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Financial materiality of ESG disclosure and stock price informativeness

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Abstract

This study explores the association between sustainable (ESG) disclosure and the stock price informativeness of Norwegian companies, operating in the Consumer Staples and Consumer Discretionary sectors. Additionally, it examines the influence of legislation regarding ESG disclosure on the quality and quantity of reports. We performed both structural equation modeling (SEM) analysis and automated content analysis, using a panel dataset of 34 companies from 2003 to 2021. The study finds no significant relationship between ESG disclosure and stock price informativeness, or between financial materiality of ESG disclosure and stock price informativeness. However, the study reveals that the social pillar has a more substantial impact on stock price informativeness, compared to the other pillars of ESG. It should be noted, however, that this relationship does not apply to the material ESG scores between the pillars.

Lack of sufficient significant results and disclosed validity concerns warrant careful consideration of these findings. In general, the research suggests that there are various uncontrolled variables in this field of research, to some extent due to a low explanatory power across all models. Overall, the results imply that there is no significant connection between ESG disclosure and stock price informativeness, implying that ESG disclosure does not influence the company's real value. Consequently, this study supports both shareholder and slack resource theory from an investor's perspective.

Keywords: ESG, Sustainability, Stock price informativeness, Stock price synchronicity, Financial materiality, Shareholder theory, Slack resource theory, Norwegian legislation, The Accounting Act, Mandatory disclosure, Corporate Sustainability Reporting Directive, CSRD

Preface

This master thesis is completed as part of the master´s degree in Business Administration, at Oslo Metropolitan University. The article presented is the last and concluding stage of our master´s degree with specialisation in finance.

Our fascination with sustainability in today's world led us to delve deeper into this area of finance research for our master's thesis. We started with an interesting research article, *Financial materiality in the informativeness of sustainability reporting* by Schiehll and Kolahgar (2021), which served as a foundation for our work. Our literature review revealed that Norway has a unique position with its legislation regulating ESG reporting. As of 2023, all members of the European Union will have similar regulations in place, making it important to investigate the financial materiality in sustainability reporting and the impact of legislation on this topic. Thus, our study aims to explore these aspects in detail.

We would like to express our appreciation to our supervisor, Muhammad Azeem Qureshi, for his guidance, expertise, and support throughout this journey. His insights were of great importance for the quality of this research. We extend our gratitude to Anette Brøto Nereng and Eduardo Schiehll for their engaging and enlightening conversations on the subject. Their perspectives and discussions have provided us with a broader understanding of the topic. Last, we would like to thank Oslo Metropolitan University for access to necessary software.

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1 Introduction

In today's society, the significance of environmentally friendly solutions has become more crucial than ever, due to the substantial environmental problems that the world is facing (Compact, 2005). There has been an ongoing debate and extensive research on whether the market and investors perceive a good environmental, social, and governance (ESG) score for a company is value-creating (El-Haj et al., 2019). The environmental challenges are currently dominating the agendas of the most prominent conferences worldwide, making it essential to explore the potential implications for both investors and companies.

Over the past few years, there has been an increase in the number of Norwegian individuals investing in stocks and funds, regardless of their social status. Although each investor may own a small share of a company, collectively, they can account for a significant percentage. Small investors often rely on various sources, including newspapers and commercial banks, to decide where to allocate their funds. As green funds and stocks have become more popular, small investors tend to allocate their funds here (Sønnervik & Zakariassen, 2022). This phenomenon may have implications for investors and companies, particularly if it creates an increase in prices that does not reflect an increase in a company's real value, leading to fragile, volatile, and unpredictable prices.

The impact of a company's ESG disclosure on the financial performance has been a topic of investigation in numerous articles and studies. However, the results have been far from conclusive and are often dependent on industry, location, and time period (Baier et al., 2020; Berg et al., 2022; El-Haj et al., 2019; Gibson Brandon et al., 2021; Khan et al., 2016). The debate on whether a company should allocate resources towards ESG efforts dates back to Freeman (2010) and Friedman (2002). While they examined the causal relationship from ESG to value, others like Waddock and Graves (1997) have explored the possibility of reverse causality.

After conducting a literature review on the topic, we came across articles that focused on stock price informativeness, rather than solely on firm performance measured by stock price (Piotroski & Roulstone, 2004; Schiehll & Kolahgar, 2021). Building on this work, we define

stock price informativeness as the extent to which stock prices reflect company-specific information, rather than market or industry factors. Our metric for measuring stock price informativeness is through stock price synchronicity. We measure stock price informativeness through stock price synchronicity, which indicates in what degree greater disclosure of company-specific information, such as ESG disclosure, leads to stock prices aggregating more company-specific information. This explains a smaller proportion of the variation in the company's stock returns. As we observe the trend of small investors (Sønnervik & Zakariassen, 2022), we view stock price informativeness as much more captivating than stock price, as the latter depends on several other variables and may not accurately reflect the true value of the company.

In previous research, Goss and Roberts (2011) discovered that companies with higher levels of ESG disclosure experience more accurate and timely stock price reactions to news events. Flammer (2015) found that companies with more comprehensive ESG disclosures also received higher analyst coverage. Additionally, Schiehll and Kolahgar (2021) found that financial materiality of sustainability issues are highly relevant to a company's financial performance. This relates to the importance of financial information when making decisions. Finally, Khan et al. (2016) found that companies performing well on material sustainability issues often outperform comparable companies in terms of stock price. Building on these findings, we aim to investigate the following research questions:

Research question #1: How does ESG disclosure affect the informativeness of stock prices?
Research question #2: Is financial materiality of ESG disclosure associated with increased stock price informativeness?

The previous addressed studies on ESG disclosure have mainly focused on countries where such disclosure is voluntary. However, scholars such as Freeman (2010) and Friedman (2002) argue that voluntary disclosure may limit companies' ability to fully report on their ESG practices. The European Union has implemented the Corporate Sustainability Reporting Directive (CSRD) which requires companies to disclose audited and comprehensive

sustainability reports from 2023 and onwards (Regnskapsloven, 2023). This will result in more reliable and comparable ESG data (Dir., 2013/34/EU). Considering that Norway already has implemented ESG disclosure legislation (Regnskapsloven, 2013), it presents a unique opportunity to investigate the impact of such legislation on companies' ESG reporting practices. Therefore, this thesis will examine this impact and formulate a hypothesis to test it.

