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The Bidirectional Relationship Between ESG and Earnings Management in Norway

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Abstract

This study examines the relationship between sustainability and earnings management (EM). The literature on this relationship is extensive and has primarily been focused on assessing how corporate social responsibility affects managers discretionary decisions, captured through EM. The current literature presents mixed results to the direction of this relationship, with most studies pointing at a negative effect of sustainability on EM. This thesis examines whether there exists a bidirectional relationship between Environmental, Social and Governance (ESG) and EM in Norway. The study finds that there exists a positive relationship between ESG and EM. These findings are consistent with arguments claiming that sustainability reporting can be used to conceal opportunistic behavior by managers, in accordance with agency theory and stakeholder theory. In addition, it finds that there exists a bidirectional relationship of EM on ESG.

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1.0 Introduction

The 'traditionalist' view of the objective of a company states that it should seek to increase the value for its shareholders (Friedman, 1962). A more recent theory argue that in addition to this, the company must take into account those with an interest in the company, often referred to as the stakeholder theory (Freeman, 1984). The inclusion of other stakeholders introduces the need for managers to focus on sustainability and social responsibility. Due to this, agency theory must be taken into consideration, as the manager acts on behalf of both owners and stakeholders. This relationship may result in managers using managerial discretion for their own personal gain (Jensen & Meckling, 1976).

Sustainability is not clearly defined but can best be described as not destroying future demand in order to meet present demand (World Commission on Environment and Development, 1987). Corporate social responsibility (CSR) traces all the way back to the 1950's and can be defined as actions with an aim of satisfying social needs (Angelidis & Ibrahim, 1993) and can be said to be the predecessor to Environmental, Social and Governance (ESG). The shift towards the more defined ESG terminology introduces criteria which looks upon a firm's ethical impact and sustainable practices. The two definitions are still imprecise, so alternating between CSR and ESG is common and of no substantial issue.

There is a clear global trend of increased sustainability reporting, and Refinitiv (2020) recognizes the increasingly critical importance of transparent, accurate and comparable ESG data for the financial industry. For the first time in KPMG's survey history, every sector has a reporting rate of 60% or more as of 2017 (KPMG International, 2017). The interest in sustainability visibility is growing and, whether one agrees with it or not, the view of ESG has dramatically shifted. There is also the talk of an impending 'Carbon Correction' which is going to create disruptions in the markets. Company valuations are about to be judged by different metrics which will create huge opportunities for investors. Nordea (2017) argues that both companies and investors simply cannot afford not to care about ESG. That there will be a reshape of finance and ESG data is how companies will be held accountable for the shift to happen, with more credit being given to those behaving responsibly (Refinitiv, 2020).

Norway constitutes the geographical delimitation in this study, where there is also no escaping the power of ESG. As of April 2013, listed Norwegian companies have been obligated to report on CSR (Borgersrud, 2013). There is a general consensus regarding the importance of sustainability in Norway. In 2020, Norway submitted an enhanced climate target under the Paris Agreement, aiming to reduce emissions with at least 50% by 2030 compared to 1990 levels (The Norwegian Government, 2020). UN's 17 Sustainable Development Goals (SDGs) will also work as a powerful driver for sustainability, where UN's reports and indexes show that Norway ranks high in terms of global implementation of the SDGs (United Nations, 2016). Norway even has a certification scheme for enterprises seeking to document their environmental efforts and demonstrate social responsibility, called Eco-Lighthouse. In order to achieve such certification, enterprises must satisfy both the General Industry Criteria and the criteria specific to their respective industries. An Eco-Lighthouse certification substantiates a number of the SDGs and Norway has more than 6 600 companies qualifying and certified (Miljøfyrtårn, 2018).

There is no single definition for earnings management (EM), but EM is mainly described as manipulation of financial reporting to achieve specific targets. It is important to note that EM is not in violation of GAAP, as opposed to fraud. A common incentive for managers to engage in EM is to achieve private benefits, for example bonuses. Other incentives for engaging in EM include capital market motives, due to the inefficiency of the stock markets to reflect the companies' intrinsic values, and third-party motives which appear due to the influence of the external parties on firm performance. EM is mainly perceived as a conflict of interest between management and shareholders and the mentioned incentives are influential when the managers expect to achieve more benefits from EM, than those from revealing the truth (Diri, 2018). This type of questionable behavior is most likely not what one associates with a country that is among the top seven when it comes to least amount of corruption, together with the other Nordic countries (Transparency International, 2019). It can therefore be presumed that there is a general opinion that Norway follows regulations and behave ethically. Corruption is also a large factor in the basis of ESG performance score calculation (Nordea, 2017).

The increased interest in sustainability has led both firms and investors to pay attention to sustainability ratings. There has already been conducted numerous

studies connecting ESG with financial performance, concluding that a high ESG-score leads to an increased financial performance (Friede, Busch, & Bassen, 2015; Velte, 2017; Refinitiv, 2020a). It would be interesting to investigate another aspect of business, such as EM. As companies in the Nordic countries generally stand out as high performers in ESG ratings (Nordea, 2017) and with the increased focus on sustainability in Norway, this leads us to believe that there is a relationship between sustainability and EM. Based on this, we arrive at the research question: *Is there a bidirectional relationship between ESG and EM in Norway?*

In order to answer the overall question, it is necessary to operationalize the variables in the research question. The sustainability score and EM will act both as the independent and dependent variables, with the ESG rating acting as a measure for the sustainability score. Several agencies provide ESG ratings based on factors related to sustainability, but there is no official standardized way on how and what, the weighting of these different factors should be. The ESG rating used will be collected from Thomson Reuters, with the ESG-score now updated from the previous ASSET4 scoring. This updated score will be more accurate and allows us to perform a more improved analysis (Refinitiv, 2020). EM is also both the dependent and the independent and will be calculated by applying the Modified Jones Model (Dechow, Sloan, & Sweeney, 1995). However, we will in addition to this, be controlling for firm performance through return on assets (ROA), as it was proposed by Kothari, Leone & Wasley (2005).

The research question will be deconstructed into two segments, where we aim to gain a complete assessment of the potential bidirectional relationship between ESG and EM in Norwegian companies. It has been conducted an empirical study by Velte (2019), which covers the German stock market. Our thesis will be conducted in a comparable way on the Norwegian stock market, to assess whether we find similar patterns. Thus, our research will provide complementary insight for the bidirectional relationship between ESG and EM in Norway. Scholtens & Sievänen (2013) argue that the ESG performance in the Nordics are highly correlated due to the similarities shared by the different countries. The result from our thesis are therefore not directly applicable for other countries or regions due to the specific characteristics of Norway. Nordic countries on the other hand, due to their specific and similar characteristics, can be expected to witness similar results from a comparable study.

2.0 Literature review

From the early 2000s several studies have analyzed the relationship between social responsibility and EM. One of the earliest studies done, by Riahi-Belkaoui (2003) state that managers' accounting choices are systematically related to the level of social responsibility. The study finds a positive relation between the degree of discretionary accruals (DA) and the level of social responsibility. Patten & Trompeter's study from 2003, which looks at the relationship between environmental disclosure and EM, have their results aligned with their argument stating that a larger corporate strategy in order to deal with political pressures, is to manipulate earnings. They view EM only as a reactive tool available for companies to deal with political scrutiny. In any case, one of the earliest descriptions of EM do not deviate from the general understanding of what defines EM. That description was written by Schipper in 1989, and states that the goal of manipulating external reporting is to achieve private benefits. In more recent years, conducted studies have shown a tendency to get results showing a negative relationship between a high degree of CSR and EM, contradictory to the findings of the earliest studies.

2.1 Social Responsibility and ESG

There has been an increased demand for CSR practices in recent years, but the concept and origin can, as mentioned, be traced back to the fifties. Corporate sustainability is important in order to ensure long-term success and value creation delivered across society. For those companies committed to sustainability, reporting to stakeholders in a public and transparent manner is vital (United Nations Global Compact, 2015). There has been an improvement concerning the availability of socially responsible activity information by both non-voluntary and voluntary disclosure agreements. Where the reporting of corporate sustainability has increased steadily from the 2000s (KPMG International, 2017). A voluntary agreement, signed by more than 160 countries, where companies produce an annual Communication on Progress (COP) on their work on ten set principles to follow, is The United Nations Global Compact (UNGC). The principles concern environment, anti-corruption, human rights, and societies and these must be embedded into the strategies and operations of companies. The number of COPs have experienced huge growth and the result of that has mainly been driven by the demand from key stakeholders, another sign of how sustainability reporting has

become widespread in recent years. The UNGC greatly increases the access to ESG data, as CSR is a large component of the basis of ESG.

Even though the UNGC's COP framework in many cases meets government requirements to disclose ESG practices, there is still a lack of standardization when it comes to ESG reporting. According to Siew (2015), deficiencies like lack of standardization and the availability of information is what makes corporate sustainability reporting tools (SRTs) problematic to compare. Reflecting a company's true sustainability becomes an issue when there is a difference amidst companies on the disclosure of sustainability data. Some companies also take advantage of the comparability difficulty in order to hide their actual practices and manipulate stakeholders' view of the company by 'green-washing'. 'Green-washing' suggests that companies use CSR reports to appear as "good", even if that is not the case, by biased reports showcasing what is positive and avoiding the negative (Cecil, LaGore, Mahoney, & Thorne, 2013). Even so, the ESG-score is presumed to be the preferred and better tool for reflecting CSR. It also provides the opportunity to single out each of the pillars; environmental, social and governance, for a more differentiated analysis.

2.2 Socially Responsible Activities and Earnings Management

The literature represents a subjectively selected sample of previous and similar research relevant to our research question: *Is there a bidirectional relationship between ESG and EM in Norway?* The literature has been evaluated in relation to the relevance of our research question and how pronounced the results have been for future research within the area.

Prior, Surroca, & Tribó (2008) investigates the connection between EM and CSR and discusses if socially responsible managers really are ethical. They argue that EM practices damage the collective interest of stakeholders. Thus, making managers engaging in earnings manipulation, able to cope with stakeholder activism by engaging in CSR activities. They conduct the study using archival data from multi-national panel sample from 26 countries between 2002-2004. Using the model of Kothari et al. (2005) to calculate the DA and applying control variables consisting of; size, leverage, and investment, they find a positive impact of EM practices on CSR. The study draws on a generalized agency theory where managers are the agents of all stakeholders, and the EM literature to highlight that CSR can

be used to cumulate support from stakeholders, and due to this enables an opportunity for entrenchment to those managers that use EM. The aim of the paper is to provide a warning signal. This being due to the relevance of distinguishing whether investments in CSR affect the company's bottom line or if it is part of a managerial strategy in order to maintain support from stakeholders, if managers have employed practices damaging to shareholders' interest, such as EM.

Kim, Park & Wier (2012) seek to investigate the relationship between earnings quality and corporate social responsibility of firms in the American market. They question whether firms that engage in CSR activities also behave in a responsible manner to constrain EM. Same as with most studies, Kim et al (2012) apply Kothari et al. (2005) to calculate accruals-based earnings management (AEM) and Roychowdhury (2006) to calculate real earnings management (REM). They argue that their results hold after they controlled for alternative determinants of EM and CSR and potential substitution between AEM and real activities manipulation. They find that their results support the premise that CSR firms are less likely to engage in aggressive EM through AEM and/or real activities manipulation.

A study which looks at the bidirectional relationship between EM and CSR, is presented by Gallego-Álvarez, Martínez-Ferrero & García-Sánchez (2015). They argue that since they use an international sample consisting of 20 countries, their results are potentially more powerful and generalizable. Specifically, in Australia, socially responsible firms are less likely to manage their earnings, and higher levels of EM tend to reduce socially responsible practices. More generally, they find that there is in fact a bidirectional negative relationship between CSR practices and EM. Nonetheless, they do acknowledge that there are multiple limitations to their international study, such as different countries' corporate governance systems, the availability of information and the fact that there is not a universally accepted or ideal empirical measure for these socially responsible practices.

