenants will penalize firms with higher debt costs, creating more tension for firms with a higher debt to manage earnings trying to avoid breaking debt covenants (Dichev & Skinner, 2002; Nguyen et al., 2022).

According to research by Dyreng et al. (2022), shareholders at high-violation-risk firms are usually more advantageous when their companies effectively implement accrual earnings management to prevent violation than those who do not manage earnings but break a covenant. Hence, covenant-associated earnings management may be in shareholders' best interests (Dyreng et al., 2022).

2.4 Gender diversity and earnings management

The issue of earnings management encompasses ethical and moral quandaries, and research has considered gender a potential factor (Kyaw et al., 2015; Wei & Xie, 2015). As earnings management is influenced by managerial judgement and decision-making, there will be various factors that could determine a company's reporting of earnings. Hence, gender differences could conceivably influence a firm's risk tolerance and impact its decision-making in relation to earnings management. Betz et al. (1989) found evidence suggesting that females and males have different moral orientations, which could serve as the foundation for different work-related values and interests (Betz et al., 1989). Additionally, their study implies that females are more engaged in relationships and helping others than males and that males are more concerned with income and advancement compared to females (Betz et al., 1989). Furthermore, the study suggests that females are less willing to break laws for their own benefit than males. Another study by Kaplan et al. (2009) examined the association between gender and reporting intentions for fraudulent financial reporting. The results implies that males were less likely to report fraudulent activity than females, which suggests that reporting intentions for fraudulent financial reporting might be influenced by gender (Kaplan et al., 2009).

Furthermore, it has been observed that gender differences might be relevant for corporate decision-making. A previous study by Huang and Kisgen (2013) found evidence suggesting that female executives are less probable to make acquisitions and issue debt. Moreover, the results indicate that men are more overconfident than females in corporate decision-making (Huang & Kisgen, 2013). However, a study conducted by Sila et al. (2016) examines the link between boardroom gender diversity and firm risk and finds no evidence that having females on the board

influences equity risk. Additionally, Khan and Vieito (2013) find no statistically significant gender difference in relation to risk aversion.

Despite extensive studies on gender differences and ethical business behavior, the relationship between earnings management and gender is a relatively recent field of research. However, it has drawn more interest in recent years as a result of the rise in female directors and the implementation of gender quotas in several nations and companies[2]. As a result, this field of research has gained increased recognition, and different academics have investigated how gender diversity affects earnings management and reporting quality (Kyaw et al., 2015; Wei & Xie, 2015).

A study by Kyaw et al. (2015) examined the effect of gender diversity on boards on earnings management. The results suggest that in countries with high gender equality having a gender-diverse board reduces engagement in earnings management (Kyaw et al., 2015). Furthermore, Wei and Xie (2015) examine the relationship between CFO gender and accruals-based and real activity-based earnings management in publicly traded firms in China from 1999 to 2011. Their findings show more cautious financial reporting among female CFOs than male CFOs (Wei & Xie, 2015). Moreover, the study implies that female CFOs less frequently practice real-activity earnings management (Wei & Xie, 2015).

Another paper studying the association between the gender of a firm's executives and earnings management is a paper written by Peni and Vähämaa (2010), where they focus on the gender of the CEO and CFO. Their findings demonstrate that firms with female CFOs employ more cautious earnings management strategies (Peni & Vähämaa, 2010). These findings are consistent with Gavious et al. (2012), who found evidence suggesting a decrease in earnings management when the CEO or the CFO is a female.

[2] Norway introduced new legislation in 2003 requiring 40% of board members to be female. More European countries, such as Spain, Belgium and France have also implemented gender quotas on boardroom representation following Norway (*Gender Quotas on Boardroom Representation in Europe*, 2013, p. 1).

Additionally, a study by Gull et al. (2018) suggests that having females on boards prevents managers from manipulating earnings. However, despite these findings, when the demographic characteristics of the female executives are accounted for, the conclusions are invalid Gull et al. (2018). Hence, the study illustrates that particular capabilities and skills might be required to recognize and address earnings management (Gull et al., 2018). Therefore, Gull et al. (2018) argues that appointing females to corporate boards should be determined by multiple factors, such as experience and qualifications, rather than requiring an application based solely on gender. This illustrates some inconsistency in previous literature regarding gender diversity and earnings management.

3.0 Methodology

In this section, we will describe the structure of our model selection process to establish the most suitable approach for answering our research question. Further, we will discuss the validity of our selected model. The structure of the empirical analysis and method is motivated by a study executed by Arun et al. (2015) and follows to a larger degree the structure of this paper. However, Arun et al. (2015) focuses on UK data, so it is not an exact replication as we concentrate on Norwegian firms.

3.1 Objective

Our thesis seeks to investigate the relationship between gender diversity and earnings management in Norwegian firms. Specifically, the study aims to analyze the possible association between the gender of the CEO and earnings management, and the number of female directors and earnings management. Therefore, our research question is the following: "*Is the gender of the CEO and the number of female directors linked to earnings management in Norwegian firms?*".

Through our investigation, we desire to contribute to knowledge of the potential relationship between gender diversity and earnings management. Furthermore, we aim to explore whether gender diversity could potentially have an impact on financial reporting practices.

3.2 Hypotheses

Our hypothesis will, based on our objective, be stated as such:

Our hypothesis H1: Female CEOs contribute to income-decreasing earnings management in Norwegian firms.
Our hypothesis H2: An increase in female board of directors contribute to income-decreasing earnings management in Norwegian firms.

Both hypotheses are derived and follow from the detailed literature review presented above.

3.3 Sample selection and data collection

3.3.1 Data collection

Unbalanced panel data refers to a panel dataset where the number of observations or time periods varies across entities (Baltagi & Liu, 2020). In other words, not all entities in the dataset have observations for the same set of periods. In our study we use an unbalanced panel dataset collected from the Centre for Corporate Governance Research (CCGR), which contains an extensive database on the population of Norwegian firms. The database focuses on how corporate ownership and governance impact value creation and the welfare of stakeholders in organizations (*Centre for Corporate Governance Research*, n.d.).

3.3.2 Sample adjustments

We require non-missing information for all primary variables to ensure that all statistical analyses are based on the same sample. In addition, we have winsorized our main variables used in the OLS regression on both sides at a 1 percent level. Winsorization helps mitigate the influence of extreme outliers, ensuring that our estimates are not biased or skewed. As most of the smaller firms tend to have extremely high leverage values, we have removed 10% of the smallest firms in our sample. This is to avoid potential skewness or bias in the results.

Table 3. 1: Leverage statistics

	Mean value
Mean leverage for 10% of smallest firms	5.6
Mean leverage excluding the 10% smallest firms	0.89

Furthermore, we have removed the following industry categories from our final sample: agriculture, forestry and fishing, mining and extraction, IT services and

communication, educational services, healthcare and social services, cultural activities and leisure activities, and financial and insurance services. The sectors of agriculture, forestry and fishing, mining and extraction, IT services and communication, educational services, healthcare and social services have been excluded from the analysis due to their historical gender imbalances. The sectors of cultural activities and leisure activities, and financial and insurance services are removed because of their unique characteristics differentiating them from other industries.

These exclusions are essential to mitigate potential bias that could potentially affect the outcome of our analysis. In this way, we can minimize potential errors caused by variations in the dynamics of these specific industries. Table 3.2 summarizes the industries included in our analysis. Additionally, we have removed industries containing less than 20 observations to ensure the data are more robust and representative.

Table 3. 2: Sample classified by industry by year. IC=Industry code.