We present the structure of this thesis, to provide you with a preview of what is to come. Chapter 2 provides an overview of the relevant literature and background information. Chapter 3 presents and explains our hypotheses. In Chapter 4, we outline our research methods, and Chapter 5 describes the data sources, sample, and variable measurement. Chapter 6 presents our results, and Chapter 7 provides a discussion of these findings. Finally, Chapter 8 concludes the thesis.

2 Theoretical Frameworks

This chapter will provide explanations of the concepts of sustainability, including ESG reporting and scores. You will be provided with relevant theoretical and empirical literature, used to develop the hypotheses and the research questions.

2.1 Sustainability Concepts

2.1.1 CSR History

Corporate Social Responsibility (CSR) is a business approach with focus on the company´s obligation to carry out their work in a socially responsible manner. The approach involves that a company's strategic management considers the impact of a company´s activities on the stakeholders, including the impact on the environment (Khan et al., 2016).

CSR as a concept can be traced back to the 1950s and 1960s, when companies first started to acknowledge their social responsibilities. During this period, companies started implementing policies that addressed issues such as consumer protection and workplace safety (Bowen, 2013). In his article *Social Responsibilities of the Businessmen,* Bowen addressed the issue of how much companies can be expected to take responsibilities to society, and what society reasonably can expect from them.

During the latter part of the 1900s, companies began to adopt a broader perspective on their social and environmental impact, thus CSR gained more traction. Literature points at the increase in public awareness of these issues, as well as the rise of environmental and social justice movements as the main reasons for the traction (Khan et al., 2016). It was first in the 1980s that CSR became more formalized, and companies started publishing reports and CSR departments. At the same time the stakeholder theory became recognized, and issues such as human rights, labour practises and ethical sourcing became part of the strategic management issues (Berg et al., 2022).

Through these decades, United Nations (UN) increased the focus on global warming and developed the United Nation Environment Program (UNEP). The main purpose was to encourage companies to consider environmental protection, human rights, and pursue sustainable developments. As stated in the report, this entails a progress that fulfills present requirements while safeguarding the capacity of future generations to fulfill their own needs (WCED, 1987).

CSR has continued to evolve, with an increasing focus on sustainability and the integration of social and environmental considerations into core business strategies. Companies all over the world view CSR as an essential part of their business model, and there is an underlying expectation that companies take a proactive approach to social and environmental issues (Khan et al., 2016). Consequently, the concept ESG have become a large part of today´s corporate world (Baier et al., 2020).

2.1.2 ESG Pillars

Socially responsible investing (SRI) became part of the research field reflecting the growing trend among investors. SRI implies that investors carry out a screening before investing and only invest in stocks which fulfils their criteria. These criteria can be as simple as not investing in tobacco and arms production, typical sin stocks, or as complex as only investing in companies with a certain ESG rating (Baier et al., 2020).

Kofi Annan, former Secretary-General in the UN, initiated a process to develop guidelines to integrate ESG issues in finance and associated research functions. Due to this initiative The World Bank introduced the ESG term, both in the report “Who Cares Wins: Connecting Financial Markets to a Changing World” and under the “Who Cares Wins” conference (Compact, 2005). Gradually, SRI was replaced as the main sustainability measure for investors (Baier et al., 2020). Through the utilization of the ESG measure, investors will consider the environmental, social, and governance aspects that can impact a company's performance and risk. The objective of disclosing these criteria is to provide stakeholders with dependable information regarding an organization's impacts and contributions towards sustainable development (Gibson Brandon et al., 2021).

Annan´s desire to integrate ESG issues in finance has been fulfilled, and as we will disclose in Chapter 2.4.3 *Future Legal Requirements and European Parliament Directive* this is now integrated in a cross-border agreement. ESG disclosing has become an important factor for several aspects of a company, such as attracting new investors, new employees, company branding etc. (Baier et al., 2020).

ESG refers to a set of factors used to evaluate the sustainability and ethical impact of a company (Baier et al., 2020; Berg et al., 2022). Environmental factors encompass the influence of a company on the natural environment, such as carbon footprints, energy and resource use, waste management. Social factors involve their impact on people and community, for example labor practices, human rights, and community involvement. Last, governance factors encompass a company´s management, including board diversity, shareholder rights, and executive compensation (Baier et al., 2020; Berg et al., 2022; Khan et al., 2016).

One explanation for the increased focus in ESG issues and -disclosure is that investors seek to align their investments with their values, and only support companies committed to sustainability and ethical practices. Another theory explaining this increase is that companies recognize the importance of ESG factors as a long-term business strategy and investor support (Baier et al., 2020; Freeman, 2010; Khan et al., 2016; Kolahgar et al., 2021; Waddock & Graves, 1997). Thus, ESG reporting and -disclosure are becoming more common. Further, investors are using these metrics to make informed investment decisions (Baier et al., 2020).

Research conducted in later years have concentrated on the relationship between ESG and financial performance, often measured as stock price. Khan et al. (2016) found in their studies that companies who perform well on material sustainability issues often exceeds comparable companies in terms of performance. However, this outperformance does not apply to immaterial sustainability issues[1]. Although much of the literature on this present the same or similar results (Flammer, 2015; Gibson Brandon et al., 2021; Waddock & Graves, 1997), the studies do not explain or question the effect on the stock price informativeness.

[1] Immaterial sustainability issues refer to factors that are not financially significant or do not have a significant impact on a company's operations, but have environmental or social implications (Khan et al., 2016).

2.1.3 ESG Score Disagreement

A hurdle for both companies and investors is that the ESG disclosure in most countries must be on one´s own initiative, and is not verified by an independent third party (Berg et al., 2022). This causes problems related to the validity and the reliability[2] of the disclosure (Wooldridge, 2016). Moreover, relying on this as a dependable decision support system can prove challenging for investors, and excessive dependence on it may lead to complications.