The study "Corporate Social Responsibility and Earnings Quality: International Evidence" (Bozzolan, Fabrizi, Mallin, & Michelon, 2015) looks at whether CSR orientation of a firm affects its reporting incentives, in terms of the trade-off between REM and AEM. Bozzolan et al. (2015) find evidence that support their hypothesis: CSR-oriented firms are less likely to engage in REM than in AEM, due to the lower cost of AEM. They also find that in strong legal enforcements countries, REM is lower compared to AEM in companies with high CSR. The paper

uses Roychowdhury (2006) to calculate the dependent variable REM and Dechow et al. (1995) for AEM. The results are interesting since they support the belief that a higher level of CSR negatively affects EM. Nevertheless, as with many of the other studies reviewed, it does not use ESG metrics that can be directly compared with this thesis.

The article “Investigating the relationship between CSR and EM: Evidence from Spain” (Fernández, Gras-Gil, & Manzano, 2016) looks at how CSR is related to ethical and moral issues concerning corporate decision-making. That engaging in socially responsible activities does not only improve stakeholder satisfaction, but also has a positive effect on corporate reputation. They use panel data methodology for a sample of Spanish non-financial companies between 2005 and 2012. Using the Modified Jones model by Dechow et al. (1995) to compute the accrual component of earnings and having control variables consisting of; size, leverage, return on assets (ROA), a dummy variable to control if it is a cross-listed firm or not. They also include industry dummies to control for industry effects on EM. Based on this, they find a negative impact of CSR practices on EM. Which shows that CSR practices may be an organizational device that leads to more effective use of resources, which then have a negative impact on EM practices. Their result is interesting as they, like several others do, use stakeholder theory to explain why companies involve themselves in socially responsible activities as a strategy to maximize their long-term return on investment. The empirical results of the study confirm their thesis that managers manipulate earnings in order to obtain private benefits, and through these practices damage the interest of stakeholders. The study does acknowledge limitations regarding the external validity problem caused by a restricted sampling frame and small sample size and how the sample only includes the most reputable companies in Spain. This again, shows how such limitations creates an information skewness in studies like these.

A more recent paper done in Germany, investigates the bidirectional link between ESG and EM (Velte, 2019). The EM is split into AEM calculated by the model of Kothari et al. (2005), and REM by the model of Roychowdhury (2006). The sample period was 2011-2017 and the ESG rating was collected from Thomson Reuters DataStream. The control variables used by Velte include firm size, market-to-book equity ratio, adjusted ROA, bigfour, leverage, growth, beta, percentage of independent members on the supervisory board, and percentage of financial experts

on the supervisory board. Velte finds that ESG performance has a significant negative influence on AEM but finds no significant relationship to REM. Individually, the three different pillars of ESG performance all have a negative influence, with the governance performance having the highest significance. The study also suggests a bidirectional relationship between ESG performance and EM. The paper is highly relevant, as this thesis will look at that same bidirectional relationship.

2.3 Connecting Previous Research to This Thesis

Based on previous literature and due to the increased focus on sustainability in Norway, we expect that ESG performance will have a negative effect on EM, and vice versa. Together with the prerequisites regarding the ethical behavior in the Nordic countries connected to the low degree of corruption, the general expectation will be an inverse relationship between ESG and EM. Will companies focusing on improving their ESG rating have a lower degree of EM, or will companies with high degrees of EM focus less on improving their ESG rating? This thesis will take agency theory and stakeholder theory into consideration when exploring the motivation for EM. That is, does a high ESG rating bear witness of managers maintaining a good stakeholder relationship? The theory behind the construction of the hypothesis will be further discussed in the theory sections 3.1 and 3.2.

The lack of disclosure of ESG data is a problem, as this will limit the number of companies that can be included in the study. Disclosure of non-financial reports is voluntary and even though Refinitiv collects its data from NGO websites, stock exchange filings and news sources, their main source are from companies' annual reports and websites. This will most likely cause a biased selection of companies, as one can assume companies choosing to report on areas and factors underlying the ESG rating, are companies already succeeding and with a strong performance regarding those factors. Companies not performing as wanted on the other hand, will have a tendency not to report, creating an information skewness. Further discussion of the data will follow in chapter 6 on Data.

3.0 Theory

There are two main theories in previous literature that have been used to explain the relationship between sustainability and EM. The agency theory, which seeks to explain how and why managers resort to EM, and the stakeholder theory, which seeks to explain how CSR can be connected to reduced EM. Below we will present the two theories with focus on their implication for the relationship studied in this thesis.

3.1 Agency Theory

An agency relationship can be defined as an agreement where one person (the principal) employ another individual (the agent) to perform actions on their behalf. These actions involve the owner entrusting the agent with some form of managerial authority (Jensen & Meckling, 1976). The article proposed the theory after analyzing the difference in behavior when an organization was fully owned by the manager and when they only owned part of the organization. The authors found diverging behavior between these two ownership structures, which they ascribed to what they called the agency problem. According to this theory, the manager will perform actions in his best interest regardless of the interest of the owners or other stakeholders. Jensen & Meckling (1976) argue that the owners should implement incentive programs that align their interest with that of the manager. By implementing such programs, they ensure that even if the manager work in his own self-interest he will still act in the interest of the owner.

The link between EM and agency theory can best be described as the manager performing activities resulting in short term gains, with possible long-term losses or value depriving effects for the company. A previous study has found a link between agency theory and EM (Davidson, Jiraporn, Kim, & Nemec, 2004). They found that EM increases the agency cost of the firm if the decisions made are not the optimal choice of actions for maximizing firm value. They argue that the manager will perform opportunistic activities resulting in an increased compensation for him.

3.2 Stakeholder Theory

Contrary to agency theory, stakeholder theory states that the main priority of the management is to satisfy the needs of all individuals and organizations with an interest in the company, not only the owner (Freeman, 1984). This introduces a set of difficult judgements for the management as it is their responsibility to balance the conflict of interest between the different stakeholders. Due to the different rights of claim to value from the entity between the stakeholders, there will also be a degree of information asymmetry between them. The attention to stakeholder's interests and right to information have increased the need for non-financial reporting such as sustainability reporting. In line with this theory it is likely that managers will seek to report more non-financial information that will be useful for stakeholders in their decision making.

Stakeholder theory has by some been attributed to be the reason why companies engage in sustainability activities and reporting. According to Freeman (1984), engaging in CSR activities will result in increased performance. This is contrary to the work of Milton Friedman (1962), known as the father of the 'traditionalist' view of a corporation's responsibility. He argued that the sole responsibility for the management is to maximize the value of the firm for the stockholders. According to the 'traditionalist' view, utilizing firm resources on CSR activities is profit reducing and should be avoided. To test this argument a review of 21 empirical studies on the relationship between CSR and financial performance found that companies who met criteria of social responsibility either outperformed or performed in line with companies not meeting the same criteria (Krausz & Pava, 1996). This supports Freeman's argument that the interest of stakeholders is as important as that of the stockholders. Recent studies have found that there is a positive relationship between ESG and financial performance (Friede et al., 2015; Velte, 2017).

In a study by Choi, Lee & Park (2013) they argue that a firm has high incentives to pursue a strong and good relationship with stakeholders as these control important resources to the firm. As CSR activities take into account the different stakeholders, such as employees, the community, environmental corporations, and NGO's, it is clear that the firm will use CSR activities in order to strengthen their relationship to these. In a different study from 2015, the authors claim that EM affects stakeholders' view of the organization negatively (Gallego-Álvarez, García-

Sánchez, & Martínez-Ferrero, 2015). Their arguments are based on the findings of a study on the consequences of fraud on stakeholder behavior, which state that managerial fraud will lead to loss of support from stakeholders and increased demand for surveillance (Priem, Rasheed, & Zahra, 2005).

A study by Banerjee, García-Sánchez, & Martínez-Ferrero (2016) found a link between a firm's use of EM and its corporate reputation and cost of capital. The study concluded that firms engaging in EM witnessed a worsened corporate reputation and an increase in cost of capital. On the other hand, they found that engaging in CSR activities resulted in enhanced reputation and reduced cost of capital, thus working as a shield from the negative effects of EM.

It is natural to conclude from the findings presented above that increased CSR, which is attributed to yield a good stakeholder relationship, will have an inverse relationship with EM, which is stated to have a negative impact on stakeholder support.

4.0 Hypothesis

This section will introduce the hypotheses driving the research of this thesis. As stated previously the research question of the thesis has been formulated as: *Is there a bidirectional relationship between ESG and EM in Norway?* This research question will be divided into two parts. The initial part will look at the relationship between EM and the overall ESG-score of the companies in the sample. The second part will look at the relationship between EM and the three pillars that make up the ESG-score, namely the ESG-Environmental (ESGE), ESG-Social (ESGS), and ESG-Governance (ESGG) scores. Subsequently we will, similar to Patrick Velte's analysis of the German Stock Exchange (2019), look at the bidirectional relationship in the last part. To limit the size of this part of the thesis, we will look at the bidirectional relationship of the effect of EM on ESG. As this study depends on the results as presented in chapter 7 it will not be presented in this part of the thesis.

Studying the relationship between ESG and EM can have an interesting bidirectional level due to a simultaneous relationship between the EM and ESG/CSR (Patrick Velte, 2019; Gallego-Álvarez et al., 2015). These prior studies

argued and found evidence of a bidirectional relationship between sustainability and EM. Based on these findings we will seek to investigate if such a relationship is also present in Norway.

ESG-score → Earnings Management

A positive relationship here would suggest that a higher ESG-score induces increased EM in the companies assessed in the study.

A negative relationship would suggest that a higher ESG-score induces lower EM in the companies assessed in the study.

However, there could be a reason to expect that EM in a company could have an effect on the ESG-score of the company. Managers willing to utilize earnings increasing accruals may be less inclined to focus on the ESG-performance of the entity.

Earnings Management → ESG-score

A positive relationship means that increased EM will lead to the company obtaining a higher ESG-score.

A negative relationship means that increased EM will lead to a lower ESG-score for the company.

The relationships presented above form the basis of our research and in the following part we will present the hypotheses of this thesis.

4.1 Part 1: ESG-score

Hypothesis 1i

Related research question: Does the level of ESG performance have an effect on EM among Norwegian companies?

H0: *There is no relationship between ESG and EM.*

HA: *There is a relationship between ESG and EM.*

4.2 Part 2: Pillars

This part will present an understanding to whether the three pillars of the overall ESG-score have any association to the EM of the company.

Hypothesis 2i

Related research question: Does the level of environmental performance have an effect on EM among Norwegian companies?

H0: *There is no relationship between ESGE and EM.*

HA: *There is a relationship between ESGE and EM*

Hypothesis 2ii

Related research question: Does the level of social performance have an effect on EM among Norwegian companies?

H0: *There is no relationship between ESGS and EM.*

HA: *There is a relationship between ESGS and EM*

Hypothesis 2iii

Related research question: Does the level of governance performance have an effect on EM among Norwegian companies?

H0: *There is no relationship between ESGG and EM.*

HA: *There is a relationship between ESGG and EM*

5.0 Methodology

The goal of this thesis is to answer the research question: *Is there a bidirectional relationship between ESG and EM in Norway?* In order to answer this a relevant model must be applied. This section of the thesis will provide the process of choosing that model by assessing the structure of the data set, finding a model fitting the structure and choosing the best model for the data set. Additionally, this section will look at the validity of the model and assess other concerns related to the results found in the analysis.

5.1 Panel Data

The data set used in this thesis consists of 353 firm-year observations over 16 years and 39 companies. This cross-sectional and time-series structure of the data makes it a panel data set. The data set is unbalanced as it does not contain data for each entity for all years in the period assessed.

The use of panel data and its models makes it possible to control for unobservable change across entities and years. In this data set, such changes can be an increased focus on ESG-reporting or choices in the company that increases the ESG-performance score. Additionally, it can include changes in management with different views on EM.

Panel data is especially beneficial when conducting research over shorter time periods as it increases the number of observations used, compared to using only cross-sectional or time series data. Furthermore, panel data enable us to capture unobserved cross-sectional heterogeneity in the data set (Wooldridge, 2020).

5.2 Building the Model

Considering the properties presented above, it is natural to use a model for panel data to benefit from these properties when analyzing the data set. In assessing panel data there are three primary models: Fixed Effects-model (FE), Random Effects-model (RE) and Pooled OLS-model. The next section will briefly present these three models, going through their advantages and disadvantages. Subsequently, the Breusch-Pagan Multiplier Test and Hausman Test will both be applied to assess what model fits the data set best. Both the validity and generalizability of the findings of the study is to a high degree dependent on the fit of the model used.