IC	Industries	2009	2010	2011	2012	2013	2014	2015	Total
1	Industry	1 502	1 566	1 661	1 642	1 683	1 631	737	**10 422**
2	Transmission of electricity	161	179	206	206	226	228	129	**1 335**
3	Remediation and other waste mgmt services	7	8	14	98	103	105	54	**389**
4	Building and construction activities	1 205	1 374	1 477	1 512	1 557	1 582	769	**9 476**
5	Retail and repair of motor vehicles	4 940	5 174	5 311	5 230	5 272	5 141	2 636	**33 704**
6	Transport and storage	13	16	28	666	678	701	348	**2 450**
7	Accommodation and catering activities	835	901	937	934	953	937	420	**5 917**
8	Sales and operation of real estate	3 048	3 352	3 769	3 914	4 019	4 022	2 141	**24 265**
9	Other professional, technical activities	1 791	1 958	2 123	2 221	2 289	2 314	1 385	**14 081**
10	Business support service activities	551	583	657	861	870	848	461	**4 831**
11	Other support service activities	26	26	29	679	716	744	484	**2 704**
Total		**14 079**	**15 137**	**16 212**	**17 963**	**18 366**	**18 253**	**9 564**	**109 574**

After making these adjustments, our sample size has reduced and contains fewer observations over a shorter time frame. However, refining the sample in this way can improve the accuracy and precision of our analysis. As we require non-missing values for all variables, consequently, our final sample consists of 90 364 observations from

2009 to 2015 on Norwegian firms[3]. However, this number may change during our robustness tests as we alter certain sample specifications.

3.3.3 Overview of gender diversity variables

The variables used to measure gender diversity in our analysis include a binary variable representing the gender of the CEO (CEO_dummy) and a variable representing the number of female directors (NFD). Table 3.3 presents the observations of the number of female directors (NFD) spanning from 2009 to 2015. Reviewing the table, it becomes apparent that most of the observations indicate the presence of one female director on the board. Table 3.4 shows the distribution of the gender of the CEOs in the sample. It shows that the percentage of female CEOs varies from 36.5 percent to 41.8 percent, depending on the year.

Table 3. 3: Distribution of female directors

	Number of female directors							
Year	1	2	3	4	5	6	7	Total
2009	10 384	2 964	599	112	16	4	0	**14 079**
2010	11 171	3 194	633	115	20	4	0	**15 137**
2011	11 989	3 360	693	132	28	10	0	**16 212**
2012	13 149	3 806	810	167	22	9	0	**17 963**
2013	13 417	3 919	835	163	24	7	1	**18 366**
2014	13 405	3 810	845	156	28	8	1	**18 253**
2015	7 094	1 927	427	92	15	8	1	**9 564**
Total	**80 609**	**22 980**	**4 842**	**937**	**153**	**50**	**3**	**109 574**

[3] Our final sample data only spans 2009 to 2015 because of missing information in our main variables. Therefore, all data from 2016 to 2020 were removed from our sample.

Table 3. 4 Distribution of the gender of the CEOs

	Female CEOs	Male CEOs	Total
2009	36,5%	63,5%	100%
2010	37,1%	62,9%	100%
2011	37,0%	63,0%	100%
2012	38,6%	61,4%	100%
2013	39,0%	61,0%	100%
2014	39,2%	60,8%	100%
2015	41,8%	58,2%	100%

3.4 Measure of earnings management and gender diversity

Various methods are employed for earnings management, and studies have explored different models and approaches to identify and detect earnings management (Jones, 1991; Dechow et al., 1995; Kothari et al., 2005; Pae, 2005). One widely examined model is the Jones model, which focuses on estimating discretionary accruals as a predictive indicator of earnings management (Jones, 1991). Peasnell et al. (2000) find evidence suggesting that the Jones model is an effective test for identifying earnings management.

Furthermore, Dechow et al. (1995) introduced the modified Jones model as an improved version of the original Jones model (Jones, 1991). The main objective of the modified Jones model is to further enhance the measurement of discretionary accruals by adjusting for changes in accounts receivable (Dechow et al., 1995). This modification provides an improved understanding of earnings management and helps mitigate the potential correlation between revenue changes and total accruals found in the original model. The modified Jones model, therefore, enables a more precise examination of earnings management. In this paper, we will measure discretionary accruals as an estimate for earnings management using the modified version of the

Jones model (Dechow et al., 1995) and the estimation of total accruals follows the paper of Arun et al. (2015):

$$\frac{TA_{it}}{A_{it-1}} = \beta 0_{it} + \beta 1_{it}\left[\frac{1}{A_{it-1}}\right] + \beta 2_{it}\left[\frac{\Delta REV_{it} - \Delta AR_{it}}{A_{it-1}}\right] + \beta 3_{it}\left[\frac{PPE_{it}}{A_{it-1}}\right] + \varepsilon_{it} \qquad (1)$$

where total accruals, TA_{it}, is defined as change in total current assets - change in cash – change in total current liabilities + change in loan to financial institutions – depreciation (Arun et al., 2015). The model includes some additional variables: change in REV_{it} which represents the change in revenue in year t, change in AR_{it} which is the change in receivable in year t, and A_{it-1} is total assets at the beginning of the year t. PPE_{it} is the gross property, plant, and equipment in year t. TA_{it}/A_{it-1} represents the ratio of total accruals to total assets (Arun et al., 2015). Finally, the estimated residual of this equation will be the estimated measure of discretionary accruals, which will then be used as the dependent variable in the OLS regression that investigates the association between earnings management and gender diversity, represented by the gender of the CEO and the number of female directors.

3.4.1 Discretionary accruals estimated on the overall sample

Our estimation of discretionary accruals follows the paper of Arun et al. (2015) for our main results, and we will estimate discretionary accruals on the overall sample of Norwegian firms (see section 4.2). The purpose is, therefore, to examine the overall relationship between gender diversity and discretionary accruals across industries and years to provide a broader perspective following Arun et al. (2015).

3.4.2 Discretionary accruals estimated separately for each industry-year cross-section

Furthermore, we will examine the relationship between gender diversity and discretionary accruals by estimating discretionary accruals separately for each industry-year cross-section (see section 4.4). We still use the modified Jones model for this model, and 10 percent of the smallest firms are excluded from the sample. This will allow us to also do an analysis to account for industry and year-specific

factors that might influence earnings management practices. This will provide a robustness check to assess whether the relationship holds consistently across industry-year combinations.

3.5 Ordinary least square (OLS)

3.5.1 Main model – examining earnings management and gender diversity

When examining the association between earnings management and gender diversity, we have chosen to use Ordinary Least Squares (OLS) regression as our preferred approach. The decision to assume a linear relationship follows the literature and is motivated by the preference for simplifying the analysis and enabling a clear interpretation. Additionally, we are able to estimate the average change in discretionary accruals associated with a unit change in the primary independent variables representing gender diversity. Additionally, using OLS regression, our study aligns with a recognized method, and our results obtained from OLS regression may be compared with previous research. The association between earnings management and female CEOs and female board directors is researched with the following model:

$$DACC_{it} = \propto_0 + \propto_1 CEO\_dummy_{it} + \propto_2 NFD_{it} + \propto_3 size_{it} + \propto_4 CFO_{it} + \propto_5 ROA_{it} + \propto_6 LEV_{it} + \propto_7 REV\_growth_{it} + \propto_8 Loss\_dummy_{it} + \sum_{k=1}^{n-1} \propto_k Ind\_category_i^k + \sum_{2009}^{2015} yr_{it} + \varepsilon_{it} \quad (2)$$

Where $DACC_{it}$ is current discretionary accruals in year t obtained from the modified Jones model (Dechow et al., 1995; Arun et al., 2015). The primary independent variables in the regression model are *CEO_dummy*, a dummy variable equal 1 if the CEO if female, 0 if the CEO is male; and, NFD, referring to the number of female directors.

To examine the effects of our primary independent variables of interest (CEO_dummy and NFD), we will construct different models for each primary

variable and include a baseline model for each table. This will enable us to establish a reference point and evaluate the impact of each primary variable on discretionary accruals. Additionally, we will construct a model encompassing all the major independent variables, allowing us to examine the combined effect of both the female variables. By employing these multiple regression models, we sought to investigate the individual impact of the female variables and their collective influence.

3.5.2 Examination of variations between firms with different leverage levels

To further extend our examination of the relationship between earnings management and gender diversity, we sought to explore the variations between firms with different leverage levels (Arun et al., 2015). Therefore, we partitioned our sample into two subsets based on the median leverage (see section 4.3) (Arun et al., 2015). The first subset consists of firms with leverage above the median, categorized as "high-debt firms" (Arun et al., 2015). The second subset includes firms with leverage below the median, labeled "low-debt firms" (Arun et al., 2015). By creating these distinct subsets, we aim to investigate whether the relationship between CEO gender and earnings management varies across firms with different leverage levels.