Different rating providers, such as Refinitiv Eikon and MSCI, generates different results. While Friedman (2002) nonparametric analysis of variance revealed no significant differences among expert panellists' ratings, more recent research has contradicted these findings. There are some disagreements regarding the foundation for these differences, however several publications indicate that they occur due to the use of different categories, measurement divergence and weight divergence (Baier et al., 2020; Berg et al., 2022; Flammer, 2015; Gibson Brandon et al., 2021). According to Gibson Brandon et al. (2021), the six largest score providers exhibit a correlation of only 0.46. Based on these findings, this thesis will only use Refinitiv Eikon as rating provider to avoid validity- and reliability issues.

2.2 Economic Theory

In this subchapter we present relevant theories used to formulate and explain the research questions. The selected theories are shareholder theory, stakeholder theory, and agency theory. Further, the slack resource theory is presented to show an alternative explanation of the causality between CSR investments and firm performance.

2.2.1 Shareholder Theory

In 1962 Friedman (2002) published a book called *Capitalism and Freedom,* where he argued that the only goal of the company is to maximize shareholder value. Through this book he warns against the use of CSR and refers to his view that shareholders should decide for themselves whether and to what degree they wanted to contribute to society. The

[2] Reliability refers to the consistency and stability of measurements or data over time, and the degree to which they can be replicated or reproduced with the same results (Wooldridge, 2016).

shareholder theory is based on Friedman´s reflections, and it argues that the only duty of companies is to maximize shareholder profit.

Investors in agreement with this theory are compliant to see work connected to sustainability reporting, that exceed the legal minimum, as destruction of capital (Friedman, 2002). The reasoning is that this work does not directly cause value creation, as all work should, according to the shareholder theory. According to Baier et al. (2020) the attention to shareholders will only increase in public held companies. If a company, despite of these views, choose to work on sustainability reporting's and issues, then the possibility of agency problems will increase with high acceleration (Jensen & Meckling, 1976).

2.2.2 Stakeholder Theory

Freeman (2010) argues in his book *Strategic Management* that companies taking ESG responsibilities serious will outperform companies operating in accordance with the shareholder view, regarding firm performance. He defines the stakeholders, in accordance with Elkington´s triple bottom line[3], as everyone having a stake in the company, this can include customers, employees, suppliers, the local community and shareholders.

Investors in compliance with this theory are under the perception that investing in CSR-activities, including ESG-activities, have an advantage compared to companies in compliance with the shareholder theory. This perception is based on the expectation that risks related to CSR will be mitigated, and thus will the risk premium be reduced and accordingly the cost of capital[4]. The market reaction includes more investments, without extra efforts (Freeman, 2010).

[3] The triple bottom line is a framework developed by J. Elkington that considers a company's performance in three dimensions: social, environmental, and financial. It is used to evaluate a company's overall sustainability and impact on society and the environment (Freeman, 2010).

[4] Cost of capital refers to the expenses that a company incurs in order to acquire funds from various sources, such as equity and debt.

2.2.3 Agency Theory

Jensen and Meckling (1976) were the first to establish the agency theory within modern economic theory and claimed they introduced a new theory of the ownership structure of the company. The theory argues that corporations can be seen as a central point for a network of contractual associations among individuals. Classical economics, such as the shareholder theory, on the other hand, regards companies as single-product entities.

The theory distinguishes between shareholders, the owners, and the managers who have the controlling tasks in the company. As humans, managers are self-interested and often want to act in their own best interest. If this comes at the expense of the shareholders, conflicts of interest may arise. These conflicts can be costly for the shareholders as they may require monitor expenditures, bonding expenditures, and residual losses (Jensen & Meckling, 1976). Thus, investors in compliance with this theory will be under the perception that the company should consider different groups of stakeholders, when deciding on different strategic management.

2.2.4 Slack Resource Theory

Freeman (2010) and Friedman (2002) suggested that CSR investments have a causal effect on financial performance. Waddock and Graves (1997) on the other hand, presented a new theory that contradicted this regular perception and claimed the opposite causality[5]. Hence, companies that are profitable will have access to funds needed to invest in CSR, and therefore are able to perform better on this area.

Waddock and Graves (1997) presented a theory where the causal effect contradicts with the views in the larger economic theories. Therefore, it is important to be familiar with the findings, as it can undermine the investors' perception of why the stakeholder theory is important and suitable for them.

[5] Causality pertains to the connection between an occurrence (the cause) and a subsequent occurrence (the effect), where the subsequent occurrence is considered a result of the first occurrence. It is the principle that every event must have a cause, and every cause must produce a measurable effect (Wooldridge, 2016).

2.3 Previous Research

Previous research has examined the concept of financial materiality in the context of sustainability reporting, with a focus on understanding to which extent ESG information impacts market outcomes. The results have been mixed, some studies find a positive relationship between ESG information and market performance, while others have found no significant relationship (El-Haj et al., 2019; Gibson Brandon et al., 2021; Khan et al., 2016).

One potential explanation for these mixed results is the need for a deeper consideration of materiality in the analysis. Some researchers argue that a more nuanced understanding of financial materiality can refine our understanding of the impact of ESG information on reducing information asymmetry[6] and its use in price valuation (Schiehll & Kolahgar, 2021).

The article *Financial materiality in the informativeness of sustainability reporting* by Schiehll and Kolahgar (2021) examines the concept of financial materiality in sustainability reporting and its impact on market outcomes. The authors argue that the effectiveness of sustainability reporting in improving market outcomes is dependent of the financial materiality of the reported ESG information. Their results also show that when ESG disclosures are financially material, they have a positive impact on market outcomes, as measured by abnormal returns and reduced information asymmetry. However, when ESG disclosures are not financially material, they have no impact on market outcomes. Further, they find that financial materiality is positively associated with size and industry membership, indicating that larger companies and those in certain industries are more likely to report financially material ESG information.