The choice between the two most used models, FE and RE, depends to a high degree on the nature of the variables and then more specifically the omitted variables.

5.2.1 Pooled Model

The pooled model or Pooled OLS-model is the simplest model of the panel data models. The model ignores the panel structure and characteristics of the data. The model produces coefficients by pooling together the dependent variable, both across entities and time (cross-sectional and time-series). The same goes for the independent variables. Due to this, the Pooled OLS-model will be estimated by using simple OLS and producing simple coefficients.

Pooled OLS is an easy model to use in order to capture effects in data sets. The downside of this model is that it ignores cross-sectional heterogeneity which is one of the benefits of panel data. The Pooled OLS-model should therefore only be used if tests show that there are no cross-sectional or time-sectional effects in the data set. These can be found through test for random and fixed effects. The relevant Pooled OLS equation to capture the relationship between EM and ESG is:

$$(Eq. 1) \quad AEM_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 Size_{it} + \beta_3 MTB_{it} + \beta_4 ROA_{adj_{it}} + \beta_5 LEV_{it} + \beta_6 Growth_{it} + \beta_7 Beta_{it} + \beta_8 Indep_{it} + \beta_9 Expe_{it} + \varepsilon_{it}$$

where $i = 1, \dots, 39$ and $t = 2003 - 2018$

As can be seen from equation 1, the coefficients of the model, i.e. β_0, β_1 and so forth, have neither time nor entity subscript. This is due to the fact that the coefficients are pooled together for all entities and across time, in other words they are constant both across time and entities.

5.2.2 Fixed Effects Model

The FE-model is a model that controls for omitted variables in the data if these varies across entities but are static over time (Stock & Watson, 2015). When regressing panel data using the FE-model the output contains an individual intercept for each entity. This intercept is most often represented using an indicator variable taking the value 1 for the entity the intercept corresponds to and 0 otherwise. These intercepts will therefore contain all omitted variables that are different across entities but stays constant over time. However, it will not capture differences that occur across time. It is important to note that one can also use a model with time fixed effects. With this model, one control for effects that are constant across

entities but changes over time. The relevant model for regressing our data with an FE-model is as follows:

$$(Eq.2) \quad AEM_{it} = \beta_{1i}ESG_{it} + \beta_{2i}Size_{it} + \beta_{3i}MTB_{it} + \beta_{4i}ROA_{adj_{it}} + \beta_{5i}LEV_{it} + \beta_{6i}Growth_{it} + \beta_{7i}Beta_{it} + \beta_{8i}Indep_{it} + \beta_{9i}Expe_{it} + \alpha_i + \varepsilon_{it}$$

where $i = 1, \dots, 39$ and $t = 2003 - 2018$

According to Griffiths, Hill & Lim (2018) a model like equation 2 may yield problems if either T or N is small, as there will be too few observations to cover all variables. Our data set consists of 16 periods and 39 entities which should be sufficiently large to sustain this. One option, however, according to Griffiths et al. (2018) is to rewrite the model as follows:

$$(Eq.3) \quad AEM_{it} = \beta_1ESG_{it} + \beta_2Size_{it} + \beta_3MTB_{it} + \beta_4ROA_{it} + \beta_5LEV_{it} + \beta_6Growth_{it} + \beta_7Beta_{it} + \beta_8Indep_{it} + \beta_9Expe_{it} + \alpha_i + \varepsilon_{it}$$

where $i = 1, \dots, 39$ and $t = 2003 - 2018$

In this model all differences between entities, or individual heterogeneity as it is called, is assumed to be contained within the intercept. This intercept is what the model refers to as the FE. By applying this notation, one rules out the need to calculate coefficients for all variables for each entity. As stated by Griffiths et al. (2018) this is highly beneficial when working with small data sets.

In order to assess which model to use we will use the Joint F-test which is presented when conducting a FE-regression in Stata. The null hypothesis of this test is that the best model to use is a Pooled OLS-model (Wooldridge, 2020). Additionally, we conduct the Hausman Test to test the strength of the FEs in the data set. How this test is conducted will be presented in the following section.

5.2.3 Random Effects Model

As opposed to the FE-model, the RE-model will consider both within and between effects in the data, i.e. changes both over time (within) and across entities (between). When applying the RE-model, unobserved variables will be assumed to be uncorrelated with all the explanatory variables (Griffiths et al., (2018)

Additionally, according to Griffiths et al. (2018) the main difference between the FE-model and RE-model is that the entities used in the analysis is selected at random, and that the individual effects between them are random rather than fixed.

The data collection and how this affects the randomness of the data is presented in the next chapter.

Some prior studies on the sustainability and EM relationship have applied the RE-model (Amar & Chakroun, 2018; Velte, 2019) and it is thus likely that the same relationship among entities exists in our data set. Our model can be specified as equation 4 to capture these effects:

$$(Eq. 4) \quad AEM_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 Size_{it} + \beta_3 MTB_{it} + \beta_4 ROA_{it} + \beta_5 LEV_{it} + \beta_6 Growth_{it} + \beta_7 Beta_{it} + \beta_8 Indep_{it} + \beta_9 Expe_{it} + u_i + \varepsilon_{it}$$

where $i = 1, \dots, 39$ and $t = 2003 - 2018$

To assess whether there are any REs we incorporate the Breusch-Pagan Lagrangian Multiplier Test for random effects (BPLM). This test has a null hypothesis that there are no REs in the data. If the null hypothesis can be rejected, there exists REs (Breusch & Pagan, 1980).

If both the F-test and the BPLM reject the null hypothesis we will use the Hausman Test (HT) to assess which effect is stronger. The HT tests whether the individual effects are correlated with the regressors in the model or not.

The null hypothesis of the tests is that the individual effects are uncorrelated with any regressor in the model (Hausman, 1978). If the null hypothesis is not rejected both models are consistent, but the FE-model will be inefficient. If the null hypothesis is rejected, the FE-model will be consistent, while the RE-model will be inconsistent and biased. In short, if the null hypothesis is rejected, we will choose the FE-model, and choose the RE-model if not rejected. The outcome from all model choice tests will be presented in chapter 7.1.

5.3 Validity

The result from the model selection tests show that the RE-model is the most suitable to investigate the research question, as presented in chapter 7.1. This next section will look at the requirements for the results to be valid.

Omitted Variable Bias

There are two primary conditions that must be met for omitted variables to lead to omitted variable bias: Firstly, the omitted variable must be correlated with the dependent variable. Secondly, it must be correlated with at least one of the independent variables included in the model. The result of omitted variable bias is that it makes the estimator inconsistent. The variables included in our model are similar to the previous literature, and their studies on the relationship between sustainability and EM (Bozzolan et al., 2015; Gallego-Álvarez et al., 2015; Velte, 2019). There are several factors that could be included in the model. However, it is important to find the right balance between a high number of variables, which can yield increased goodness-of-fit, and few variables which can yield a lower estimator variance, as degrees of freedom is reduced when including more variables.

Selection Bias

Sample selection bias can be a threat to a study's internal validity. According to Stock and Watson (2015) sample selection bias is often a result of missing data, where they define 'missing' as related to the selection process of entities based on the dependent variable. As presented previously, our data is not selected through random sampling as we have needed companies who have ESG-scores reported over a sufficiently long time period. Sample selection bias can in turn result in inconsistent estimators. The reason for this is that companies can chose to report on ESG-performance score enhancing data, based on internal motivation to showcase their corporate sustainability activities. Additionally, companies who refrain from reporting ESG data may do this due to low internal focus on sustainability and other ESG-factors. This could lead to the data set being skewed towards a higher average ESG-score than what is the true case. The drawback of inconsistent estimators is that this thesis may not be generalizable to other companies in Norway, but rather only be valid for the entities in this study.

Large Outliers

The definition of outliers is not very clear. The general thought is that an outlier is a data point which deviates considerably from the rest of the data set. Large outliers can be a product of a mistake with regards to the entry of data into the database. If it is not due to an entry mistake, it could be an actual outlier with different attributes than the rest of the data set. Such outliers may pull the estimations too much in either direction. This assumption requires us to be mindful of how the data looks.

Heteroskedasticity

This assumption requires that the random errors be homoscedastic, implying that the variance of the random error terms are constant for any value of the fitted value. If this assumption is violated the estimations will be consistent, however, the standard errors of the regression will be incorrect. The quickest and easiest way to assess heteroskedasticity in the error terms of panel models is by plotting the predicted residuals, i.e. error terms against the fitted values of the regression. One can then inspect the pattern of the residuals and assess whether these show any sign of increasing variance with increasing or decreasing fitted values. If there is heteroskedasticity in the error terms, one can use options in most statistical software to compute robust standard errors (Griffiths et al., 2018).

Endogeneity

For the estimates to be consistent there must be no endogeneity in the model. Endogeneity occurs when the error term is correlated to one or more of the independent variables (Croissant & Millo, 2018). This occurs mainly for two reasons: simultaneity or omitted variables. As presented above there is always the threat of omitted variables when working with data not generated through a lab experiment or similar. Additionally, our thesis is based on a bidirectional relationship between ESG and EM, i.e. we do expect there to be a simultaneous relationship between these two factors, which again can result in endogeneity in the model. The problem of endogeneity is said to be common in RE-models as the individual-specific error term, α_i can be correlated with some of the regressors (Griffiths et al., 2018).

Multicollinearity

An important assumption when working with multiple regression models is that there is no perfect multicollinearity (PM). The problem of multicollinearity arises when one or more of the independent variables are correlated with others of the independent variables (Griffiths et al., 2018). We distinguish between perfect and imperfect multicollinearity (IM). PM is the most adverse, but least probable, form of multicollinearity as it means that at least one of the variables is a perfect linear combination of the others. This means that they both explain the exact same variance in the dependent variable. PM will make it impossible to perform a regression over the variables, and most statistical programs will aid with adjusting the model to prevent this. IM, on the other hand, occurs when two or more variables are highly correlated to each other, thus explaining some of the same variance in the dependent variable. IM can therefore result in imprecise regression coefficients.

Testing for multicollinearity is not uncomplicated. However, by producing a correlation matrix one can inspect the correlation between the different variables and assess whether there are any of them that have a high correlation with each other. A correlation matrix will indirectly show if there is imperfect multicollinearity among the variables. However, it will not capture if there is a relationship between two variables and a third, i.e. the sum of variable one and two is highly correlated with variable three. The correlation matrix can be seen in chapter 6.2

The multicollinearity of included variables can be tested by applying the variance inflator factors (VIF) test. As the VIF test is produced to test for multicollinearity in simple ordinary least squares regressions (OLS) it cannot be directly applied to panel data regressions. However, by running an OLS regression with entity and time specific indicator variables one can see if there is any sign of multicollinearity. It is generally accepted that the lower the VIF, the lower the probability that there exists multicollinearity in the model. In addition, Anderson et al. argues that a VIF below 10 poses no real threat to the estimation (Anderson, Babin, Black, & Hair Jr., 2013)

Autocorrelation

Autocorrelation, or serial correlation as it is sometimes referred to, is a situation where there is correlation across time. This form of correlation will often occur in data with a time-series structure, and means that something that happens in time period t will happen in time period $t + 2$ (Stock & Watson, 2015). Autocorrelation can also occur in the error term u_{it} if there is autocorrelation among the omitted variables. As autocorrelation produces a bias in the standard errors which in turn makes the results less efficient, it is important to detect and counter the effect in the data. To detect autocorrelation in the data, a code for the Wooldridge test will be applied as it was proposed by David Drukker (2003). Drukker wrote a code to be used in Stata in order to find the degree of autocorrelation in the data set.

Measurement Error

With any types of secondary data, i.e. data downloaded from databases, there will be a risk of the data being measured wrongly or containing typing errors. Our data is entirely collected from Eikon's database DataStream. There are especially two advantages from this. Firstly, having all data collected from the same database will result in a consistent measurement of variables and ratios as they have been produced in the same system. Secondly, Eikon is a large international provider of statistical data where they have systems for accurately collecting and producing the variables, meaning that there is a low probability that there will be measurement errors.

The section in this thesis with the highest probability of measurement error is how rating agencies calculate the ESG-score of companies. The calculation differs among agencies, as a result of there not being a standardized procedure. This risk is mostly neutralized by using only data from Eikon on ESG-scores, although reducing the amount of data available, but making sure that all scores are calculated on the same basis.