3.5.3 Robustness exercises

For our robustness testing, we will run our OLS by altering certain sample specifications. Firstly, we will see if any disruption concerning the financial crisis in 2008 may affect our results by excluding the years 2009 and 2010. By doing this, we can isolate the effect of the financial crisis, which had a significant impact on the economy, and assess whether the observed relationship between gender diversity and earnings management is driven by the crisis period. Secondly, as we have excluded 10% of the smallest firms due to their tendency to have leverage over 1, we will conduct a robustness test excluding firms with leverages values over 1 and under 0 to ensure consistency in the treatment of the leverage-related observations.

3.6 Control variables

We will include *return on assets* (ROA) as a control variable as it measures firm financial performance. Existing literature predicts an association between companies

with strong financial performance and income-increasing earnings management (Gavious et al., 2012; Arun et al., 2015). *Sales growths* (REV_growth) are incorporated to control for financial growth, and it is anticipated that high-growth firms will execute income-increasing earnings management (Chih et al., 2008; Peni & Vähämaa, 2010; Arun et al., 2015). Furthermore, *loss* (Loss_dummy) is added to control for the firm's financial situation, and it is predicted that firms in financial difficulties will employ income-decreasing earnings management (DeAngelo et al., 1994; Arun et al., 2015).

Further, *Leverage* (LEV) is measured as total liabilities scaled by total assets (Arun et al., 2015). Defond and Jiambalvo (1994) find evidence suggesting that highly levered firms will more likely execute accounting irregularities. In addition to including leverage as a control variable, we perform sample splits based on leverage to explore whether high (low) leverage also impacts the magnitude and significance of all other coefficient estimates. Further, firm size (size) is included as previous studies have found evidence suggesting a relationship between a firm's accounting choices and size. However, previous literature is not consistent which implies that firm size can affect earnings management both negatively and positively (Watts & Zimmerman, 1990; Richardson, 2000; Gul et al., 2009). Moreover, we will incorporate *cash flow operating* (CFO) to account for the impact of economic activity on earnings management. Studies suggest that there is a negative association between CFO and earnings management (Dechow et al., 1995; Gul et al., 2009; Arun et al., 2015). Based on this, we will expect similar outcomes from our study in relation to the control variables.

Additionally, by including industry and year dummies we can account for industry- and time-specific factors that may influence the association between discretionary accruals and gender diversity. This helps isolate the effect of gender diversity on discretionary accruals and reduces the risk of any industry- or time-specific factors distorting the results.

3.7 Validity

To ensure validity, we will discuss the factors that may threaten the validity of the regression and the various approaches we used to reduce these threats.

3.7.1 Selection bias

When data is introduced for analysis in a way that prevents proper randomization, selection bias arises, failing to guarantee a representative sample (Wooldridge, 2010). Our sample consists of Norwegian firms, which means that our findings may not be generalizable to firms in other countries. The context and characteristics of the Norwegian business environment need to be considered, as it may differ from those of other countries. Furthermore, our analysis relies on non-missing information for all variables. This introduces the possibility of selection bias which could potentially impact the observed relationship between earnings management and gender diversity. For instance, it is possible that firms with more extreme levels of earnings manipulation are less likely to report gender-related information. Therefore, we must be cautious in generalizing our results.

3.7.2 Omitted variable bias

When a model fails to include a relevant explanatory variable, omitted variable bias arises, which can lead to inaccurate conclusions (Wilms et al., 2021). We have included a comprehensive set of control variables in our regression model to address the potential for omitted variables bias. These variables have been selected based on recommendations from prior research and considerations to ensure that we capture all relevant factors that may influence the relationship between the gender diversity variables and earnings management (Arun et al., 2015).

3.7.3 Heteroskedasticity

Heteroskedasticity refers to the condition in which the variance of unseen factors differs across several population segments (White, 1980). We will employ the robust command in Stata when conducting our OLS regression. By doing so, we can ensure that our standard errors are adjusted to accommodate heteroskedasticity.

3.7.4 Multicollinearity

When the independent variables in a regression model show considerable correlation, multicollinearity occurs, which makes it difficult to isolate the distinct influence of each independent variable on the dependent variable (Alin, 2010). If multicollinearity occurs, it can lead to inaccurate estimates with significant variances and covariances. While it is anticipated to observe some degree of correlation among variables in a multivariate regression model, high correlation poses a concern (Brooks, 2019). To assess the presence of multicollinearity, we will employ a test called VIF (variance inflation factor). The VIF test enables us to determine whether there is a high correlation among the independent variables. Furthermore, we will evaluate the correlation between all the independent variables in our regression to assess whether multicollinearity potentially can occur due to high correlation between any of the independent variables.

3.8 Descriptive statistics

Table 3. 5: Descriptive statistics

Variable	Obs	Mean	SD	Min	Max
Earnings management measure					
DACC	109 574	-5.93e-11	0.286	-1.061	1.364
Gender diversity measures					
CEO_dummy	109 574	0.383	0.486	0	1
NFD	109 574	1.332	0.623	1	7
Control variables					
Size	109 574	15.402	1.613	12.595	24.399
CFO	109 574	0.032	0.243	-0.817	1.177
ROA	109 574	0.065	0.194	-0.741	0.761
LEV	109 574	0.805	0.675	0.089	5.106
REV_growth	90 364	0.030	0.379	-1	2.14
Loss_dummy	109 574	0.251	0.433	0	1

Notes: The table displays descriptive statistics for all firms included in the regression sample. Discretionary accruals (DACC) are estimated using the modified Jones model. CEO_dummy is equal to 1 if the CEO is female, and equal to 0 if the CEO is male. NFD represents the number of female directors. Size denotes firm size and is measured as the natural logarithm of total assets. Operating cash flow (CFO) and return on asset (ROA) are

expressed as a percentage of total assets. Leverage (LEV) is calculated by total liabilities to toal assets ratio. REV_growth represent the sales growth ratio, and Loss_dummy is a dummy variable which is 1 if the firm has negative net income and 0 otherwise.

Table 3.5 shows an overview of relevant summary statistics. In our sample, the estimated mean value of the discretionary accruals obtained from the modified Jones model (DACC) is -5.93e-11, which is very close to zero. The discretionary accruals represent the unexplained portion of the accruals subject to management's discretion. Further, the average proportion of female CEOs is 38 percent, and the median number for female directors is 1. This suggests an underrepresentation of females in leadership positions and on corporate boards. Furthermore, the mean firm size (size) is 15.4, and the average operating cash flow (CFO) is 3.2 percent. Additionally, the average ROA accounts for approximately 6.4 percent. The annual revenue growth rate is 5.5 percent, and the average financial leverage is around 80 percent. Around 25 percent of the firms reported negative income.

4.0 Findings and discussion

In this section, we will present our findings and discuss and analyze the results. We will elaborate on the implications of our findings and explore potential underlying factors.

4.1 Correlation

To identify potential relations between the variables in our analysis we have computed a correlation matrix. Table 4.1 shows the correlation matrix of the variables.

Table 4. 1: Correlation matrix

	DACC	CEO d	NFD	Size	CFO	ROA	LEV	REV gr	Loss d
DACC	1.0000								
CEO d	-0.0181***	1.0000							
NFD	-0.0057*	0.0816***	1.0000						
size	0.0305***	-0.2882***	0.1272***	1.0000					
CFO	-0.4262***	-0.0116***	0.0145***	0.0529***	1.0000				
ROA	0.0971***	-0.0188***	0.0055*	0.1128***	0.5079***	1.0000			
LEV	-0.0627***	-0.0198***	0.0279***	-0.0297***	0.0585***	-0.1386***	1.0000		
REV gr	0.0308***	-0.0076**	0.0043	0.0493***	0.0156***	0.1453***	-0.0205***	1.0000	
Loss d	-0.0677***	0.0328***	-0.0046	-0.1667***	-0.2611***	-0.6213***	0.1997***	-0.1405***	1.0000

Note: The table shows the correlation between all variables in our regression. The significance levels are denoted by ***, **, and *, indicating significance at the 1, 5, and 10% levels, respectively.