Studies examining companies with enhanced ESG disclosure have found that these companies have higher stock price informativeness (Flammer, 2015; Khan et al., 2016). This suggests that the disclosure of ESG information can help investors better understand a company´s risk profile and long-term prospects, leading to more informed investment decisions and higher

[6] Information asymmetry pertains to a circumstance where one party has more or better information than another party in a transaction or exchange, which can lead to an imbalance of power and potentially negative outcomes for the party with less information (Jensen & Meckling, 1976).

stock price. For example, a study by Goss and Roberts (2011) found that companies with higher levels of ESG disclosure had more accurate and timely stock price reactions to news events, indicating that investors were better able to incorporate ESG information into their decision-making. Another study by Flammer (2015), found that companies with more comprehensive ESG disclosures had higher analyst coverage, suggesting that investors and analysts view ESG information as valuable in their analysis.

Overall, the existing research highlights the need for further exploration of the role of financial materiality in the effectiveness of sustainability reporting, and how investors can use this to make more informed decisions. The evidence suggests that companies with enhanced ESG disclosure may enjoy a competitive advantage in terms of their stock price informativeness, as investors increasingly value sustainability and ESG factors in their decision-making (Flammer, 2015; Goss & Roberts, 2011; Khan et al., 2016; Schiehll & Kolahgar, 2021).

2.4 Norwegian Legislation

This subchapter will give an overview of the Norwegian legislation regarding ESG disclosure. We will present an introduction including an explanation of who is bound by the laws, and the historical and future legal requirements. Further, there will be a disclosure of the previous mentioned cross-border agreement from the European Parliament (EU).

2.4.1 Companies Bound by Law

In Norway it is The Accounting Act and the Transparency Act that regulate the sustainability reporting requirements companies must comply with. Both laws state that presented regulations applies to companies considered large enterprises, as defined by the Accounting Act §1-5.

Large enterprises are considered as large companies if they are either; a public limited company, listed company, or accountable if stocks, shares, participation certificates, or bonds are traded on a stock exchange or a foreign regulated market, or other accountable if this is stipulated in regulations issued by the Ministry of Finance (Regnskapsloven, 2005). This

definition was included in 2005 to ensure that the paragraphs are structured in accordance with the structure of the directive (Cf. Prop. 66 (2020-2021)).

2.4.2 Historical Legal Requirements

In 1998 the Act on Annual Accounts was introduced in the collection of Norwegian legislation. The law regulates how Norwegian companies must keep accounts. Further, it provides information on accounting principles, good accounting practices, rules for annual accounts, note information, and how to handle profit and loss. The law is regulated by the Ministry of Finance (Regnskapsloven, 1998).

Chapter 3, *Annual accounts and annual report*, of the law concerns the obligation to prepare annual accounts and annual reports. Paragraph 3-3C *Account of social responsibility* regulates sustainability reporting and was first included in 2013 (Regnskapsloven, 2013). It has later been updated in 2020, 2021 and 2023 (Regnskapsloven, 2020, 2021, 2023).

The initial edition, dated 2013, stipulates that large enterprises are required to provide an account of how they incorporate the consideration of human rights, employee rights, social conditions, environmental factors, and anti-corruption efforts into their business strategies. This statement must “at least contain information on guidelines, principles, procedures, and standards the company uses to integrate the considerations into its business strategies”, according to paragraph 3-3C. Further, companies must provide information on how the enterprise works to transfer these into action and an assessment of the results achieve. The account of social responsibility also requires companies that do not have guidelines, principles, procedures and standards, to disclose this (Regnskapsloven, 2013).

The Ministry of Finance can determine, in regulation, that a public progress report in accordance with the UN's initiative for cooperation with business on sustainable development or a public report the company has submitted within the framework of the Global Reporting Initiative, can replace the report under the first paragraph. The Ministry can also establish

further requirements for such reporting, including requirements that additional information should be provided in the company's annual report (Regnskapsloven, 2013).

The requirement for an explanation in the first paragraph does not apply to subsidiaries, if the parent company has provided an explanation as stated in the annual report for the group which also includes the subsidiary. In that case, the subsidiary must disclose this in its annual report and state where the report is publicly available. The explanation according to the first paragraph must be given in the annual report or in another publicly available document. If the explanation is given in another publicly available document, it must be stated in the annual report where the document is publicly available (Regnskapsloven, 2013).

Information about matters mentioned in §3-3A ninth to twelfth subsections can be included in an explanation according to the first subsection which is given as a separate document, instead of in the annual report (Regnskapsloven, 2013). This paragraph states that information about conditions at the business which may have a significant impact on the external environment must be provided. It must be stated which environmental effects the individual aspects of the business cause or can cause, as well as which measures have been or are planned to be implemented to prevent or reduce negative environmental effects. If this access is used, this must be disclosed separately in the annual report (Regnskapsloven, 2010).

The paragraph got a new historical version in 2020. This version emphasize that large enterprises are defined by the Act on Annual Accounts §1-5. Furthermore, the requirement that the subsidiary must disclose where the report is publicly available now is specified. Subsidiaries that have an obligation to deliver an annual report have to disclose where the report is publicly available in the annual report (Regnskapsloven, 2020).

In 2021 the Accounting Act undergoes several changes. According to this historical version, large enterprises must prepare a report on social responsibility with certain requirements for the content. Environment, social conditions, working environment, equality and non-discrimination, compliance with human rights and combating corruption and bribery, must

now be included to the extent necessary to understand the company's development, results, position, and consequences of the company's operations. Furthermore, there are minimum requirements regarding what the report should include. Companies must provide a description of the business model, company guidelines, effect of guidelines and risks linked to the company and its operations. Where it is relevant and significant information about business relationships, products or services that can be expected to have a negative impact on conditions, how the company handles these risks and performance indicators that are relevant to the company's operations must also be included in the report (Regnskapsloven, 2021).