Additionally, issues may arise from the way variables and ratios used in the EM-models are computed and calculated in order to detect and calculate the amount of EM in the companies. However, as this is done consistently over all firms, and the input comes from the same data source, we see it as a low probability that we will have measurement error in our data.

6.0 Data

This part of the thesis focuses on the data used in our model, how it has been collected and how each variable is related to each other. This part is divided into three main sections: dependent variable, independent variables, and control variables. In the section regarding the independent variable AEM, we will present the data used to calculate this variable.

6.1 Variable Description

The data used in this thesis is collected from Thomson Reuters Eikon. Through Eikon DataStream it is possible to collect time-series data on a vast number of company metrics. In order to look into the relationship between ESG and EM in Norway a selection of companies has to be made. This study consists of a rather small but varied selection of companies. The initial number of firm years in the analysis was 353, but after including control variables we are left with 159, due to missing data.

As the study is aimed at the Norwegian market, only companies listed on the Norwegian Stock Exchange has been considered in the selection process. Furthermore, as with prior studies (Bozzolan et al., 2015; Gallego-Álvarez et al., 2015a; Velte, 2019) financial companies have been excluded from the sample as the business model of these companies are considerably different from non-financial firms. This difference is mainly attributed to the difference in asset structure (Fama & French, 1992). Additionally, a study on the valuation of firms finds significant effects from excluding financial firms when studying the effect of different value driving factors (Foerster & Sapp, 2005). Thus, they are not easily comparable to the other companies on the Exchange and should therefore be excluded.

Due to the limited number of companies with ESG-reporting over a long period of time, we have chosen to also include entities which first started reporting later than 2003. This has produced an unbalanced data set. However, we see the value of an increased data set as outweighing the negative effects of this unbalance. The full list of companies is presented in the Appendix I.

As argued in 5.3, in order to apply the RE-model, the sample must be selected at random. The entities in our data set cannot be viewed as picked fully at random, as

this thesis includes next to all the companies and years with accessible data. However, a certain degree of randomness can be attributed to which companies did in fact have attainable data in order to calculate EM. In addition, companies who have been unlisted for certain periods have been excluded, adding to the randomness of the data set.

6.1.1 Dependent/Independent Variable

As the emphasis in the thesis is to look into the bidirectional relationship between ESG and EM, there will be two regressions: AEM as the dependent variable with ESG as the independent, and ESG as the dependent with AEM as the independent. This next section will present these two variables in turn.

Earnings Management

This thesis will be based on AEM. The reason for this being that Velte (2019) finds no significant relationship when looking at ESG on REM. Additionally this limits the extent of our thesis. AEM is a form of manipulation of the accruals that is said to be within-GAAP. This form of EM is based on discretionary choices of accrual accounting. In this lies choices like depreciation rates, calculation of bad debt and how inventory is valued. The use of accruals manipulation can produce a skewed picture of the company's financials.

As opposed to the ESG-scores, which can be collected directly from Eikon, the EM must be calculated using accounting figures from the companies studied. There are a few models created to detect EM, as presented in the literature review of this thesis. This thesis will be based on EM-calculation using the Modified Jones Model of Dechow et al. (1995) and controlling for firm-performance as proposed by Kothari et al. (2005). By running a regression between total accruals (TA) and scaled changes in revenue and scaled property, plant, and equipment (PPE) and controlling for lagged ROA, it is possible to calculate each company's DA:

$$(Eq. 5) \quad \frac{TA_{it}}{A_{t-1}} = \beta + \beta_1 \frac{1}{A_{t-1}} + \beta_2 \frac{(\Delta R_{it} - \Delta Rect)}{A_{t-1}} + \beta_3 \frac{PPE_{it}}{A_{t-1}} + \beta_4 ROA_{t-1} + \varepsilon_{it}$$

The AEM is calculated as the residual of the regression in equation 5. The calculation in this thesis is based on the code work of David Veenman (2019). The study of this thesis will focus on income increasing EM and will therefore only include positive AEM values in the model. Like mentioned in the introduction, the

motivation behind performing EM is often due to managers having incentives in the form of bonuses if they reach certain performance goals (Diri, 2018). Furthermore, as presented in chapter 3, both agency theory and stakeholder theory support the notion that managers will apply ESG activities to hide such opportunistic behavior. Thus, we choose to only include income increasing EM in the study.

The model used to study the relationship between ESG and EM was presented in chapter 5.2 and is based on the extensive literature on this relationship, and especially that of Velte (2019) as this is one of the most recent studies and is conducted in a Northern European country.

Thomson Reuters ESG-Scores

In order to analyze the relationship between the ESG performance score and the EM of companies, the companies in our data must have an ESG-score. Filtering the companies based on the availability of the ESG-scores, means that we only include firms with ESG-scores in the database in at least one of the years in the period 2003-2018. This screening may lead to a selection bias and is discussed in chapter 5.3. The screening resulted in 39 companies (Appendix I) with the timespan 2003-2018.

There are several rating agencies measuring the ESG performance of companies, such as EIRIS, Bloomberg, MSCI's, Sustainalytics and Thomson Reuters, to mention some (Novethic, 2013). Deciding which agency to collect data from is difficult as the main criticism is that the calculation methodologies differ between all agencies (Siew, 2015). Hence, there is no regularity and standardized procedure in the way the ESG-score is being measured. This absence of overall regularity cannot be accounted for in this study when choosing which agency to use to collect ESG-score.

The Thomson Reuters ESG rating was chosen due to their comprehensive ESG rating database. The transparency regarding Thomson Reuters ESG rating's methodology is also of huge importance as company disclosure is at the core of their methodology (Refinitiv, 2020). According to Siew (2015), one of the main concerns of ESG rating is the lack of disclosure on the relevant factors from companies. The Thomson Reuter ESG rating takes this into consideration and

companies that do disclose more relevant information will be recognized for this (Refinitiv, 2020).

The Thomson Reuters ESG rating is collected from the database Eikon. In 2016, Thomson Reuters changed their sustainability reporting tool from the ASSET4 rating to Thomson Reuter ESG. The new Thomson Reuter ESG rating dates back to 2002 but does not cover nearly as many companies as for the ratings done recent years. The ESG universe consists of 9 000 companies globally and unless there is a special event affecting the ESG rating, the scores are updated annually. 186 underlying comparable measures goes into the calculation of the ESG-score and are based on comparability, impact, data availability and industry relevance. These are grouped into ten categories that reformulates the three Pillar Scores and the final ESG-score.

The scoring is based on more than 450 ESG measures, which the Thomson Reuters analysts process manually for each company. The data is collected from annual reports, company websites, NGO websites, stock exchange filings, CSR reports, and news sources. In order to ensure exceptional data quality, Thomson Reuters use a combination of both algorithmic and human processes. There are both 400 built-in functions and 300 automated quality check screeners running on the data prior to independently done audits, also to ensure data quality (Refinitiv, 2020).

Thomson Reuter's industry grouping is used to benchmark the environment, social and governance score for the firms. This means that the comparisons are done to companies within one category. Each score within each of these categories lies between zero and a hundred. The score considers companies in the same category, the number of companies with scores and how well they performed. The formula in figure 1 is provided by Thomson Reuters' Refinitiv (2020) and explains how the score is calculated.

$$\frac{\text{Firms with a worse value} + \frac{\text{Firms with the same value included in the current one}}{2}}{\text{Firms with a value}}$$

Figure 1: Equation for calculating each of the pillar scores based on number of peers performing worse or similar on the pillar components.

6.1.2 Control Variables

This section will explain the control variables used in the model of our thesis, applied to calculate the relationship between EM and ESG. Control variables are included in order to capture some of the effects that would otherwise have been left in the error term. Inclusion of relevant control variables greatly reduces the chance of omitted variable bias and thus inconsistent results.

We base the regression of the relationship between ESG and EM on the following equation:

$$(Eq. 6) \quad AEM_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 Size_{it} + \beta_3 MTB_{it} + \beta_4 ROA_{it} + \beta_5 LEV_{it} + \beta_6 Growth_{it} + \beta_7 Beta_{it} + \beta_8 Indep_{it} + \beta_9 Expe_{it} + u_i + \varepsilon_{it}$$

where ESG is the total ESG-score for each company in each time period as explained above in the sub-chapter *Thomson Reuters ESG-Scores*.

SIZE is the natural logarithm of the market value of equity. This variable is included, as prior studies have found that there is a relationship between size and EM (Roychowdhury, 2006), and between size and CSR (Kim et al. 2012; Prior et al. 2008), which is closely related to the ESG-scores used in this thesis. Due to these findings there is a high chance that excluding this variable could lead to omitted variable bias.

MTB is the market-to-book value of the equity. *MTB* is included as the relationship between the market value of the equity and the book value of the equity captures some of the market's expectations related to future earnings. As EM to some extent can be seen as manipulation of earnings to smoothen these towards the market expectations, it is natural to expect that there is a relationship between the *MTB*-ratio and EM. Additionally, since *MTB* captures the market's expectation to the company's future earnings it also shows an expectation towards the growth of the company. Roychowdhury argued that growth opportunities have an ability to explain a significant portion of EM (2006), it is however worth noting that this is mostly related to REM which will not be applied in this thesis. The relationship between *MTB* and EM is still of such an important degree that it is included in the model.

Adjusted *ROA*, or return on assets, is included to isolate the ethical consideration of ESG on EM by controlling for effects of financial performance. Financial performance is an important motivation for managers to conduct EM, and by including ROA as a control variable it will be possible to include the effect from financial performance from the relationship. The ROA of each company is adjusted by the mean of the industry, thus capturing the ROA above/below the industry average.

LEV is the long-term debt of the company, scaled by its total assets, and is included to control for the leverage of each firm. The capital structure of the company can have a tremendous effect on EM. Firms with a high degree of borrowed capital can become in breach of their loan covenants and could therefore be interested in managing their earnings to prevent this from happening. Based on this it is natural to expect a positive relationship between leverage and EM.

GROWTH is the logarithmic change in sales between year $t - 1$ and year t . The variable captures if the company has seen an increase or decrease in sales. Based on previous literature it is natural to assume a negative relationship between *growth* and EM (Bozzolan et al., 2015; Velte, 2019).

BETA captures the systematic risk of the company through the beta factor. A study on CSR and EM finds there to be a relationship between social responsibility and a firm's cost of capital (Banerjee et al., 2016). Furthermore, in the three-factor model of Fama & French (1993), systematic risk captured by the beta factor explains most of the company specific risk. Due to this, the variable Beta is included to incorporate the effect of firm risk in our model.

INDEP is based on the percentage of independent board members in the Board of Directors (BoD). An independent member of the board is an individual with no obvious ties to the company (Mellette & Hogler, 1995). The independent board members function as a control mechanism, making sure that decisions are made to increase company value. Due to this, we expect a negative relationship between the independence of board members and EM. Like the study of April Klein (2002), we have chosen to make this variable into an indicator variable where 1 equals > 50% independent board members.

EXPE is based on the percentage of board members with industry specific competence or with profound financial skills. Experienced board members will have a thorough understanding of how the company and industry functions and will be better at detecting attempts of earnings manipulation. A negative relationship with EM is expected with this variable. This variable has been produced the same way as *Indep*.