The highest correlation is between the variable's ROA and income loss (Loss_dummy), with a correlation of approximately 0.621, which is relatively high. This implies that firms with higher return on assets may be better positioned to avoid income loss. However, after running a Variance Inflation Factor (VIF) test to check for multicollinearity, the variables are still significant, and we view them as essential explanation variables for discretionary accruals (see Appendix C-G). Therefore, we decided to include them in our regression. Further, the correlation between our primary independent female variables, the gender of the CEO, and the number of

female directors suggest a weak, positive relationship of 0.0816. This indicates that the more female CEOs, the higher the number of female directors. However, the correlation between the variables is not very strong. Other than this, no other variables have a significantly high correlation.

4.2 Main results

We started our analysis by estimating the modified Jones model (Equation 1) to detect discretionary accruals, the proxy used for earnings management. This estimate follows the paper by Arun et al. (2015), so we estimated discretionary accruals on the overall sample for our primary model. Further, we use discretionary accruals as the dependent variable and run a pooled regression to capture the effect of gender diversity (CEO_dummy and NFD) on discretionary accruals (Equation 2).

The results are presented in the Table 4.2, and include a baseline model without the gender variables, a model that accounts for the effect of the CEOs gender explicitly, a model that captures the effect of the number of female directors explicitly, and a model that incorporates both gender variables to capture the overall effect of gender diversity on discretionary accruals.

Table 4. 2: OLS regression analysis – main model

DACC	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Intercept	-0.0772***	-0.0661***	-0.0765***	-0.0659***
	(0.000)	(0.000)	(0.000)	(0.000)
CEO_dummy		-0.0076***		-0.0075***
		(0.000)		(0.000)
NFD			-0.0016	-0.0009
			(0.200)	(0.482)
Size	0.0029***	0.0024***	0.0030***	0.0024***
	(0.000)	(0.000)	(0.000)	(0.000)
CFO	-0.7669***	-0.7669***	-0.7669***	-0.7669***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.6563***	0.6565***	0.6562***	0.6565***
	(0.000)	(0.000)	(0.000)	(0.000)
LEV	0.0076***	0.0075***	0.0076***	0.0076***
	(0.005)	(0.006)	(0.005)	(0.005)
REV_growth	-0.0161***	-0.0160***	-0.0161***	-0.0160***
	(0.000)	(0.000)	(0.000)	(0.000)
Loss_dummy	0.0221***	0.0221***	0.0221***	0.0221***
	(0.000)	(0.000)	(0.000)	(0.000)
Industry dummies	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included
Observations	90 364	90 364	90 364	90 364
Adjusted R2	0.3170	0.3172	0.3171	0.3172
F-value	587.35	564.05	561.81	540.52
Note:	****p<0.01, **p<0.05, *p<0.1*			

Notes: The table shows the results of our OLS regression analysis. The modified Jones model is utilized to estimate discretionary accruals. The table displays the effect of different gender diversity measures on discretionary accruals. Model 1 presents a baseline model including only control variables. Model 2 explicitly captures the effect of the gender of the CEO. Model 3 explicitly captures the effect of the number of female directors. Model 4 captures the collective effect of both the gender diversity measures. The sample period is 2009-2015. The coefficients of the CEO_dummy and the Loss_dummy demonstrate the marginal effect when the dummy variable changes from 0 to 1. The coefficients of NFD (Number of female directors) shows the marginal effect in the dependent variable when NFD increase by one unit. The coefficients of the remaining variables, size, CFO, ROA, LEV and REV_growth, show an impact on the dependent variable when these variables increase by 1 percent. In addition, industry and year dummies are included in the regression to account for industry- and time-specific factors. The significance levels are denoted by ***, **, and *, indicating significance at the 1, 5, and 10% levels, respectively. P-values are in the parentheses.

Table 4.2 shows different statistical significance depending on the gender diversity measure. The findings suggest an association between both gender diversity measures and income-decreasing earnings management. More specifically, our findings imply that when the CEO is female, there is an estimated reduction of 0.0076 in discretionary accruals compared to when the CEO is male (Model 2), and that each additional female director is associated with an estimated decrease of 0.0016 in discretionary accruals (Model 3). However, only the estimated coefficient for the gender of the CEO is statistically significant, suggesting a significant association between the gender of the CEO and discretionary accruals. Based on this, our results are consistent with our hypothesis H1. These findings align with a previous study by Gavious et al. (2012) suggesting income-decreasing earnings management when the CEO or the CFO is female.

Furthermore, these findings imply that having more female CEOs might positively impact a firm's financial reporting in terms of more conservative earnings manipulation. Although Norway is one of the most gender-equal countries globally, only 14 percent of CEOs in the country's largest companies are women (Regjeringen, 2021; *Global Gender Gap Report 2022*, 2022, p. 5). Consequently, these findings may have implications for Norwegian companies seeking to increase gender diversity in top management. Moreover, the findings draw attention to the potential advantages associated with having a female CEO in influencing corporate behaviors and decision-making, particularly in terms of encouraging less aggressive accounting practices. The association found in our study might be explained by previous findings suggesting that gender differences are relevant for corporate decision-making, risk aversion, and ethical conduct (Kaplan et al., 2009; Mittal & Vyas, 2011; Huang & Kisgen, 2013). Additionally, Betz et al. (1989) conducted a study implying that females are less willing to break laws for their own benefit than males, which may form a potential explanatory foundation for female CEOs engaging in more conservative earnings management.

Further, the estimated coefficient for the number of female directors is statistically insignificant at all levels, which implies that the association discovered is not robust enough to make definite conclusions. Therefore, the findings do not indicate

sufficient evidence to confirm our hypothesis H2. The statistical insignificance of the number of female directors could stem from there being generally few female directors in our sample. Most companies have one or two female directors, which could potentially limit variation and reduce the strength of our analysis (see Table 3.3). Furthermore, a potential reason could be the presence of omitted variable bias, meaning that other explanatory variables, that are not included, impact both earnings management and the number of female directors. It could potentially be variables that characterize the board's composition, such as experience or competence. It is plausible to assume that these traits have an impact on the firm's decision-making process and the potential for earnings manipulation.

Overall, the results suggest that the gender of the CEO might have a stronger, more direct impact on earnings management compared to the number of female directors. This could be explained by the CEO having a greater influence on shaping the earnings management practices in a company. Further, the findings may potentially provide insights into the limited effect and less prominent role of female directors in decision-making processes related to earnings management. Additionally, the correlation between the variables is weak, and the VIF test does not indicate multicollinearity (see Appendix C and Table 4.1).

For our control variables, most of the signs of the beta coefficients are comparable to what has previously been documented (Watts & Zimmerman, 1990; DeAngelo et al., 1994; DeFond & Jiambalvo, 1994; Dechow et al., 1995; Richardson, 2000; Chih et al., 2008; Gul et al., 2009; Peni & Vähämaa, 2010; Gavious et al., 2012; Arun et al., 2015). However, the coefficient for revenue growth (REV_growth) and income loss (Loss_dummy) contradicts previous findings. Our results indicate an association between income-decreasing earnings management and firms with high-growth. This could potentially be explained by the companies wanting to reduce reported income to meet market expectations. Furthermore, our findings imply that firms declaring income loss more frequently perform income-increasing earnings management which might be to avoid negative market reactions.

4.3 Association of firms with different leverage levels

Further, we want to investigate the relationship between earnings management and gender diversity across firms with different leverage levels using the modified Jones model (Arun et al., 2015). We find it interesting to explore the split between high- and low-debt firms because it allows for analyzing whether firms with various financial structures exhibit diverse earnings management approaches. Moreover, by comparing firms with different debt levels, we may identify other unique practices or trends that may not be apparent when analyzing the entire sample.