The Norwegian Transparency Act, also known as the Public Limited Liability Companies Act, requires companies to be more transparent about their social and environmental practices. The law was passed in 2013 and is seen as a landmark piece of legislation in the field of corporate responsibility. In accordance with the Accounting Act §3-3C, the purpose of this law is to assist investors and stakeholders in making better-informed choices. It's worth noting, that the Transparency Act only concerns the social pillar of ESG and does not require companies to disclose information regarding environmental or governance practices (Åpenhetsloven, 2021).

2.4.3 Future Legal Requirements and European Parliament Directive

In 2022 the EU adopted new rules regarding sustainability reports, called Corporate Sustainability Reporting Directive (CSRD). The directive was first announced in 2018, and included in the Norwegian law and is valid from 2023 (Regnskapsloven, 2023). This directive applies for all listed companies, as well as other companies if they exceed a balance sheet total of 20 million euro, a turnover greater than 40 million euro, or have more than 250 employees. These thresholds also apply for holding companies, and in these cases the reporting requirements apply to the parent company (Dir., 2013/34/EU).

In the EU, the first reports will be done in 2025, for the financial year 2024, and the directive will be fully implemented in 2029. In Norway, the directive was included in both the Accounting Act and Auditors Act the first of January 2023 (Regnskapsloven, 2023). Companies will be reporting on some of the subjects already included in the Accounting Act. Furthermore, companies inform about their impact on sustainability conditions, and on how these conditions affect the development, results, and position of the company. The directive secures that the reports will be more comprehensive and detailed than by today's standards and focus on the pillars in ESG. There is also a requirement to have these reports audited by an independent third-party (Dir., 2013/34/EU), which can be helpful to overcome the validity problems which follows from self-reporting.

3 Hypotheses

The objective of this master thesis is to examine the relationship between ESG disclosure practices and stock price informativeness. We aim to examine whether Norwegian legislation has a noticeable effect on companies' ESG reporting practices, in terms of quality and quantity. By testing hypotheses, we can gain insights into the impact of ESG factors on financial markets and provide guidance for companies and investors alike. We hope to provide this insight through two research question:

Research question #1: How does ESG disclosure affect the informativeness of stock prices?
Research question #2: Is financial materiality of ESG disclosure associated with increased stock price informativeness?

To understand the significance of company specific ESG information in determining the value of sustainability investments and its economic effects, it is important to establish the relevance of ESG disclosure. According to stakeholder theory, companies have a responsibility to balance the interests of all stakeholders. Voluntary disclosure of ESG information may improve a company´s reputation and relationship with stakeholders (Freeman, 2010). On the other hand, shareholder theory posits that companies have a primary responsibility to maximize shareholder value. Hence, work connected to sustainability reporting, that exceed the legal minimum, can be seen as destruction of capital. Further, ESG disclosure practices can be considered as an indication of a company's ESG commitment and intention to reduce information asymmetry regarding ESG risk exposure and to mitigate these risks (Friedman, 2002). Despite consistent evidence of the impact of ESG information on risk assessment and cost of capital, it is unclear whether ESG disclosure improves stock price informativeness (Schiehll & Kolahgar, 2021).

Previous research has mainly focused on the economic effects of ESG disclosure, such as the company's financial performance (Flammer, 2015; Goss & Roberts, 2011; Khan et al., 2016). Existing studies have highlighted the need for further exploration of the role of financial materiality in the effectiveness of sustainability reporting (Schiehll & Kolahgar, 2021), and how

investors can use this to make more informed decisions (Baier et al., 2020). There is still a lack of direct evidence on the decision-usefulness or informativeness of the separate components of ESG disclosure (Khan et al., 2016). Despite the increasing importance of sustainability and ESG factors in investors' decision-making, the existing research does not provide sufficient insight into the differential effect (Schiehll & Kolahgar, 2021). Therefore, this study seeks to examine whether financial materiality in ESG disclosure, compared with overall ESG disclosure, provides incremental effects on a company's stock price informativeness. We anticipate that certain ESG components may exert a more pronounced influence on the informativeness of stock prices.

This study examines the informativeness of ESG disclosure in terms of stock price synchronicity. Stock price synchronicity suggests that greater disclosure leads to stock prices aggregating more firm-specific information. Therefore, the proportion of the variation in a company's stock returns that is explained by market and industry factors should decrease (Morck et al., 2000). Goss and Roberts (2011) found that companies with higher levels of ESG disclosure had more accurate and timely stock price reactions to news events, indicating that investors were better able to incorporate ESG information into their decision-making. We aim to contribute to the literature by exploring the impact of ESG disclosure on stock price informativeness. We expect that companies which provide more transparent and detailed information on their ESG performance will experience a reduction in the volatility of their stock prices.

Further, the study recognizes that companies may have different sustainability strategies and behave differently in terms of the same ESG risk factor. As a result, companies could use various initiatives to mitigate the same ESG risks within the same sector (Schiehll & Kolahgar, 2021). It is suggested that investors' decisions are largely influenced by their assessments of ESG drivers, risks, and opportunities (Berg et al., 2022). Therefore, a deeper consideration of materiality can refine the understanding of whether ESG information reduces information asymmetry and how it is used for price valuation (Schiehll & Kolahgar, 2021). Hence, this study will examine the role of materiality in enhancing the informativeness of ESG disclosure and

investigate how the separate components of ESG disclosure affect a company's stock price synchronicity. We believe that investors will perceive companies that provide ESG disclosures that align with financial materiality to be more reliable and trustworthy, leading to increased confidence in their stock prices. Considering the preceding discussion, the following research hypotheses are formulated:

H1: Companies that provide enhanced ESG disclosure have higher stock price informativeness, which will become evident as a negative association with stock price synchronicity.

H2: Companies that prioritize financial materiality in their ESG disclosure will have higher stock price informativeness than those that do not. This higher stock price informativeness will be indicated by a stronger negative association with stock price synchronicity.

H3: The contribution of individual ESG components to stock price informativeness will vary, which will become evident as a negative association with stock price synchronicity.

H4: Norwegian legislation has a significant impact on companies' ESG reporting practices, both qualitatively and quantitatively.