6.2 Descriptive Statistics

Inspecting the data collected can give an idea of the general direction of relationships in our model. The two most applied forms of descriptive tabulations in prior studies (Bozzolan et al., 2015; Velte, 2019; Choi et al. 2013) have been correlation matrices and summary statistics over the mean, median, standard deviation, maximum and minimum values. These are two fast and straightforward ways of inspecting the data and the relation between the different components of the model. Furthermore, the correlation matrix can be used to discover any combination of variables that may result in multicollinearity, as argued in chapter 5.3.

	dac	ESG	ESGE	ESGS	ESGG	growth	size	mtb	lev	beta	roa_adj	indep	expe
dac	1.0000	-0.0144	0.0117	0.0168	-0.0912	0.0550	-0.0810	0.2330	0.0439	0.2768	0.3044	-0.1970	0.0502
ESG	-0.0144	1.0000	0.9374	0.9490	0.6480	-0.0707	0.4828	-0.1049	-0.3456	-0.1636	-0.0770	0.3091	-0.1848
ESGE	0.0117	0.9374	1.0000	0.8646	0.4590	-0.1169	0.4223	-0.1336	-0.3434	-0.1604	-0.1091	0.2040	-0.1824
ESGS	0.0168	0.9490	0.8646	1.0000	0.4582	-0.0980	0.4299	-0.0814	-0.2912	-0.1514	-0.0594	0.2324	-0.1867
ESGG	-0.0912	0.6480	0.4590	0.4582	1.0000	0.0933	0.4418	-0.0433	-0.2812	-0.0789	0.0096	0.4723	-0.0724
growth	0.0550	-0.0707	-0.1169	-0.0980	0.0933	1.0000	0.1512	0.0964	0.2579	-0.1515	0.2731	0.1316	0.005
size	-0.0810	0.4828	0.4223	0.4299	0.4418	0.1512	1.0000	0.1570	-0.2375	-0.2641	0.0920	0.1306	-0.0603
mtb	0.2330	-0.1049	-0.1336	-0.0814	-0.0433	0.0964	0.1570	1.0000	-0.0427	0.0712	0.1653	0.0943	-0.002
lev	0.0439	-0.3456	-0.3434	-0.2912	-0.2812	0.2579	-0.2375	-0.0427	1.0000	-0.0059	0.0879	-0.1038	0.1041
beta	0.2768	-0.1636	-0.1604	-0.1514	-0.0789	-0.1515	-0.2641	0.0712	-0.0059	1.0000	-0.0807	-0.1188	0.1817
roa_adj	0.3044	-0.0770	-0.1091	-0.0594	0.0096	0.2731	0.0920	0.1653	0.0879	-0.0807	1.0000	0.1033	-0.0241
indep	-0.1970	0.3091	0.2040	0.2324	0.4723	0.1316	0.1306	0.0943	-0.1038	-0.1188	0.1033	1.0000	-0.2429
expe	0.0502	-0.1848	-0.1824	-0.1867	-0.0724	0.005	-0.0603	-0.002	0.1041	0.1817	-0.0241	-0.2429	1.0000

Table 1: This table presents the Pearson Correlation Matrix with the correlation coefficients of the ESG-performance score (and the pillar scores), dac and the control variables. The variables are defined in table A4.

There are some interesting observations that can be made from table 1 on the previous page. There is a high correlation between the three ESG-pillars and the combined ESG-score. This is as expected as the ESG-score is a product of the three pillars and thus should move in the same direction. Additionally, there are some other interesting results that can be interpreted from the matrix. Firstly, there is a rather high positive correlation between the percentage of independent board members and the ESG-score. Secondly, there is a negative correlation between our two main variables, ESG and DA (here *dac*). This is in line with our general understanding that increased ESG-score results in a decrease in EM. Additionally, as we seek to look into the bidirectional relationship between ESG and EM, it is interesting to see that most control variables in this matrix is negatively correlated with ESG.

It is also interesting to see the correlation between the different ESG-pillars and *indep* i.e. the percentage of independent board members. The correlation is rather high and positive, implying that firms with a higher degree of independent members in the board may have a higher focus on ESG than firms with lower percentages.

The correlation matrix does not tell the user about the effects one variable has on another but gives instead a general understanding and is a quick method to find areas where multicollinearity can pose a threat. It is generally accepted that a strong correlation exists when $corr > \pm 0.5$. Except for between the pillars, there are no variables with correlation above 0.5. As we have no strong correlation, we assess the threat for multicollinearity to be low. We will however test this thoroughly by performing a VIF-test. The output from this test will be presented in chapter 7.2.

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
dac	286	0.035	0.021	0.042	0	0.208
ESG	331	0.42	0.41	0.23	0.021	0.914
ESGE	331	0.37	0.39	0.29	0	0.969
ESGS	331	0.44	0.40	0.27	0	0.966
ESGG	331	0.47	0.45	0.23	0.023	0.942
growth	569	0.107	0.07	0.456	-3.201	4.342
size	533	15.95	15.9	1.707	9.795	20.18
mtb	529	3.363	1.91	6.793	-53.43	86.63
lev	579	0.264	0.20	0.263	0	2.227
beta	529	1.035	1.00	0.574	-3.060	3.910
roa_adj	578	0.003	0.03	0.209	-1.725	1.953
indep	641	0.281	0.00	0.450	0	1
expe	641	0.197	0.00	0.398	0	1

Table 2: This table presents the summary statistics for the analysis between ESG and EM in this study. It presents the number of observations per variable, their mean, median, standard deviation, minimum, and maximum value. A description of each variable is presented in table A4.

As mentioned above, any DA with negative values are excluded as we seek to study the relationship between ESG and income increasing EM. This results in *dac* ranging from 0 to 0.208. It is also evident from table 2 that there are large deviations in the ESG-score and its underlying pillars. This can be seen both from the Std. Dev. and the large range between *min* and *max*. This is in line with our expectations, as our sample of companies consists of several companies from widely different sectors.

Additionally, we can see from the min and max values of *growth*, *mtb* and *roa_adj* that these values range between both high and low and have rather large standard deviations. This can mainly be attributed to some of the companies in our sample being young, or sustaining severe value drops in our period, for example from the financial crisis in 2008. The effect of these values will be discussed in chapter 8 under limitations.

7.0 Results

This section of the thesis will present the results of the tests for model choice as well as the results from the regressions. Furthermore, we will present the findings and discuss them in light of prior research and the theory presented in chapter 3.

7.1 Model Choice

As stated in chapter 5.2 we will apply the F-test, Breusch-Pagan Test and Hausman Test to choose the best panel data model to use in our regression. As this thesis is based on four regressions, modeling the relationship between the different ESG-pillars and EM, we will below present a table where the results of the model choice tests are displayed with corresponding p-values from the tests.

	F-Test	Breusch-Pagan	Hausman Test	Model Choice
ESG on EM	0.0036*	0.0001*	0.6151	RE-model
ESGE on EM	0.0038*	0.0001*	0.6017	RE-Model
ESGS on EM	0.0018*	0.0000*	0.6531	RE-Model
ESGG on EM	0.0018*	0.0000*	0.4728	RE-Model

*Table 3: This table presents the output from the model specification tests F-Test, Breusch-Pagan, and Hausman Test. The result from the three tests state that either an FE-model or RE-model should be used instead of a Pooled OLS and that of these two the random effects are strongest. The tests and how they are conducted are presented in chapter 5.2.2 and 5.2.3. *Indicate that H_0 is rejected at 5% level.*

Based on the results from the F-Test and the Breusch-Pagan test it is clear that the data contains characteristics such that both the RE-model and the FE-model is preferred over the Pooled OLS-model. The results from the Hausman Test tells us that we cannot reject the null hypothesis, stating that the RE-model is the preferred model for this study. This is in line with previous studies within the field of the relationship between EM and ESG/CSR (Velte, 2019; Amar & Chakroun, 2018). Additionally, it is in line with our expectations of the data having effects both within and between entities.

7.2 Validity

This section of the results chapter will go through the results from tests regarding the validity of our data. These tests have been used to control the validity and generalizability of the thesis. The focus in this section has been to assess and control for multicollinearity, autocorrelation and heteroskedasticity.

When performing a test of multicollinearity with panel regressions, such as the RE-model used in this thesis, it is not possible to use the variance inflation factors (VIF) test directly. However, by performing an ordinary least squares regression and including entity and time specific indicator variables, we can perform the general VIF test. The VIF test indicates no multicollinearity as the mean VIF is given as 3.36 for the relationship between ESG and EM, and no individual VIF exceeds 10. Furthermore, inspecting the correlation matrix in the chapter 6.2 tells us that there are no especially high correlations among variables. Based on this we conclude that the threat of multicollinearity in our model is neglectable.

In order to assess if there exists any autocorrelation in our data, we have applied the Wooldridge test for serial correlation (Drukker, 2003). The test has a null hypothesis that there is no first order autocorrelation. The p-value of the test is 0.6166 and we can therefore not reject the null hypothesis. As the test does not give witness of any serial correlation, we do not see it necessary to use measures in order to obtain serial correlation-consistent standard errors. We are not able to perform cross-sectional correlation computations on the data, as it is too unbalanced for the Pesaran test to function. However, we do not expect there to be high correlations between entities in our data set, as they are separate listed companies. Thus, the threat of cross-sectional autocorrelation can be expected to be limited in this study.

We have performed a visual assessment of the distribution of residuals across fitted values to assess whether there exists a problem of heteroskedasticity. We can see no clear trend of heteroskedasticity in the distribution. However, we will perform a test of robustness to heteroskedasticity by implementing robust standard errors in the regression (Petersen, 2009). The results will be presented after the regression outputs below.

7.3 Regression Results

The output from the regressions will be presented in this next part. Contrary to studies like Velte (2019) and Choi et al., (2013) we mainly find a positive relationship between ESG and EM. This is, however, in line with the findings of Francoeur, Gargouri & Shabou (2010) who in their study found a positive relationship between CSR and EM. It is furthermore worth noting that the coefficients of the relationship in our study is very small, implying that there exists a significant and positive relationship albeit with very little effect.

7.3.1 ESG on Earnings Management

This is the initial hypothesis of this thesis as it investigates the relationship between EM and the overall ESG-score. Table 4 shows the output from the RE panel data regression presented in the chapter 5.2

The specific equation used in this regression is given as:

$$(Eq. 7) \quad AEM_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 Size_{it} + \beta_3 MTB_{it} + \beta_4 ROA_{it} + \beta_5 LEV_{it} + \beta_6 Growth_{it} + \beta_7 Beta_{it} + \beta_8 Indep_{it} + \beta_9 Expe_{it} + u_i + \varepsilon_{it}$$

where $i = 1, \dots, 39$ and $t = 2003 - 2018$

	Coefficient	Std. Err.
ESG	0.043896***	0.0167
growth	0.010038	0.0106
size	-0.003938	0.0026
mtb	0.001389**	0.0004
lev	0.006432	0.0128
beta	0.019411***	0.0068
roa_adj	0.113517***	0.0268
indep	-0.022512***	0.0063
expe	-0.003165	0.0060
R-sqr	0.2972	
Obs.	159	

Table 4: This table presents the regression output from our regression of ESG on EM and controls, over the period 2003-2018 on the whole sample of available data. The variables are described in table A4. *** and ** indicates a significance at the 1% and 5% level, respectively.

Based on prior studies we expected a negative relationship between ESG and EM. However, as can be seen from table 4, the relationship between ESG and EM in this study is positive, albeit very small. Furthermore, the effect is statistically significant at the 1% level. The ESG-score used in this regression has been adjusted so that it

ranges between 0 and 1 rather than 0 and 100. As can be seen from the regression output an increase in ESG-score of 1 implies an increased EM of 0.000439, i.e. the effect is close to negligible. We can see from the R^2 that the explanatory power of the model is rather high, telling us that 29.72% of the variance in the AEM can be explained by the independent variable and the control variables.

That the relationship is positive is surprising based on most prior research (Velte, 2019; Fernández et al., 2016; Choi et al., 2013; Bozzolan et al. 2015), and our expectation that companies with higher ESG-scores would be less inclined to performing such actions. This will decouple the relationship between the sustainable and ethical perspective of ESG and the mischievous perspective of indulging in EM.

Some studies looking at the relationship between sustainability and EM present that there might be a possible reason for why one can obtain a positive relationship between, in their case CSR and EM, despite them getting results of a negative impact of CSR practices on EM (Fernández et al., 2016). According to them, managers participating in opportunistic behavior may use CSR activities to mask this behavior from stakeholders. This corresponds to the entrenchment strategy proposed by García-Sánchez & Martínez-Ferrero (2015) and that managers will seek to hide their use of EM, according to the agency theory (Jensen & Meckling, 1976). Furthermore, it is in line with the study of Francoeur et al. (2010) where they documented a positive relationship of CSR on EM. Additionally, according to Prior et al. (2008) CSR-activities can be one way managers compensate stakeholders for the value depriving effects of EM. This form of compensation can be seen in light of the stakeholder theory, presented earlier in this thesis, as a way of maintaining a good relationship to the stakeholders of the company.