Table 4. 3.1: OLS regression analysis of firms with high debt

DACC	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Intercept	-0.1108***	-0.1034***	-0.1103***	-0.1033***
	(0.000)	(0.000)	(0.000)	(0.000)
CEO_dummy		-0.0053**		-0.0052*
		(0.049)		(0.060)
NFD			-0.0016	-0.0011
			(0.421)	(0.573)
Size	0.0048***	0.0044***	0.0049***	0.0045***
	(0.000)	(0.000)	(0.000)	(0.000)
CFO	-0.8407***	-0.8408***	-0.8407***	-0.8407***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.7417***	0.7418***	0.7417***	0.7418***
	(0.000)	(0.000)	(0.000)	(0.000)
LEV	0.0152***	0.0151***	0.0153***	0.0152***
	(0.000)	(0.000)	(0.000)	(0.000)
REV_growth	-0.0050	-0.0049	-0.0050	-0.0049
	(0.105)	(0.108)	(0.105)	(0.108)
Loss_dummy	0.0155***	0.0155***	0.0155***	0.0156***
	(0.000)	(0.000)	(0.000)	(0.000)
Industry dummies	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included
Observations	44 901	44 901	44 901	44 901
Adjusted R2	0.3723	0.3724	0.3723	0.3724
F-value	1210.08	1157.71	1157.49	1109.47

Note: ****p<0.01, **p<0.05, *p<0.1*

Table 4.3.1: OLS regression analysis of firms with low debt

DACC	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Intercept	-0.0211*	-0.0079	-0.0203*	-0.0078
	(0.059)	(0.496)	(0.070)	(0.506)
CEO_dummy		-0.0087***		-0.0085***
		(0.000)		(0.000)
NFD			-0.0021	-0.0013
			(0.137)	(0.361)
Size	0.0007	0.0000	0.0009	0.0001
	(0.245)	(0.978)	(0.182)	(0.869)
CFO	-0.6174***	-0.6174***	-0.6175***	-0.6174***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.4736***	0.4740***	0.4732***	0.4738***
	(0.000)	(0.000)	(0.000)	(0.000)
LEV	-0.0138**	-0.0134**	-0.0136**	-0.0133**
	(0.013)	(0.016)	(0.014)	(0.017)
REV_growth	-0.0221***	-0.0220***	-0.0220***	-0.0219***
	(0.000)	(0.000)	(0.000)	(0.000)
Loss_dummy	0.0242***	0.0239***	0.0241***	0.0240***
	(0.000)	(0.000)	(0.000)	(0.000)
Industry dummies	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included
Observations	45 463	45 463	45 463	45 463
Adjusted R2	0.2133	0.2136	0.2133	0.2136
F-value	559.89	536.63	535.65	514.31
Note:	****p<0.01, **p<0.05, *p<0.1*			

Notes for Table 4.3.1 and 4.3.2: The tables show the results of our OLS regression analyses across different leverage levels, where the modified Jones model is utilized to detect discretionary accruals. Table 4.3.1 include firms with leverage above the median, while Table 4.3.2 include firms with leverage below the median. Sample period is 2009-2015. The CEO_dummy and the Loss_dummy coefficient demonstrates the marginal effect when the dummy variable changes from 0 to 1. The NFD (Number of female directors) coefficient shows the marginal effect in the dependent variable when NFD increase by one unit. The remaining variables, size, CFO, ROA, LEV, and REV_growth, shows an impact on the dependent variable when these variables increase by 1 percent. In addition, industry and year dummies are included in the regression. The significance levels are denoted by ***, **, and *, indicating significance at the 1, 5, and 10% levels, respectively. P-values are in the parentheses.

From our regressions we find that for firms with high debt, having a female CEO estimates a reduction of 0.005 in discretionary accruals compared to when the CEO is

male (see Table 4.3.1). For low-debt firms, the reduction of 0.009 in discretionary accruals (see Table 4.3.2). This implies a potential association between female CEOs and income-decreasing earnings management for companies with both debt levels. Further, our findings also estimate an association between the number of female directors and income-decreasing earnings management for both low and high-debt firms.

However, similarly, as in our main model, the female director coefficient is not statistically significant in either of the models. In addition, the female CEO coefficient is not statistically significant for high-debt firms at every level. This finding is inconsistent with what we found when not dividing into high-debt and low-debt firms. One reason could be that the smaller sample size of high-debt firms lowers the statistical power to notice substantial effects. With fewer observations, the coefficient estimate may become less accurate and more prone to fluctuation, resulting in conflicting findings.

4.4 Discretionary accruals by industry-year

Several studies examining earnings management often estimate discretionary accruals separately for each industry-year combination to account for industry and year-related differences that can influence the level of earnings management. In line with this method, we performed an additional regression analysis where discretionary accruals are estimated separately for each industry-year combination. This robustness check allows us to address the industry and time-related distinctions that may affect our findings.

Firstly, we used the modified Jones model to estimate discretionary accruals for each industry-year combination. Further, we use the estimated discretionary accruals as the dependent variables and run a regression to capture the effect of gender diversity (CEO_dummy and NFD) on discretionary accruals (see Equation 2). The results are presented in Table 4.4.

Table 4. 4*:* OLS regression analysis, industry-year cross-section

DACC	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Intercept	-0.0936***	-0.0875***	-0.0937***	-0.0876***
	(0.000)	(0.000)	(0.000)	(0.000)
CEO_dummy		-0.0042**		-0.0043**
		(0.012)		(0.011)
NFD			0.0002	0.0006
			(0.893)	(0.648)
Size	0.0026***	0.0023***	0.0026***	0.0022***
	(0.000)	(0.000)	(0.000)	(0.000)
CFO	-0.7467***	-0.7468***	-0.7468***	-0.7467***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.6425***	0.6426***	0.6425***	0.6427***
	(0.000)	(0.000)	(0.000)	(0.000)
LEV	0.0077***	0.0076***	0.0078***	0.0076***
	(0.005)	(0.005)	(0.005)	(0.005)
REV_growth	-0.0088***	-0.0088***	-0.0088***	-0.0088***
	(0.003)	(0.003)	(0.003)	(0.003)
Loss_dummy	0.0240***	0.0239***	0.0240***	0.0239***
	(0.000)	(0.000)	(0.000)	(0.000)
Industry dummies	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included
Observations	89 621	89 621	89 621	89 621
Adjusted R2	0.3087	0.3088	0.3087	0.3088
F-value	555.66	532.48	531.60	510.45

Note: ****p<0.01, **p<0.05, *p<0.1*

Notes: The table shows the results of our OLS regression analysis. The modified Jones model is utilized to estimate discretionary accruals separately for each industry-year combination. The table displays the effect of different gender diversity measures on discretionary accruals. Model 1 presents a baseline model including only control variables. Model 2 explicitly captures the effect of the gender of the CEO. Model 3 explicitly captures the effect of the number of female directors. Model 4 captures the collective effect of both the gender diversity measures. The sample period is 2009-2015. The coefficients of the CEO_dummy and the Loss_dummy demonstrate the marginal effect when the dummy variable changes from 0 to 1. The coefficients of NFD (Number of female directors) shows the marginal effect in the dependent variable when NFD increase by one unit. The coefficients of the remaining variables, size, CFO, ROA, LEV and REV_growth, show an impact on the dependent variable when these variables increase by 1 percent. In addition, industry and year dummies are included in the regression to account for industry- and time-specific factors. The significance levels are denoted by ***, **, and *, indicating significance at the 1, 5, and 10% levels, respectively. P-values are in the parentheses.

The results still suggest that there is an association between the gender of the CEO and income-decreasing earnings management of statistical significance (see Table 4.4). However, for this model our findings imply that when the CEO is female, there is an estimated reduction of 0.0042 in discretionary accruals which is a little lower than compared to our main results (see Table 4.2). This implies a slightly weaker relationship compared to when the discretionary accruals were estimated separately for each industry-year combination. This suggests that when discretionary accruals are not estimated separately for each industry-year combination, potential differences across industries and time-related effects on earnings management practices may be overlooked. Further, it might explain that our main analysis (see section 4.2) did not adequately account for industry-specific and time-specific variations. Moreover, it indicates the potential need to consider industry and time factors to obtain a more accurate picture of the association between gender diversity and earnings management. However, this model exhibits a smaller sample size due to a lack of sufficient data for some specific combinations of industry and year, which could also potentially impact the strength and accuracy of the estimates.