Although we have set four hypotheses based on previous literature, we acknowledge that there could be another plausible reason for the relationships. Uncontrolled effects, of the factors that are internal and/or external to the firm, may have influenced the outcomes of our study that we may not have controlled adequately. For instance, the rising popularity of green funds and stocks has led small investors to rely on various sources, to decide where to allocate their funds (Sønnervik & Zakariassen, 2022). This phenomenon could have impacted the relationship between ESG disclosure and stock price informativeness.

4 Research Methods

In this chapter, you will be presented with a detailed description of the research models that were employed in this study. The purpose of this section is to familiarize the reader with the specific methodologies utilized in the research process. Further, the rationale behind the selection of these models will be explained. It is essential to understand the strengths and limitations of each approach to ensure the credibility and validity of the study's findings.

4.1 Automated Content Analysis

Automated content analysis is a method of analyzing and categorizing large volumes of text data using computational algorithms and software. The process involves using natural language processing (NLP)[7] techniques to extract relevant information and structure from the text, and then applying machine learning algorithms[8] to classify and categorize the data (Shermis & Burstein, 2013).

One of the most influential developments in this field was the introduction of the Latent Dirichlet Allocation (LDA) algorithm in 2003. LDA is a machine learning algorithm that can be used to identify latent topics[9] in a corpus of text data and has since become a popular tool for topic modeling and text classification. Today, automated content analysis is widely used in a variety of fields, including market research, social media analysis, and political science (Shermis & Burstein, 2013). With the increasing availability of big data[10] and advances in natural language processing and machine learning, the potential for automated content analysis to provide insights into human behaviour and society is greater than ever before (Krippendorff & Yu, 2015).

[7] NPL, a discipline within the realms of computer science and artificial intelligence, concentrates on facilitating computers' ability to comprehend, interpret, and generate human language. This field encompasses the creation of algorithms and models designed to analyze and process natural language data (Shermis & Burstein, 2013).

[8] Learning algorithms are a set of mathematical procedures that enable computers to learn from data inputs and make predictions or decisions based on that learning (Shermis & Burstein, 2013).

[9] Latent topics refer to hidden themes or patterns in text data that can be extracted using techniques such as topic modeling (Wooldridge, 2016).

[10] Big data refers to extremely large, complex and diverse datasets that require advanced technologies and techniques to collect, store, process, analyze and visualize (Krippendorff & Yu, 2015).

The method has four main advantages: scalability, consistency, speed, and objectivity. Scalability refers to the fact that automated content analysis allows for the processing of large amounts of data, in a relatively short amount of time. Consistency implies that the analysis is less prone to errors or variations in interpretation, which can occur with human coders. The algorithms can be programmed to follow specific rules, ensuring that the same criteria are applied consistently across all data (Krippendorff & Yu, 2015). Further, the analysis can provide results much faster than manual methods allowing for more timely insights and decision-making. Automated content analysis can provide a more objective analysis of the data, as it is not influenced by individual biases or opinions (Shermis & Burstein, 2013).

However, the method has some weaknesses that can impact the results of the analysis. Automated content analysis may miss important nuances or context in the text data. Human analysts can still find and correct these errors. The algorithms may struggle with certain aspects of natural language, such as sarcasm or irony, which can lead to incorrect categorization (Krippendorff & Yu, 2015). Given that the data we are analyzing comprises official and formal documents, we anticipate a minimal presence of natural language. As a result, we do not perceive this as a critical concern. Further, the algorithms rely on training data, which can lead to biases in the analysis if the training data is not representative (Krippendorff & Yu, 2015).

This thesis uses the software *NVivo* to perform the automated content analysis on the obtained annual- and sustainability reports. This software has the advantages that it supports various types of data and has a user-friendly interface. Further, it allows multiple users to work on the same project simultaneously, and it has tools for sharing and exporting data in a variety of formats. As we consider these features as great advantages when carrying out the analysis, and OsloMet provides us with a licence, this software is the preferred choice.

Automated content analysis was chosen as the method for this research for several reasons. First, the study focuses on the relationship between ESG disclosure and stock price informativeness, which involves analyzing a large amount of qualitative data. This analysis

allows for the processing of large volumes of data in a relatively short amount of time, which can be an advantage over manual methods. This method can also provide consistency in the analysis, as the algorithms can be programmed to follow specific rules and criteria, minimizing errors or variations in interpretation that can occur with human coders (Shermis & Burstein, 2013). Additionally, the research aims to identify how the contribution of individual ESG components will vary. Automated content analysis can be useful in this regard, as it allows for the identification and categorization of relevant information and themes within the data.

Further, the study aims to investigate the impact of legal requirements on ESG reporting. Specifically, the focus is on the requirements stipulated in the Accounting Act §3-3C. As this section only mandates qualitative reporting (Regnskapsloven, 2013), it is valuable to include a qualitative analysis in the study. This is because such an analysis can provide valuable insights into the nature and quality of ESG reporting. It can help identify the strengths and weaknesses of the reporting practices and highlight areas that require improvement (Shermis & Burstein, 2013). With the increasing volume of ESG reporting, it is essential to use tools that can efficiently and effectively process the data.

4.2 SEM Analysis

To further examine the relationship between ESG disclosure and stock price informativeness, we also conducted a structural equation modeling (SEM) analysis at the company-year level, with observed information matrix (OIM) standard errors. SEM is a powerful analytical tool that allows tests of complex theoretical models by examining relationships between multiple observed and latent variables[11] (Hancock & Mueller, 2013).

As a result of the varying dates of incorporation among the companies in our sample, there are missing data in the dataset. Thus, preforming a SEM analysis can be favourable (Hancock & Mueller, 2013). One of the major advantages of SEM is its ability to model multiple relationships among variables simultaneously, while controlling for measurement error and

[11] Latent variables are unobservable constructs that are used to represent underlying concepts or dimensions of interest. The variables that cannot be directly measured but are inferred from other observed variables (Hancock & Mueller, 2013).

biases. Further, SEM has the capacity to manage missing data and incorporate both observed and latent variables (Hancock & Mueller, 2013), making it a valuable tool for our analysis. Our study involves using a complex theoretical model that includes multiple latent variables and interrelated constructs. Additionally, the dataset consists of variables with covariance between them (presented in Chapter 6) and complex data structures. As Hancock and Mueller (2013) suggests, SEM is a suitable method for handling these challenges. We conducted our analysis using Stata, a commonly used statistical software in social science research.