As can be seen from the regression output, several of our control variables are statistically significant. As mentioned in chapter 6.1.2, these variables have been chosen as they represent interesting firm specific attributes that can affect EM. Additionally, these are most of the generally accepted control variables used in other studies investigating the relationship between ESG/CSR and EM (Prior et al., 2008; Choi et al.; 2013; Bozzolan et al., 2015; Fernández et al., 2016; Velte, 2019). Beta, adjusted ROA, and percentage of independent board members are statistically significant at the 1% level. The market-to-book ratio is statistically significant at the 5% level. This deviates somewhat from the study of Patrick Velte (2019). Most

of the significant control variables in his study are also significant in our study. Surprisingly, however, is that while in his study he finds that Size is significant while market-to-book ratio is not significant, we find the opposite relationship. A reason for this is difficult to determine, but there might be a relationship between market value and book value existing in Norway, that is not evident among the German companies in his study. The control variables have a different sign from his study. This can be due to his study focusing on the absolute value of AEM, while this study has focused only on income increasing AEM, i.e. only the positive values of AEM.

As there is a fine line between ESG and CSR today, as presented in chapter 1, it is reasonable to draw a similar conclusion based on our positive relationship between ESG and EM. The basis for using ESG rather than CSR comes down to the increasing shift towards focusing on the environmental effects of business production and how ESG provides a fuller picture of sustainability. CSR does not fully capture this environmental effect of business and as the world begin to focus more and more on how we affect the environment with our production, consumption, and leisure activities, more and more attention will be focused on companies' ESG-performance.

7.3.2 Pillar Scores

Patrick Velte (2019) found a statistically significant negative relationship between all of the pillars and EM when regressed separately. As stated earlier in this thesis, there has been increased focus on the environment and how business processes affect the environment. Using ESG rather than CSR introduces this effect into the assessment of the relationship between sustainability and EM and has previously been studied to a small degree. Additionally, as presented in chapter 2.1 this provides the opportunity to analyze the relationship more thoroughly by assessing each of the pillars' effect on EM separately. Our hypothesis has been set based on this and the relevant regression for this relationship is:

$$(Eq. 8) \quad AEM_{it} = \beta_0 + \beta_1 Pillar_{it} + \beta_2 Size_{it} + \beta_3 MTB_{it} + \beta_4 ROA_{it} + \beta_5 LEV_{it} + \beta_6 Growth_{it} + \beta_7 Beta_{it} + \beta_8 Indep_{it} + \beta_9 Expe_{it} + \alpha_i + u_{it}$$

where $i = 1, \dots, 39$ and $t = 2003 - 2018$

Running the RE-model of equation 8 yielded the following regression output.

	ESGE	ESGS	ESGG
Pillar	0.035442***	0.034662***	0.008436
growth	0.010468	0.011313	0.006808
size	-0.003482	-0.003420	-0.001310
mtb	0.001393***	0.001321***	0.001214***
lev	0.006165	0.005201	0.000763
beta	0.020066***	0.018901***	0.018579***
roa_adj	0.113300***	0.1114745***	0.106679***
indep	-0.020622***	-0.020623***	-0.019490***
expe	-0.002804	-0.003022	-0.004073
R-sqr	0.3009	0.2894	0.2597
Obs.	159	159	159

Table 5: This table presents the output from the regression of the different pillars on EM and controls, over the period 2003-2018 on the whole sample of available data. The "variable" pillar represents the coefficient of each of the pillar scores on EM. The variables are described in table A4. *** and ** indicates a significance at the 1% and 5% level, respectively.

The coefficients of ESGE and ESGS are positive and statistically significant at the 1% level. The ESGG coefficient is not significant at any conventional significance levels and is even smaller than the other coefficients. These results are in line with the regression of the full ESG-score, but contradictory to the findings of Velte (2019). The significance of the control variables is similar to the full score regression, although *mtb* is significant also at the 1% level in these models. Additionally, we can see a similar R-squared compared to the full-score regression.

The findings coincide with the findings of our initial regression, and the arguments of Prior et al. (2008). According to them, management could be using the components of ESG, either in order to compensate stakeholders, or to shift the focus away from the earnings manipulation. Focusing on environmental activities can have an effect by signaling to investors that the company focus on good use of resources and innovation. A focus on social responsibility announces to stakeholders that the company cares about the community and human rights. While using measures to increase the governance score can give stakeholders a false impression that there exist good control measures within the company that would reveal earnings manipulation.

A few other studies illustrate the same relationship as our analysis does (Azim, Khan, & Muttakin, 2015; Patten & Trompeter, 2003; Gargouri et al., 2010).

Additionally, one study finds a positive relationship between EM and a company’s cost of capital and between CSR and corporate reputation, arguing that CSR can be used by managers to shield the company against negative effects of EM (Banerjee et al., 2016). This is in line with both the theory presented by Fernández et al. (2016) and the arguments of Prior et al. (2008).

7.3.3 Bidirectional Relationship

Several of the studies researching CSR and EM have used EM as the independent variable and CSR as the dependent. Based on this, and the bidirectional perspective in the study of Velte (2019) and of Gallego-Álvarez et al. (2015), we will in this section assess the bidirectional relationship. As stated earlier in this chapter, we have chosen to solely look at the relationship between EM and ESG-score. As the results from the regression are quite similar across pillars, we assess this to be substantially sufficient to give an idea of the bidirectional relationship between EM and the pillars. Like previously stated, we will therefore assess the bidirectional relationship between EM and ESG in the following section. The model for this relationship is given as:

$$(Eq. 9) \quad ESG_{it} = \beta_0 + \beta_1 EM_{it} + \beta_2 Size_{it} + \beta_3 MTB_{it} + \beta_4 ROA_{it} + \beta_5 LEV_{it} + \beta_6 Growth_{it} + \beta_7 Beta_{it} + \beta_8 Indep_{it} + \beta_9 Expe_{it} + u_i + \varepsilon_{it}$$

where $i = 1, \dots, 39$ and $t = 2003 - 2018$

Running equation 9 gives the following regression output:

	Coefficients	Std. Err.
dac	0.771478**	0.3264
growth	-0.093056**	0.0416
size	0.062897***	0.0121
mtb	-0.003197*	0.0018
lev	-0.113661**	0.0569
beta	-0.026591	0.0311
roa_adj	-0.22633*	0.1229
indep	0.08748***	0.0260
expe	0.018411	0.0247
R-sqr.	0.4038	
Obs.	159	

Table 6: This table presents the output from the bidirectional regression of EM on ESG and controls, over the period 2003-2018 on the whole sample of available data. *** and ** indicates a significance at the 1% and 5% level, respectively

We can see from the regression output presented in table 6 that in this bidirectional analysis the regressors, all but Beta, are statistically significant. EM is significant at the 5% level and accounts for a large part of the ESG-score. The relationship is positive, which is both in line with the initial regression and with prior studies in the field (Prior et al., 2008; García-Sánchez & Martínez-Ferrero, 2015). However, as with the findings of the initial analysis, it is contrary to the findings of Velte (2019) who found it to be clear negative relationship between EM and ESG, although only significant at the 10% level.

7.4 Robustness Checks

When conducting studies such as with this bidirectional relationship, there can be several coincidences which can lead the study to yield a significant result. Due to this, it is necessary to test how changes to the model or the data affects the regression output. We have conducted some tests that we believe provide interesting insight to both the validity of the study and how robust the results are.

One relevant check of robustness for our study is to use lagged ESG-scores as the regressor. The reason for this being that there can exist an interesting and different relationship between ESG_{t-i} and EM_t as opposed to that presented in 7.3. By running the regression and lagging the ESG-score, we see that the level of significance drops and ESG is now significant at a 5% level. The relatively small change in significance from this alteration in the model is a witness of good strength in the relationship between ESG and EM in our study.

Another robustness check is to change the sample. As our sample stretches from 2003, it contains the effects of the financial crisis. Although the crisis officially started in 2008, several signs of an impending crisis materialized themselves in 2007 with the subprime meltdown starting in January 2007 (Acharya, Philippon, Richardson, & Roubini, 2009). Due to this we exclude the years 2003-2006, thus only assessing data from the financial crisis up until today to look at how this changes the regression output. The result from excluding those years is that the p-value of the ESG-coefficient increases to 0.029, meaning that the effect is only statistically significant at the 5% level. This is still a significant result and shows that limiting the sample yields significant results.

Initially, we applied the AEM-model of Dechow et al. (1995), which is not adjusting for performance. We changed the model to include performance adjustment as we

saw that including this was a more generally accepted method, based on the model proposed by Kothari et al. (2005). We have chosen not to include any of these regressions; however, they yielded the same results as our initial study, showing the effect of ESG on EM, based on the performance adjusted EM, albeit only statistically significant at the 10% level. This shows that the effect found in our main study also is consistent when using the original Modified Jones Model (Dechow et al., 1995)

As presented in the validity part of this chapter, we could have had some issues with heteroskedasticity as this is difficult to test for with panel data models. As argued earlier, one can implement robust standard errors in order to make the estimates robust to heteroskedasticity. When applying heteroskedasticity robust standard errors we get a p-value of 0.0097. In other words, the relationship is still significant at the 1% level. The conclusion from this is that the significance of our findings is also robust to using heteroskedasticity robust standard errors.

8.0 Conclusion

The objective of this thesis was to contribute to the field of sustainability analysis by studying the relationship between Environmental, Social and Governance (ESG) and earnings management (EM) in Norway. The thesis presents the following research question:

Is there a bidirectional relationship between ESG and EM in Norway?

Based on the result from the regressions, we conclude that there is a positive, albeit small effect of ESG on EM in Norway, as well as of EM on ESG. Furthermore, as the correlation between the different pillars making up the ESG-score were so high, we conducted studies on the effect of the individual pillars on the EM of the sample companies. We found it to be a positive and significant effect from the environmental score and social score on EM, while we found no significance between the governance pillar and EM. This is contradictory to the findings of Patrick Velte's bidirectional study from 2019, where the governance score actually produced the highest significance.

The positive relationship indicates that the management will increase the amount of EM as the ESG performance increases. The increased EM can result in higher short-term gains for the managers and thus give them an incentive to increase the ESG performance to conceal this (Prior et al. 2008; Banerjee et al., 2016).

Prior studies on the topic have found mixed results. However, an overweight of studies have found a negative relationship implying that increased ESG or corporate social responsibility (CSR) performance implicates decreased EM. This agrees with the stakeholder theory where managers will engage in CSR activities in order to maintain and strengthen their relationship with stakeholders of the firm. However, independent of their results, several studies have theorized that a positive relationship can occur as managers seek to hide their earnings manipulating activities. This is in line with the self-interest aspect of the agency theory and can be used to maintain a good relationship with stakeholders through manipulating how the company is perceived by society and thus masking their own manipulating actions.

A conclusion can be drawn from our findings that the positive result from the study may bear witness of managers in Norwegian companies participating in ESG activities to hide the earnings manipulation, in order to maintain a good relationship

with owners and other stakeholders. This can be seen as contradictory to the report of the United Nations, stating that Norway is one of the least corrupt nations in the world. On the other hand, the effect of corruption on EM, is outside the scope of this thesis as that is rather a question of the magnitude of EM in Norway.

The main limitation of this study is the limited amount of entities in our sample. According to the Oslo Stock Exchange's own statistics, there were 193 companies listed on the Exchange per December 2018 (Oslo Børs, 2018). As our data set consists of 39 companies and several of these were missing data on ESG in our timeframe, we see the findings of our study to have little generalizability to the rest of the Norwegian market and especially to the other Nordic countries. As presented in the chapter 1 and 2 there has been a trend of increased ESG reporting in the last few years. Based on this we will argue that performing a similar study in a few years may yield other interesting findings as well as more generalizable result as it may be possible to obtain a balanced panel data set for several other companies.

The calculation of the discretionary accruals presents another limitation of the study as it is not based on readily data such as the ESG-score or the different company metrics. This can result in measurement errors of the dependent variable EM. However, as we use generally accepted calculation methods, such as the model of Kothari et al. (2005) and based the calculation of Veenman (2019), we see this threat as limited, although it is most definitely present.

The ESG-score itself may pose as a limitation due to the lack of standardization and availability of information as a result of voluntary disclosed sustainability reporting (Siew, 2015). The potential issue with 'green-washing' also contributes to the threat of biasness and hides a company's true sustainability (Cecil et al., 2013). The choice of SRT will also, as long as there is no standardized procedure of calculating the ESG-scores, be a factor affecting conducted studies.