Further, the results suggest a positive association between the number of female directors and discretionary accruals, which contradicts our previous findings. This may indicate that the effect of the number of female directors on discretionary accruals may vary depending on industry and time. However, the coefficient is not statistically significant in either model, making it difficult to draw a definitive conclusion about the effect of the number of female directors on discretionary accruals.

4.5 Robustness exercises

In this section, we execute various robustness exercises to ensure the validity of our findings. Firstly, we employ the original Jones model (see Equation 3) to estimate discretionary accruals. Secondly, we will exclude the years surrounding the financial crisis of 2008 to investigate whether the crisis heavily influenced our results. Lastly, we eliminate the firms with leverage exceeding 1 and below 0 to assess the consistency of our results compared to excluding the 10 percent smallest firms.

4.5.1 Original Jones model for discretionary accruals estimation

Firstly, to assess the credibility and robustness of our findings, we will use the original Jones model (Equation 3) as an alternative model to estimate discretionary accruals. By applying this model, it will help validate the robustness of our estimates and results. Furthermore, if multiple models consistently provide comparable findings, it enhances confidence in the reliability of the findings. The following equation is used to estimate discretionary accruals based on the original Jones model (Jones, 1991), and the estimation of total accruals follows the paper of Arun et al. (2015):

$$\frac{TA_{it}}{A_{it-1}} = \beta 0_{it} + \beta 1_{it}\left[\frac{1}{A_{it-1}}\right] + \beta 2_{it}\left[\frac{\Delta REV_{it}}{A_{it-1}}\right] + \beta 3_{it}\left[\frac{PPE_{it}}{A_{it-1}}\right] + \varepsilon_{it} \quad (3)$$

Where total accruals, TAit, is defined as change in total current assets - change in cash – change in total current liabilities + change in loan to financial institutions – depreciation (Arun et al., 2015). The model includes some additional variables: change in REVit which represents the change in revenue in year t, Ait-1 is total assets at the beginning of the year t and PPEit is the gross property, plant, and equipment in year t. TAit/Ait-1 represents the ratio of total accruals to total assets (Arun et al., 2015).

Further, similarly as for the main results, we use the discretionary accruals as the dependent variables and run a pooled regression to capture the effect of gender diversity (CEO_dummy and NFD) on discretionary accruals (see Equation 2).

Table 4.5 1: OLS regression analysis – Original Jones model

DACC	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Intercept	-0.0725***	-0.0603***	-0.0717***	-0.0602***
	(0.000)	(0.000)	(0.000)	(0.000)
CEO_dummy		-0.0083***		-0.0082***
		(0.000)		(0.000)
NFD			-0.0017	-0.0009
			(0.166)	(0.447)
Size	0.0028***	0.0022***	0.0029***	0.0023***
	(0.000)	(0.000)	(0.000)	(0.000)
CFO	-0.7665***	-0.7665***	-0.7665***	-0.7665***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.6485***	0.6487***	0.6484***	0.6487***
	(0.000)	(0.000)	(0.000)	(0.000)
LEV	0.0075***	0.0074***	0.0075***	0.0074***
	(0.006)	(0.006)	(0.005)	(0.006)
REV_growth	-0.0382***	-0.0381***	-0.0382***	-0.0382***
	(0.000)	(0.000)	(0.000)	(0.000)
Loss_dummy	0.0237	0.0236***	0.0238***	0.0237***
	(0.000)	(0.000)	(0.000)	(0.000)
Industry dummies	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included
Observations	90 364	90 364	90 364	90 364
Adjusted R2	0.3126	0.3128	0.3126	0.3128
F-value	581.08	558.16	555.81	534.88
Note:	****p<0.01, **p<0.05, *p<0.1*			

Notes: The table shows the results of our OLS regression analysis. The discretionary accruals are estimated using the original Jones model. The table displays the effect of different gender diversity measures on discretionary accruals. Model 1 presents a baseline model including only control variables. Model 2 explicitly captures the effect of the gender of the CEO. Model 3 explicitly captures the effect of the number of female directors. Model 4 captures the collective effect of both the gender diversity measures. The sample period is 2009-2015. The coefficients of the CEO_dummy and the Loss_dummy demonstrate the marginal effect when the dummy variable changes from 0 to 1. The coefficient of NFD (Number of female directors) shows the marginal effect in the dependent variable when NFD increases by one unit. The coefficients of the remaining variables, size, CFO, ROA, LEV and REV_growth, shows an impact on the dependent variable when these variables increase by 1 percent. In addition, industry and year dummies are included in the regression to account for industry- and time-specific factors. The significance levels are denoted by ***, **, and *, indicating significance at the 1, 5, and 10% levels, respectively. P-values are in the parentheses.

From Table 4.5 we observe the results of our robustness test using the original Jones model (Jones, 1991) to estimate discretionary accruals. The findings align quite consistently with our previous findings. In Table 4.5 the results still suggest an association between gender diversity and income-decreasing earnings management. This finding seems to be similar to previous literature on earnings management and gender diversity. However, the association between the number of female directors and income-decreasing earnings management remains statistically insignificant. These consistent findings give additional confidence and robustness to our findings derived from the modified Jones model (see Table 4.2).

4.5.2 Assessing the impact of the financial crisis

For our second robustness exercise, we removed two years from our sample to see whether the financial crisis of 2008 affected our primary model. Thus, our sample in this regression model only consists of observations from 2011 to 2015. By considering the impact of the financial crisis on our findings, we can evaluate whether the crisis had a significant effect on our results in the main model or if the relationship holds consistently over time. In addition, if our results remain consistent when excluding the crisis period, it strengthens the robustness of our findings.

Table 4.5.2: OLS regression analysis for period 2011 to 2015

DACC	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Intercept	-0.0797***	-0.0690***	-0.0791***	-0.0688***
	(0.000)	(0.000)	(0.000)	(0.000)
CEO_dummy		-0.0076***		-0.0074***
		(0.000)		(0.000)
NFD			-0.0018	-0.0011
			(0.226)	(0.462)
Size	0.0034***	0.0028***	0.0035***	0.0029***
	(0.000)	(0.000)	(0.000)	(0.000)
CFO	-0.7521***	-0.7521***	-0.7521***	-0.7521***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.6542***	0.6544***	0.6541***	0.6543***
	(0.000)	(0.000)	(0.000)	(0.000)
LEV	0.0114***	0.0113***	0.0114***	0.0113***
	(0.000)	(0.000)	(0.000)	(0.000)
REV_growth	-0.0174***	-0.0174***	-0.0175***	-0.0174***
	(0.000)	(0.000)	(0.000)	(0.000)
Loss_dummy	0.0218***	0.0218***	0.0218***	0.0218***
	(0.000)	(0.000)	(0.000)	(0.000)
Industry dummies	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included
Observations	66 097	66 097	66 097	66 097
Adjusted R2	0.3110	0.3112	0.3110	0.3112
F-value	447.00	428.22	425.69	408.72
Note:	****p<0.01, **p<0.05, *p<0.1*			

Notes: The table shows the results of our OLS regression analysis excluding the potential impact of the financial crisis in 2008. The modified Jones model is utilized to estimate discretionary accruals. Model 1 presents a baseline model including only control variables. Model 2 explicitly captures the effect of the gender of the CEO. Model 3 explicitly captures the effect of the number of female directors. Model 4 captures the collective effect of both the gender diversity measures. The sample period is 2011-2015. The coefficients of the CEO_dummy and the Loss_dummy demonstrates the marginal effect when the dummy variable changes from 0 to 1. The coefficients of NFD (Number of female directors) shows the marginal effect in the dependent variable when NFD increase by one unit. The coefficients of the remaining variables, size, CFO, ROA, LEV, and REV_growth, show an impact on the dependent variable when these variables increase by 1 percent. In addition, industry and year dummies are included in the regression to account for industry- and time-specific factors. The significance levels are denoted by ***, **, and *, indicating significance at the 1, 5, and 10% levels, respectively. P-values are in the parentheses.

Our findings from the robustness test controlling for the disruption concerning the financial crisis in 2008 are consistent with our previous findings from section 4.2.