Although SEM analysis can be a powerful tool, there are some limitations to consider. SEM analysis is based on several key assumptions that underpin the validity and interpretation of its results. First, linearity assumes that the relationships among variables are additive and proportional, enabling a linear representation of the relationships. Second, normality assumes that both observed variables and latent variables follow a normal distribution, facilitating accurate parameter estimation. Independence assumes that observations are independent of each other, ensuring unbiased estimates. Additionally, the absence of multicollinearity assumes that there is no perfect linear relationship among independent variables, avoiding estimation challenges. Homoscedasticity assumes constant variances across all levels of the independent variables, contributing to unbiased estimates. The absence of endogeneity assumes that independent variables are not influenced by the dependent variable or other variables, ensuring accurate causal inference. Last, no model misspecification assumes that the specified model accurately represents the underlying theoretical relationships, avoiding biased estimates. Adhering to these assumptions is important to establish reliable and valid results (Hancock & Mueller, 2013). To ensure appropriateness of our analysis, we conducted a thorough series of diagnostics test of the key assumptions underlying SEM. A comprehensive description of these tests, and goodness-of-fit measures, can be found in Appendix 6 and 7.

The OIM approach is frequently employed in SEM analysis and other maximum likelihood estimations to calculate standard errors, and provide information about the estimations precision (Hancock & Mueller, 2013). In our analysis, we utilize the OIM standard errors to improve the precision and dependability of our findings. By integrating the estimated

parameters, their covariances and correlations, we achieve more accurate estimations of standard errors (Hancock & Mueller, 2013), which plays a pivotal role when striving for validity. As outlined in Appendix 7, the normality assumption was found to be violated through the Shapiro-Wilk test. The OIM technique adeptly addresses these concerns and provides effective results. Further, the technique allows us to account for the potential influence of unobserved heterogeneity[12], which can improve the accuracy of our results. While we controlled for a variety of factors that could impact our results, there may be omitted variables[13] (Wooldridge, 2016).

In accordance with Schiehll and Kolahgar (2021), we employed the following path model, to investigate our research questions. However, their research is based on the Ordinary Least Square (OLS) regression, while ours is as discussed, a SEM analysis:

$$Synchronicity_{i,t+1} = b_0 + b_1 ESGDisclosure_{i,t} + b_2 PricetoBook_{i,t} + b_3 FirmSize_{i,t} + b_4 ROASD_{l,t} + b_5 TotalRevisions_{i,t} + FE + U_{i,t}$$

In this model, the 1-year-ahead *Synchronicity* is our dependent variable. To secure that ESG information is made accessible to the market prior to any fluctuations in stock prices, we incorporate a one-year-lag[14]. The *ESGDisclosure* serves as the primary explanatory variable, which varies across the models to account for the total ESG disclosure, its components, and their derivatives, including material and relative material ESG disclosure. Our model also includes several other control variables, such as the price-to-book equity ratio, *PricetoBook*, natural logarithm of the company´s total assets, *FirmSize*, standard deviation of quarterly return on assets, *ROASD*, and total revisions, *TotalRevisions*. All variables will be explained in

[12] Heterogeneity refers to the presence of unobserved differences or variations within a particular group or population. In research it is important to account for heterogeneity in order to accurately capture the diversity of the population being studied (Hancock & Mueller, 2013).
[13] Omitted variables refer to variables that are not included in a statistical analysis but have an impact on the outcome. Failing to account for these variables can lead to biased or inconsistent results (Wooldridge, 2016).
[14] A one-year lag refers to a time delay of one year in the occurrence of an event and its impact on an outcome.

Chapter 5.5 *Variable Measurement*. To capture the constant effects of company and year, we used a vector of fixed effects (FE)[15].

Overall, by using SEM analysis and conducting rigorous statistical testing, we are able to gain insights into the relationship between ESG disclosure and stock price informativeness (Hancock & Mueller, 2013). The automated content analysis can provide a more objective analysis of the data, as it is not influenced by individual biases or opinions (Shermis & Burstein, 2013). By combining the two analyses we hope our findings can provide valuable information for investors and policymakers seeking to better comprehend the influence of ESG disclosure on financial markets.

[15] A vector of fixed effects (FE) is a statistical method used in regression analysis to account for unobserved heterogeneity across individual units, by adding a set of dummy variables to the model that capture individual-specific characteristics that do not vary over time (Wooldridge, 2016).

5 Data and Variable Construction

This chapter will provide our data, including the information on software sources and descriptive statistics. Additionally, you will be provided an explanation of the scores and dictionary used to test the hypotheses.

5.1 Data Sources

In this subchapter we will provide information regarding what methods and software are used to collect data. This includes information about the databases Refinitiv Eikon and Sustainability Accounting Standard Board (SASB).

5.1.1 Annual Reports

The automated content analysis is performed on a dataset consisting of 248 reports, obtained from company´s webpages. Of these reports we categorize 195 as annual reports, 47 as sustainability reports, and 6 as other reports. Because the disclosure requirements do not obligate companies to have a separate sustainability report (Regnskapsloven, 2013), we include other types of reports where companies have disclosed relevant information. The reports date back to 2003 and extend to 2021. Some companies only provide the reports in Norwegian, therefore our dataset is bilingual.