The model choice for investigating the relationship may also be a limitation. Looking at previous studies we find no particular model being used extensively. Two studies apply the generalized method of moments (GMM) model (Gallego-Álvarez et al. 2015; García-Sánchez et al. 2015), two studies apply a two-stages least squares (2SLS) model (Bozzolan et al. 2015; Choi et al. 2013), two apply OLS (Azim et al. 2015; Patten & Trompeter, 2003). Lastly, three studies apply the RE-model similar to our study (Choi et al. 2013; Amar & Chakroun, 2018; Velte, 2019).

Based on this, conducting a study using several of the models may yield interesting and different results than from applying only one model.

As presented in chapter 6, endogeneity pose a substantial threat to the validity of studies, especially when applying RE-models. We cannot disregard that there exists endogeneity in our model, which may in turn make the estimated coefficients inconsistent. Gallego-Álvarez et al. (2015) argue that one way to account for endogeneity is to implement two-stages regression models such as the GMM model. Bozzolan et al. (2015) uses 2SLS by introducing instrument variables to account for the possible endogeneity, as they argue that the CSR orientation and managers' EM strategies may be simultaneously determined. Additionally, Choi et al. (2013) tests the relationship both with a RE-model and by using 2SLS to account for endogeneity. This gives interesting implications for further analysis of the relationship in Norway as one can test the relationship by applying such econometric methods.

In the data set of this thesis, there exists some larger and smaller data points. However, as the data set is limited, due to its 159 firm-years observations, we have chosen not to exclude any of these potential outliers. Future research on this topic might see increased validity from excluding such outliers, if their number of firm-years allows it.

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Appendix

A1: List of Companies

Akastor	Kongsberg Gruppen	Questerre
Aker	Kværner	REC Silicon
Aker BP	Lerøy	Salmar
Aker Solutions	Mowi	SAS
Atea	Nel	Schibsted
Ausevoll Seafood	Nordic Semiconductor	Seadrill
Bakkafrost	Norsk Hydro	Stolt-Nielsen
DNO	Norway Royal Salmon	Subsea 7
Equinor	Norwegian Air Shuttle	Team Tankers
Flex	Ocean Yield	Telenor
Frontline	Orkla	TGS-NOPEC
Höeg LNG	PGS	Tomra
Kongsberg Automotive	Prosafe	Yara

A2: ESG Composition as of April 2020

Pillar	Category	Weights	Pillar Weight
Environmental	Emissions	15 %	43 %
	Resource use	15 %	
	Innovation	13 %	
Social	Workforce	13 %	31 %
	Human rights	5 %	
	Community	9 %	
	Product responsibility	4 %	
Governance	Management	17 %	25 %
	Shareholders	5 %	
	CSR strategy	3 %	

A3: Definition of Pillar Score Factors

Score	Definition
TR ESG Resource Use Score	The Resource Score reflects a company's performance and capacity to reduce the use of materials, energy or water, and to find more eco-efficient solutions by improving supply chain management
TR ESG Emissions Reduction Score	The Emission Reduction score measures a company's commitment and effectiveness towards reducing environmental emissions in the production and operational processes.
TR ESG Innovation Score	The Innovation Score reflects a company's capacity to reduce the environmental costs and burdens for its customers, thereby creating new market opportunities through new environmental technologies and processes or eco-designed
TR ESG Workforce Score	The Workforce Score measures a company's effectiveness towards job satisfaction, healthy and safe workplace, maintaining diversity and equal opportunities, and development opportunities for its workforce.
TR ESG Human Rights Score	The Human Rights Score measures a company's effectiveness in respecting the fundamental
Community Score	The Community Score measures the company's commitment to being a good citizen, protecting public health and respecting business ethics.
TR ESG Product Responsibility Score	The Product Responsibility Score reflects a company's capacity to produce quality goods and services, incorporating the customer's health and
TR ESG Management Score	The Management Score measures a company's commitment to and effectiveness in following best practice corporate governance principles.
TR ESG Shareholders Score	The Shareholders Score measures a company's effectiveness in the equal treatment of shareholders and the use of anti-takeover devices.
TR ESG CSR Strategy Score	The CSR Strategy Score reflects a company's practices to communicate that it incorporates the economic (financial), social and environmental dimensions in its day-to-day decision-making

A4: Variable Explanation Main Model

Variable	Description
Dac	Discretionary accruals calculated using the Modified Jones Model of Dechow et al. (1995) adjusted for performance, based on Kothari et al. (2005).
ESG	Environmental, Social and Governance performance score retrieved from Thomson Reuters Eikon.
Growth	Logarithmic change in sales from prior year.
Size	The logarithmic value of the market capitalization.
Mtb	The market-to-book ratio.
Lev	Long-term debt scaled by lagged total assets
Beta	Beta factor capturing the systematic risk.
ROA_adj	Return on assets, adjusted by the mean of the sector.
Indep	Indicator variable taking the value 1 if percentage of independent board members is larger than 50%.
Expe	Indicator variable taking the value 1 if percentage of experienced board members is larger than 50%.

A5: Variable Explanation Accruals Model, Equation 5

Variable	Description
TA	Total accruals, calculated as income before extraordinary items minus cash flow from operations.
A_t-1	Total assets prior year.
ΔR	Change in revenue from prior year.
ΔRect	Change in net receivables from prior year
PPE	Property, Plant & Equipment.
ROA	Return on assets prior year.

Preliminary Master Thesis Report

Is There a Relationship Between ESG Performance and the Earnings Management of Companies in Norway?

Supervisor:

Christopher Bleibtreu

Study Program:

Master of Science in Business

Major in Accounting and Business Control

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1.0 Introduction

The main goal of this master thesis is using panel data to create a multiple regression analysis and investigate if there is a relationship between the environmental, social and governance, i.e. ESG performance score, and Earnings Management of companies in Norway. Our aim is to carefully consider if the ESG performance score, divided into its three pillars, have a connection with earnings management. Norway is of special interest due to the large number of companies reporting corporate responsibility and given that CR-reporting is standard practice for large and mid-cap companies around the world (KPMG International, 2017).

In an article describing the methodology behind the ESG scores, Refinitiv recognize the increasingly critical importance of transparent, accurate and comparable ESG data for the financial industry (Refinitiv, 2019). There is a clear global trend of increased CSR reporting. Interviews revealed how governments and stock exchanges all over the world are bringing in new layers of regulation for ESG. For the first time in KPMG's survey history, every sector has a reporting rate of 60% or more. They also predicted back in 2017 that the emerged trend of companies linking their corporate responsibility activity to the UN Sustainability Development Goals (SDGs) will have a growing profile in CR reporting over the next two to three years. The survey of CR reporting 2019 is yet to be published, but by looking at previous figures the trend is pointing at KPMG's predicted direction. Their key findings also suggest that more reporting regulations is on its way, that "non-financial" is the new financial and that it will be all about reporting your impact and not statistics (KPMG, 2017).

Focus on ESG and sustainable business processes have been increasing all around the world during the last decade, and on BI it is no different. One of us participated in the elective "Environment and Sustainable Development" and through this course discovered the importance and widespread the sustainable focus has in the current business environment. We decided to research further into this topic, and it became clear that there is an ever-increasing focus on this area of business processes and operations. We discussed this topic with our supervisor, who introduced us to the interesting relationship between ESG performance and earnings management, stating that similar studies have been conducted in other countries in recent years.

In our search for studies touching upon this topic, we discovered that while there are some empirical studies with an international sample (Bozzolan et al., 2015; Garcia-Sanches and Garcia-Meca, 2017), and studies on the two European countries; Spain (Gras-Gil et al., 2016) and Germany (Velte, 2019), there is, to the best of our knowledge, no analysis on the ESG performance – earnings management relationship conducted on the Norwegian capital market. Due to this, we rapidly decided that we wanted to conduct similar research and that our master thesis will be a contribution to fill a current knowledge gap. The study by Velte (2019) was conducted based on the German Stock Exchange. As of this, we believe that it would be interesting to conduct an equivalent test on the Norwegian Stock Exchange to see whether we find similar patterns of the relationship between ESG performance and Earnings Management. Such an outcome could make his conclusion more generalizable across countries whereas the opposite outcome would make us question its validity as a general “rule”.

In the following part of our preliminary thesis we will describe previous conducted work relevant for our topic and the essential main elements of our thesis. Lastly, we will present the data we are going to use and how we are going to obtain it.

Our initial expectations on the results from our research, based on the similar studies, is that we will find that there is a negative relationship between ESG and earnings management, i.e. higher ESG performance results in lower earnings management. The intuition behind this is rather clear, as companies focusing on the sustainability of their processes will be less likely to deceive stakeholders with earnings management, especially when managers use earnings management to their own advantage. This leads us to the following research question for our thesis:

Is there a relationship between ESG performance and the Earnings Management of companies in Norway?

2.0 Literature review

In recent years, several studies have analyzed either the relationship between ESG performance and Earnings Management or between CSR and Earnings Management. Most studies are national, but some have an international focus. These studies provide valuable insights into aspects of earnings management and the ESG performance. In addition, they contribute to a greater understanding on how to conduct our study, what approach might be most suitable and potential challenges we may face. There have also been conducted studies concerning the financial implications of the ESG performance score and studies since the mid 80's covering the prevalence of earnings management in financial reporting. Throughout the years there have been various ways of detecting and measuring earnings management, with our research revealing some of the several models of the field.

2.1 Earnings management

Accounting information and reported numbers are used by a range of different stakeholders daily. The accounting figures presented by the organizations are used by both individual and industrial investors, credit rating agencies and governmental agencies to make decisions. Due to this, it is highly important that the numbers work as a truthful representation of the actual situation in the company. All companies must follow a set of accounting principles locally decided. Additionally, most companies, especially those enlisted on stock exchanges, must follow international standards, such as the IFRS standards produced by IASB.

The literature generally splits earnings management into *accruals-based* and *real earnings management*. Braam, Nandy, Weitzel and Lodh states that accrual-based earnings management “[...] aims to obscure true economic performance by changing accounting methods or estimates within the generally accepted accounting principles.” (Braam, Nandy, Weitzel, & Lodh, 2015, p. 112). This definition is based on the paper *Earnings Management: Reconciling the Views of Accounting Academics, Practitioners, and Regulators* by Dechow and Skinner

from 2000. Braam and his fellow researchers also presents in the same paper that “On the contrary, real earnings management alters the execution of real business transactions” (Braam, Nandy, Weitzel, & Lodh, 2015, p. 112), which in turn is based on the work of Sugata Roychowdhury on real activities manipulation on earnings management (Roychowdhury, 2006). In this article, Roychowdhury defines real earnings management as

“departure from normal operational practices, motivated by managers’ desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations” - (Roychowdhury, 2006, p. 337)

In their article *A Review of the Earnings Management Literature and its Implication for Standard Setting*, Paul Healy and James Wahlen present the most used and cited definition of the broad term earnings management:

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

It is important to note that earnings management is not purely fraudulent in its most basic form. Many companies use earnings management to smoothen earnings over a period. Due to this, Dechow and Skinner argues that earnings management can be divided into four distinctions: Conservative Accounting, Neutral Accounting, Aggressive Accounting, and Fraudulent Accounting. *Conservative* accounting is associated with aggressive recognition of such items as provisions and/or reserves. *Neutral* accounting represents accounting treatment where the earnings are a result of a neutral business operations. *Aggressive* accounting is close to the opposite of the conservative approach, bad debts and

provisions are here understated. These three forms of earnings management are said to be within GAAP. *Fraudulent* accounting, on the other hand, violates GAAP and examples of this are recognition of sales before the company can actually realize them and overstatement of inventories by recording fictional inventory (Dechow & Skinner, 2000).

Since the mid 80's there have been conducted several empirical studies aimed at the prevalence of earnings management in financial reporting. In a study from 1985, Paul Healy found that managers who are incentivized through bonus programs will "select accounting procedures and accruals to maximize the value of their bonus awards" (Healy, 1985, p. 106). This shows that when incentivized, managers will seek to affect the earnings either up or down. Healy's study found that managers will seek to decrease the earnings if they understand that the goal of the year or quarter will not be possible to meet. Likewise, they will seek to increase the earnings if they are close to meeting the goals.