The findings from Table 4.5.2 indicate that the financial crisis does not heavily impact the observed association between the gender of the CEO and earnings management. Moreover, the relationship appears persistent over time and might not be impacted by external shocks. There is a slight change in the coefficient representing the number of female directors. However, the association is still not statistically significant. By conducting this robustness exercise and receiving similar results, we provide more validity to our findings from the main model. Moreover, it reinforces the reliability of the findings and reduces the risk that they are attributable to random change.

4.5.3 Excluding firms with leverage below 0 and above 1

In our sample, we have observed that smaller firms tend to have extreme values of leverage. Consequently, we excluded the 10 percent smallest firms from our main analysis to mitigate the potential impact of these extreme leverage values. To further assess the robustness of these results, instead of excluding the 10 percent of the smallest firms, we concentrated on removing the firms with leverage above 1 and below 0. Thus, to observe if our findings remain consistent when considering a different approach to handling the extreme leverage values.

When dropping the firms with leverage above 1 and below 0, the mean of leverage became 0.588, slightly lower than when 10 percent of the smallest firms were excluded (see Table 4.5.3).

Table 4.5.3: Descriptive statistics, removing leverage above 1 and below 0

Variable	Obs	Mean	SD	Min	Max
LEV	**89 591**	**0.588**	**0.232**	**0**	**1**

For the robustness exercise, we first excluded the firms with leverage above 1 and below 0. After that, we estimated the modified Jones model to detect discretionary accruals following the paper by Arun et al. (2015). Further, we used discretionary accruals as the dependent variables and ran a pooled regression to capture the effect

of gender diversity (CEO_dummy and NFD) on discretionary accruals (see Equation 2). The results are presented in Table 4.5.4.

Table 4.5.4*:* OLS regression analysis excluding firms with leverage over 0 and 1

DACC	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Intercept	-0.0252***	-0.0172*	-0.0244***	-0.0169*
	(0.003)	(0.051)	(0.004)	(0.054)
CEO_dummy		-0.0056***		-0.0054***
		(0.000)		(0.001)
NFD			-0.0015	-0.0009
			(0.171)	(0.375)
Size	0.0007	0.0003	0.0008*	0.0004
	(0.127)	(0.541)	(0.094)	(0.467)
CFO	-0.7101***	-0.7101***	-0.7101***	-0.7101***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.4993***	0.4997***	0.4990***	0.4995***
	(0.000)	(0.000)	(0.000)	(0.000)
LEV	-0.0059*	-0.0057*	-0.0059*	-0.0057*
	(0.069)	(0.079)	(0.067)	(0.077)
REV_growth	-0.0039	-0.0038	-0.0038	-0.0038
	(0.168)	(0.170)	(0.170)	(0.171)
Loss_dummy	0.0091***	0.0091***	0.0091***	0.0091***
	(0.000)	(0.000)	(0.000)	(0.000)
Industry dummies	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included
Observations	74 900	74 900	74 900	74 900
Adjusted R2	0.2275	0.2276	0.2275	0.2276
F-value	465.68	446.76	445.71	428.32
Note:		****p<0.01, **p<0.05, *p<0.1*		

Notes: The table shows the results of our OLS regression analysis. The modified Jones model is utilized to estimate discretionary accruals. Firms with leverage ratio below 0 and above 1 are excluded. The table displays the effect of different gender diversity measures on discretionary accruals. Model 1 presents a baseline model including only control variables. Model 2 explicitly captures the effect of the gender of the CEO. Model 3 explicitly captures the effect of the number of female directors. Model 4 captures the collective effect of both the gender diversity measures. The sample period is 2009-2015. The coefficients of the CEO_dummy and the Loss_dummy demonstrate the marginal effect when the dummy variable changes from 0 to 1. The coefficients of NFD (Number of female directors) shows the marginal effect in the dependent variable when NFD increase by one unit. The coefficients of the remaining variables, size, CFO, ROA, LEV and REV_growth, show an impact on the dependent variable when these variables increase by 1 percent. In addition, industry and year dummies are

included in the regression to account for industry- and time-specific factors. The significance levels are denoted by ***, **, and *, indicating significance at the 1, 5, and 10% levels, respectively. P-values are in the parentheses.

The results in Table 4.5.4 suggest that the association between gender diversity and earnings management is still negative, only a little weaker than when 10 percent of the smallest firms are excluded. The coefficient for the gender of the CEO is still considered statistically significant at the 1, 5, and 10 percent levels. In contrast, the coefficient for the number of female directors is still statistically insignificant for all levels. This aligns with our previous findings. As we obtain similar results in terms of the association between gender diversity and earnings management when using a different approach to address the extreme leverage values, it implies that the impact of these particular subsets of firms on the relationship is not considerably different. Additionally, it suggests that the observed association is not simply driven by the traits of the smaller firms. However, it is noticeable that in this analysis, several control variables are statistically insignificant compared to previous studies. This could be explained by the reduced variation and loss of information because of a smaller sample size in this analysis.

4.6 Limitations

Some limitations exist in our research. More specifically, as the association between the number of female directors and income-decreasing earnings management is not statistically significant, there might be a case of an omitted variable bias. It is reasonable to believe that additional variables, not included, could influence the firm's decision-making process, and which would then also affect the potential for earnings manipulation. Additionally, the loss of some years of observations due to the requirement of non-missing values could potentially affect the statistical power of the findings. Therefore, future research could benefit from including additional, relevant variables and a broader range of years to improve the coverage. In general, more research is imperative due to the various conclusions in the existing literature.

5.0 Conclusion

This research paper investigates the relationship between gender diversity and earnings management for Norwegian companies. When examining this topic, we used a dataset retrieved from the CCGR database, where our final sample contained 90 364 observations from 2009 to 2015.

Previous literature has discussed earnings management considerably, and multiple studies have focused on determining the motives and methods of manipulating earnings. However, the association between gender diversity and earnings management has been less discussed and researched. Previous research has suggested a difference between males and females in relation to risk preference, corporate decision-making, and ethical conduct. For these reasons, we aimed to explore whether the gender of the CEO and/or whether the number of female board directors influences the earnings management practices in Norwegian companies. Our research question is as follows: "*Is the gender of the CEO and the number of female directors linked to earnings management in Norwegian firms?*".

We use total discretionary accruals as a proxy to measure earnings management, and the estimation of total accruals follows the paper of Arun et al. (2015). Consequently, we utilized the modified Jones model (Dechow et al., 1995; Arun et al., 2015). When analyzing the association between earnings management and gender diversity, we use Ordinary Least Squares (OLS) regression. Our main independent variables of interest are a CEO gender dummy and the number of female directors. Furthermore, we include relevant control variables based on previous research to isolate the relationship between discretionary accruals and gender diversity.

The result from our OLS regression using the modified Jones model suggests an association between female CEOs and income-decreasing earnings management. This seems to be similar to previous literature on earnings management and gender diversity (Peni & Vähämaa, 2010; Gavious et al., 2012; Wei & Xie, 2015). However, the association between the number of female directors and income-decreasing earnings management is not statistically significant. The potential reason for the

female variables having distinct statistical significance can be explained by the fact that the variables have different impacts on earnings management practices. Consequently, the findings might potentially shed light on the limited influence of female directors in decision-making processes related to earnings management.

Furthermore, our analysis for high-debt and low-debt firms implies a potentially negative association between having a female CEO and income-decreasing earnings management, similarly as in our main model. However, the female CEO coefficient is not statistically significant for high-debt firms. This indicates a lack of statistical significance and makes it difficult to draw meaningful conclusions.

In line with previous studies, we also conduct an analysis where the discretionary accruals were estimated separately for each industry-year combination to account for industry and year-related differences. Our findings for this analysis suggested a slightly weaker association between the gender of the CEO and income-decreasing management. This indicates that it may be necessary to consider industry and time factors to control for unobserved variation in the association between gender diversity and earnings management. Further, the result regarding the number of female directors and discretionary accruals contradicts our previous results which implies that the effect may vary depending on industry and time. However, the coefficient is not statistically significant in either model, making it difficult to draw firm conclusions.