There are several ways to manage earnings in financial reports, according to Ronen and Yaari (2008). The management can choose between LIFO and FIFO treatment of inventories, they can decide the timing of when to adopt certain standards and how transitory effects will be accounted for. Depending on local regulations and what IFRS' they adopt, the management will to some extent have some options when it comes to asset depreciation, asset valuation and allowance for bad debt. Another widely used measure of earnings management is "the strategic timing of asset sales" (Gunny, 2005).

2.2 Detecting Earnings Management

Literature on the detection of earnings management is extensive, and several models for detecting and measuring earnings management have been created. Based on the current literature it becomes clear that one of most used models when analyzing companies in the western world is the modified Jones model of Dechow (Dechow, Sloan, & Sweeney, 1995), based on the econometric model by Jennifer Jones (Jones, 1991). Another modification of the Jones model was presented in 1999 by Ron Kasznik (Kasznik, 1999). A study conducted in Romania in 2010 examined the statistical significance of the three models

presented above. They found that out of these three, the Jones model proved to have the highest significance among Romanian companies (Matiş, Vladu, Negrea, & Sucala, 2010). Additionally, a study from 2015 investigated the significance of the same three models in the republic of Serbia and found, contrary to the findings of Matiş et al. that the Kasznik model was the one with the highest explanatory power and *Dechow* having the lowest (Bešlić, Bešlić, Jakšić, & Andrić, 2015). It can be seen from this research that there are considerable differences between countries.

While these models are widely used in these relationship studies, our analysis will most likely focus on a newer model, proposed by Kothari et al. (2005) which modifies the modified-Jones of Dechow et al. by including performance-matching in the analysis of accruals-based earnings management. In the article *Earnings management through real activities manipulation* Sugata Roychowdhury presents the most used model for detecting real earnings management, which is also used by Velte in his study of the bidirectional relationship in Germany (Roychowdhury, 2006). Both models will be presented in the chapter concerning the methodology of our thesis, where we introduce the models we will use and how these are computed.

2.3 ESG performance-score

Environmental, Social and Governance, most often referred to as ESG, has increased in popularity in recent years and then especially in light of so-called responsible investing (Poh, 2019). Owners' and stakeholders' focus more and more on these factors of company performance which in turn has led to extensive research on the effect of ESG on company performance, e.g. Friede, Busch, & Bassen (2015) and Kempf & Osthoff (2007). The study by Friede, Busch & Bassen found that there mainly is a positive relationship between ESG-performance and financial performance among the studied companies. It is possible to interpret these findings in a way that managers can be motivated to introduce a focus on ESG to the organization in order to capture this increased financial performance.

ESG has not only been of increasing interest for investors and stakeholders in recent years. Companies themselves also have discovered the value of enhanced ESG performance and ESG reporting. According to the KPMG International's biannual Survey of Corporate Responsibility Reporting from 2017; the reporting of corporate sustainability has increased steadily from 2000 to 2017 (KPMG International, 2017). The management has understood that investors use ESG and CSR as measures of including or excluding companies from their portfolios. Additionally, as a study by Daniel Murphy and Dianne McGrath found, managers are likely to increase the reporting from the company when there is a risk of class action lawsuits (Murphy & McGrath, 2013). De Villiers and van Staden argue that following the tremendous costs of the BP oil spills and other environmental disasters, companies and their management has understood that there is a need to act in an environmental-friendly manner (de Villiers & van Staden, 2011). They state that even though there are several sources available to monitor environmental performance, the most available one is information disclosed by the company itself. This also applies to the social and governance part of ESG, implying an increased demand for such reporting among investors and stakeholders.

The increased focus on ESG-reporting has also introduced some issues with regards to the legitimacy of the companies' ESG-reporting. Companies in breach of generally demanded ESG-measures will be shunned by the community and even boycotted. This works as an additional motivation for the company to be in line with general demands for ESG-performance. On the other hand, this will result in companies focusing on ESG without an inherent motivation other than being shunned by customers or business partners (de Villiers & van Staden, 2011).

2.4 The relationship between ESG and Earnings Management

While a company's focus on ESG and sustainable business operations indicates that the management seeks to make responsible decisions regarding their processes, earnings management on the other hand may imply that the company have deceitful intentions. As presented earlier, managers often engage in earnings management in order to reach certain goals or milestones when this will yield a

bonus or reward for them (Healy, 1985, p. 106). One can therefore, in extreme cases, argue that these are opposing views on how to conduct business. Due to this, recent research has focused on the relationship between ESG performance and focus, and the degree of earnings management in the financial reporting. Of the most recent studies, and also the most relevant for a study in Norway, is the paper *The bidirectional relationship between ESG performance and earnings management – empirical evidence from Germany* by Patrick Velte (Velte, 2019). This paper seeks to investigate the bidirectional relationship between the ESG performance and earnings management in the two-tier system in Germany. In the paper, Velte splits earnings management into the two forms presented above, i.e. *accruals-based earnings management* and *real earnings management*, and looks at the effect ESG performance has on these individually. He does this as he believes that these two are good proxies for earnings management, and therefore conduct separate regression analyses for them both (Velte, 2019, p. 326). When discovering the work of Velte (2019), he points out that prior studies have connected our research topic with a reversed causality problem as earnings management behavior may also influence ESG performance.

In addition to this study, there have been studies on the relationship between Corporate Social Responsibility and earnings management, both in Asia (Yoon, Kim, & Lee, 2019; Kim & Park, 2011) and in Europe (Gras-Gil et al., 2016; Almahrog, Aribi, & Arun, 2018). Additionally, there has also been conducted studies with an international focus (Bozzolan et al., 2015; Garcia-Sanches and Garcia-Meca, 2017; Chih, Shen, & Kang, 2008). These studies differ from the study by Velte in that they either only focus on real earnings management, often then referred to as real activities manipulation, or they focus on earnings management in the form earnings smoothing and earnings decrease/loss avoidance (Gras-Gil et al., 2016).

A majority of these previous studies have found a negative relationship between ESG/CSR and earnings management. This is in line with the general thought, that companies focusing on ESG and social responsibility will be less inclined to undertake earnings management in order to adjust reported earnings. As stated

previously, earnings management, especially when it is primarily beneficial to the managers, is not well received by the stakeholders as it may cost them in the long run.

3.0 Methodology

To be able to analyze the relationship between the ESG-scores, which are readily available in databases, and earnings management, we need to compute the degree of earnings management in the companies of the study. In order to fully capture the ESG effect we will split the ESG performance into its three components; Environmental, Social and Governance, as this gives us the opportunity to capture the effect of each of the pillars of the total ESG performance score. As with the bidirectional study of Velte, we have also chosen to divide earnings management into Accruals-based Earnings Management (AEM) and Real Earnings Management (REM). This way, we will be able to see the effect of ESG on both discretionary accruals decisions, and on real activities manipulation. Additionally, we will be able to compute the effect of AEM and REM on ESG-performance, i.e. the bidirectional effect.

The regression will, as with the other studies, be based on panel data for listed companies on the OBX-index from 2010 to 2018. We will use multiple regressions over this data. Our initial regression will seek to capture the effect ESG has on AEM and REM, respectively. We will base our regression model on the model used by Velte in his article:

$$AEM_{it} = \alpha + \beta_1 ESGP_{it} + \beta_2 SIZE_{it} + \beta_3 MB_{it} + \beta_4 ROA_{adj_{it}} + \beta_5 BIGFOUR_{it} \\ + \beta_6 LEV_{it} + \beta_7 GROWTH_{it} + \beta_8 BETA_{it} + \beta_9 IND_{it} + \beta_{10} EXP_{it} + \varepsilon_{it}$$

where ESGP is a proxy for ESG-performance, MB is the market-to-book ratio, BIGFOUR is 1 if the firm is audited by a Big four audit firm, GROWTH is growth in sales, IND is the percentage of independent members of the board and EXP is the percentage of financial experts in the board. We will adapt the model

of Velte in order to fit the data we gather and will include or exclude variables when deemed necessary.

The same model will be used to compute the relationship between REM and ESG-performance. Additionally, we expect that all the same independent variables will be used when computing the relationship of earnings management on ESG. Prior studies also connected our research topic with a reversed causality problem as earnings management behavior may also influence ESG performance (Velte, 2019). This is likely to be relevant for us to investigate throughout our thesis process.

3.1 Modified Jones Model (Kothari et al. 2005)

To compute and analyze the discretionary accruals earnings management (AEM) we have chosen to use the modified Jones model from 2005, presented by Kothari and his fellow researchers (Kothari, Leone, & Wasley, 2005). Kothari, Leone and Wasley modified the existing model by Jones, from 1991, by including performance-matched accruals. They found that by adding performance-matching when analyzing discretionary accruals, they were able to reduce the type I errors in their research. Furthermore, they found that including a constant term in estimations using the Jones model or the modified-Jones model of Dechow will further decrease the model misspecification. The original Jones model is computed as:

$$TA_{it}/A_{it-1} = \alpha_i[1/A_{it-1}] + \beta_{1i}[\Delta REV_{it}/A_{it-1}] + \beta_{2i}[PPE_{it}/A_{it-1}] + e_i$$

Kothari et al.'s model builds on the model proposed by Jones in that it adds a variable for return on assets (ROA), which makes it possible to compare companies with the closest ROA. Their addition to the original model can therefore be specified as:

$$TA_{it}/A_{it-1} = \alpha_0(1/A_{it-1}) + \alpha_1(\Delta Rev_{it} - \Delta REC_{it})A_{it-1} + \alpha_2(PPE_{it}/A_{it-1}) + \alpha_3IBXI_{it-1}/A_{it-1} + e_t$$

as it is presented by Velte in his study. It is worth noting that Velte in his work has re-written the ROA part of Kothari et al.'s to $IBXI_{it-1}/A_{it-1}$ rather than ROA_{it-1} .

3.2 Roychowdhury (2006)

Roychowdhury's model is based on measuring real earnings management by calculating what he calls abnormal levels of cash flow from operations (CFO), abnormal production costs, and abnormal discretionary expenses. Roychowdhury uses the model proposed by Dechow, Kothari and Watts (Dechow, Kothari, & Watts, 1998) to determine the normal levels of CFO, production costs and discretionary expenses. Thus, these deviations from the predetermined "normal levels" are deemed abnormal. Velte found in his study that there was no significant relationship between ESG and REM. We will therefore consider later on whether we will incorporate REM at all in our analysis.

4.0 Data

The thesis will be based on secondary data on ESG performance and financial figures. The primary source of this data will be Thomson Reuters Eikon and Bloomberg's databases. The data on ESG performance will mainly be collected from the Asset4 database in Eikon as this is the database mostly used in prior research on our topic. Even though no prior studies have used the database, we will also consider the Refinitiv database, also available from Eikon to further broaden our data collection. As with the study by Patrick Velte (2019) we will seek to analyze the effect of the three pillars of ESG on earnings management. The data will be extracted into Excel where we will clean it and adjust to the format needed to analyze it in STATA.

The research will focus on the companies on the current OBX-index, i.e. the 25 most liquid companies on the Norwegian Stock Exchange and their performance between 2010 and 2018. Velte argues in his study that one should remove companies from the banking and insurance sector, as they have very different capital structures, accounting principles and are often subject to heavier disclosure regulations that are specific to those sectors (Velte, 2019, p. 326). We will consider if this is necessary in our study as well as most of these differences also applies to Norwegian banking and insurance companies. As the study of earnings management is based on analysis of multiples not available in databases, we will need to compute these from the data collected from Eikon/Bloomberg on each company. The methodology for doing this have been more thoroughly explained in the Methodology part of this Preliminary Thesis Report.

5.0 Plan for the thesis process

January	<ul style="list-style-type: none"> • Writing the preliminary • More in dept research on most important aspects of our thesis • Begin the process of collecting data
February	<ul style="list-style-type: none"> • Continue collecting data • Begin cleaning the data in ExCel
March	<ul style="list-style-type: none"> • Extract data from ExCel and use STATA to form multiple regression models
April	<ul style="list-style-type: none"> • Begin first draft of master thesis • Continue writing thesis alongside exam prep in final program course
May	<ul style="list-style-type: none"> • Hand in first draft by the end of May
June	<ul style="list-style-type: none"> • Correct first draft in accordance with feedback and comments from supervisor • Hand in final draft by third week of June, preferably around 20.06.2020

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