Additionally, we have executed various robustness exercises to further ensure the validity of our findings. We employed the original Jones model to estimate discretionary accruals, yielding results that closely align with our previous findings. Further, we investigated the potential impact of the financial crisis on our findings, which indicated only minimal changes in the coefficients. As a result, the findings suggested that the financial crisis did not heavily impact the observed association between gender diversity and earnings management. In addition, we observed that our sample consists of smaller firms that tended to have extreme leverage ratios. Therefore, we decided to drop the firms with leverage above 1 and below 0 to test a different method in addressing the extreme leverage values. Our results still implied

an association between gender diversity and income-decrease earnings management, although the link was slightly weaker.

In conclusion, the overall results suggest an association between female CEOs and income-decreasing earnings management, and this relationship is robust through the robustness exercises conducted. However, the association between the number of female directors and income-decreasing earnings management is not statistically significant. The potential explanation for this might be that the CEO might have a more substantial impact on shaping the earnings management practices in a company as the top decision-maker.

6.0 Appendices

Appendix A: Modified Jones model regression table

Scaled_TACC	Coef	St.Err	t-value	p-value	[95% Conf Interval]		Sig
inv_lagTA	-4248.371	1999.541	-2.12	0.034	-8167.443	-329.3	**
term2	-0.043	0.003	-16.25	0.000	-0.048	-0.037	***
scaled_PPE	0.015	0.003	5.26	0.000	0.009	0.02	***
Constant	0.035	0.001	25.15	0.000	0.033	0.038	***
Mean dependent var		0.035	SD dependent var			0.287	
R-squared		0.005	Number of obs			109 574	
F-test		104.964	Prob > F			0.000	

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

Notes: Scaled_TACC = Scaled total accruals measured by total accruals divided by lagged total assets; inv_lagTA = 1 divided by lagged total assets; term2 = delta revenue minus delta account receivables divided by lagged total assets; scaled_PPE = Property, plant and equipment divided by lagged total assets.

Appendix B: Original Jones model regression table

Scaled_TACC	Coef	St.Err	t-value	p-value	[95% Conf Interval]		Sig
inv_lagTA	-4304.007	1999.106	-2.15	0.031	-8222.296	-385.858	**
term2	-0.012	0.002	-4.96	0.000	-0.017	-0.007	***
scaled_PPE	0.016	0.003	5.84	0.000	0.011	0.022	***
Constant	0.034	0.001	24.09	0.000	0.031	0.037	***
Mean dependent var		0.035	SD dependent var			0.287	
R-squared		0.001	Number of obs			109 574	
F-test		25.619	Prob > F			0.000	

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

Notes: Scaled_TACC = Scaled total accruals measured by total accruals divided by lagged total assets; inv_lagTA = 1 divided by lagged total assets; term2 = delta revenue divided by lagged total assets; scaled_PPE = Property, plant and equipment divided by lagged total assets.

Appendix C: Variance Inflation Factor test for Table 4.2 - Main model

Variable	VIF	1/VIF
Industry dummy 5	2.9	0.345272
ROA	2.19	0.456487
Industry dummy 9	2.15	0.464881
Year dummy 5	1.94	0.515715
Year dummy 6	1.94	0.516785
Year dummy 4	1.92	0.521417
Year dummy 3	1.82	0.548916
Loss_dummy	1.80	0.555578
Year dummy2	1.79	0.559034
Industry dummy 8	1.72	0.580891
Industry dummy 4	1.71	0.583810
Year dummy 7	1.56	0.642267
Industry dummy 7	1.53	0.652556
Industry dummy 10	1.38	0.722084
CFO	1.35	0.740599
size	1.34	0.746247
Industry dummy 11	1.34	0.748642
CEO_dummy	1.22	0.818642
Industry dummy 6	1.21	0.824405
Industry dummy 2	1.14	0.877092
LEV	1.09	0.917972
NFD	1.05	0.949964
REV_growth	1.04	0.962879
Industry dummy 3	1.04	0.963452
Mean VIF	1.59	

Appendix D: Variance Inflation Factor test for Table 4.4 - Industry-year cross-sectional

Variable	VIF	1/VIF
Industry dummy 5	2.96	0.338265
ROA	2.20	0.455423
Industry dummy 9	2.19	0.457026
Year dummy 5	1.94	0.515742
Year dummy 6	1.93	0.516888
Year dummy 4	1.92	0.521664
Year dummy 3	1.82	0.549674
Loss dummy	1.80	0.554831
Year dummy 2	1.79	0.559191
Industry dummy 8	1.75	0.571211
Industry dummy 4	1.74	0.575011
Year dummy 7	1.55	0.644411
Industry dummy 7	1.55	0.645048
Industry dummy 10	1.39	0.717608
CFO	1.35	0.740082
Industry dummy 11	1.34	0.747152
size	1.34	0.747462
CEO_dummy	1.22	0.818492
Industry dummy 6	1.21	0.826436
Industry dummy 2	1.15	0.872529
LEV	1.09	0.916639
NFD	1.05	0.950807
REV_growth	1.04	0.962875
Industry dummy 3	1.03	0.969710
Mean VIF	1.60	

Appendix E: Variance Inflation Factor test for Table 4.5.1 - The original Jones model

Variable	VIF	1/VIF
Industry dummy 5	2.9	0.345272
ROA	2.19	0.456487
Industry dummy 9	2.15	0.464881
Year dummy 5	1.94	0.515715
Year dummy 6	1.94	0.516785
Year dummy 4	1.92	0.521417
Year dummy 3	1.82	0.548916
Loss_dummy	1.80	0.555578
Year dummy2	1.79	0.559034
Industry dummy 8	1.72	0.580891
Industry dummy 4	1.71	0.583810
Year dummy 7	1.56	0.642267
Industry dummy 7	1.53	0.652556
Industry dummy 10	1.38	0.722084
CFO	1.35	0.740599
size	1.34	0.746247
Industry dummy 11	1.34	0.748642
CEO_dummy	1.22	0.818642
Industry dummy 6	1.21	0.824405
Industry dummy 2	1.14	0.877092
LEV	1.09	0.917972
NFD	1.05	0.949964
REV_growth	1.04	0.962879
Industry dummy 3	1.04	0.963452
Mean VIF	1.59	

Appendix F: Variance Inflation Factor test for Table 4.5.2 - Removed years, financial crisis:

Variable	VIF	1/VIF
Industry dummy 5	2.95	0.338686
Industry dummy 9	2.20	0.454224
ROA	2.15	0.465513
Loss_dummy	1.77	0.563824
Industry dummy 8	1.77	0.564128
Industry dummy 4	1.73	0.576563
Year dummy 3	1.68	0.594847
Year dummy 4	1.68	0.595604
Year dummy 2	1.67	0.599474
Industry dummy 7	1.54	0.650785
Industry dummy 11	1.44	0.692564
Year dummy 5	1.43	0.697535
Industry dummy 10	1.42	0.705332
CFO	1.35	0.741037
size	1.34	0.746999
Industry dummy 6	1.28	0.781187
CEO_dummy	1.23	0.811306
Industry dummy 2	1.14	0.875157
LEV	1.08	0.925979
NFD	1.05	0.949862
Industry dummy 3	1.05	0.952626
REV_growth	1.04	0.962825
Mean VIF	1.55	

Appendix G: Variance Inflation Factor test for Table 4.5.4 - Removed LEV > 1 and LEV < 0:

Variable	VIF	1/VIF
Industry dummy 5	2.88	0.346844
Industry dummy 9	2.31	0.433536
ROA	2.28	0.438601
Year dummy 6	1.96	0.510151
Year dummy 5	1.96	0.510505
Year dummy 4	1.93	0.517802
Year dummy 3	1.83	0.546872
Loss_dummy	1.81	0.553328
Year dummy2	1.79	0.557894
Industry dummy 4	1.73	0.577476
Industry dummy 8	1.68	0.595356
Year dummy 7	1.61	0.621646
Industry dummy 7	1.45	0.688524
CFO	1.41	0.710782
Industry dummy 10	1.39	0.717754
Industry dummy 11	1.37	0.732215
size	1.36	0.736650
CEO_dummy	1.22	0.819242
Industry dummy 6	1.20	0.830398
Industry dummy 2	1.14	0.873828
REV_growth	1.07	0.937422
LEV	1.06	0.940211
NFD	1.05	0.950683
Industry dummy 3	1.04	0.961209
Mean VIF	1.61	

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