In our sample, we see an upward trend in the number of reports around the year 2019. The increase appears to be coincidental with the increase in ESG scores provided by Refinitiv Eikon. As previously mentioned, the EU announced in 2018 that it would introduce an ESG taxonomy alongside relevant regulations (Regnskapsloven, 2023). In anticipation of the new regulations, some companies may have adopted ESG reporting as early as 2019 and increased their implementation of it in 2020 as a precautionary measure. Another interesting pattern is the distinct increase in the number of annual reports from 2013. This can be attributed to the implementation of stricter regulations pertaining to sustainability reporting under the Accounting Act §3-3C (Regnskapsloven, 2013). Figure 1 displays the amount of yearly data that has been gathered for the research sample.

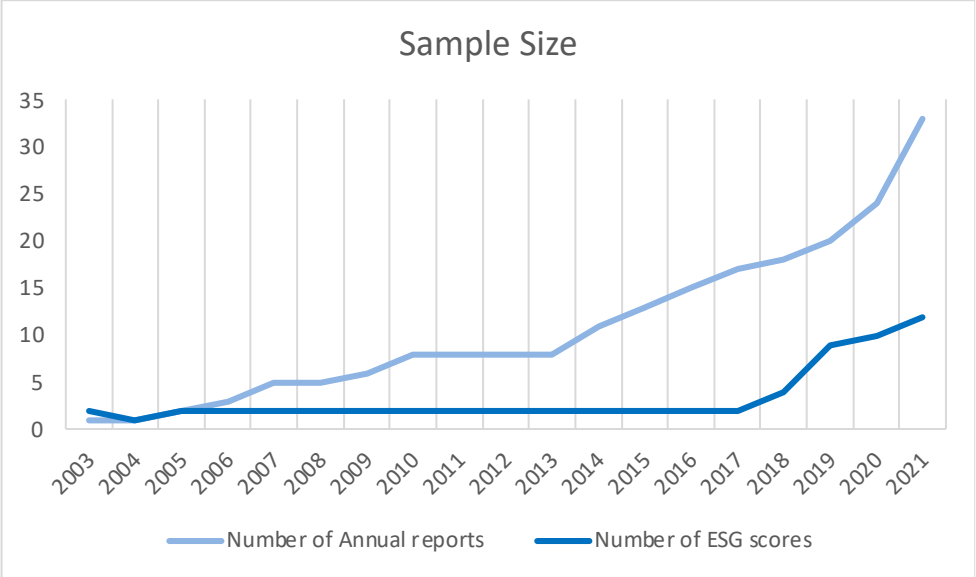

Figure 1 Sample Size

5.1.2 Refinitiv Eikon

Refinitiv Eikon is a recognized and well-known provider of financial market data and gives the user access to industry-leading data, insights, exclusive and trusted news. As the database provide us all the data we need, and is recognized by researcher, investors, and analysts (Refinitiv, 2023) it was chosen over its peers. Through a license provided by OsloMet we have access to the database and used it to develop our dataset.

Refinitiv Eikon is considered one of the largest providers of ESG information and provide data for over 10 000 companies. The data ranges from 2002 to today, in most cases this imply data for 2022. As of March 27th, Eikon provides ESG scores for 82 Norwegian companies (Refinitiv, 2023), however it varies greatly how far back in time data is available.

Sustainability data provided by Refinitiv Eikon is based on 630 ESG variables, and depending on industry a company's score will be calculated by comparing some of them. The variables considered common practice for an industry will be weighed heavier than others. It is important to note that while the database uses financial reports and stock prices to provide financial variables, the sustainability reporting is based on the company´s own reporting (Refinitiv, 2023).

5.1.3 SASB

SASB is an independent organization that develops and maintains industry-specific standards for sustainability accounting. It was founded in 2011 with the aim of providing investors with standardized, comparable, and reliable information on the sustainability performance of companies (SASB, 2023).

SASB's standards are organized into 77 industry-specific categories, covering a range of sustainability topics including ESG issues that are material to financial performance. The standards are designed to help companies identify, manage, and disclose ESG risks and opportunities, as well as to help investors evaluate the sustainability performance of companies in their investment portfolios (SASB, 2023).

SASB collaborates with companies, investors, and other stakeholders to ensure that its standards are relevant and responsive to emerging sustainability issues. The organization also works with accounting and auditing companies to develop training programs and guidance for professionals seeking to integrate sustainability information into financial reporting. The standards are voluntary, but increasingly adopted by companies and investors to enhance their sustainability reporting and disclosure practices. SASB has gained recognition from several financial regulatory bodies, including the US Securities and Exchange Commission (SEC), as a relevant framework for sustainability reporting (SASB, 2023).

Khan et al. (2016) claimed that SASB guidelines for ESG materiality classification had predictive power of a company’s future returns. In accordance with previous literature, their results show that companies concentrated on material sustainability issues often exceeds comparable companies regarding the stock returns. However, this outperformance does not apply for immaterial sustainability issues.

5.2 Sample

As discussed, CSR has become an increasingly important aspect of modern business operations, and in many areas, companies are now expected to report on their ESG practices (Baier et al., 2020). We have conducted a study of 34 Norwegian companies. This is particularly important as the legislation and cultural norms regarding ESG reporting can vary significantly across countries. By focusing on Norwegian companies, we are able to isolate the effects of Norwegian legislation on ESG reporting (as per Hypothesis 4).

The selection of companies in the sample was made according to their respective industries. Refinitiv Eikon has placed the 34 companies in the industries of Consumer Staples and Consumer Discretionary. Our sample is based on these industries as they are highly visible to the public eye. This selection is important because of our assumption that companies in these industries are likely to face greater scrutiny from stakeholders regarding their ESG practices and may therefore be more likely to engage in ESG reporting. By focusing on companies within these industries, we can enhance our understanding of the underlying factors involved in highly visible industries, and how these reporting decisions may be influenced by Norwegian legislation.

It is important to note that Refinitiv Eikon and SASB do not use the same industry classifications. While the two chosen industries in Refinitiv Eikon were Consumer Staples and Consumer Discretionary, these industries correspond to 14 industries in the SASB framework. These industries include Toys & Sporting Goods, Meat, Poultry & Dairy, Leisure Facilities, Processed Foods, Agricultural Products, Education, Food Retailers & Distributors, Auto Parts, E-commerce, Multiline and Specialty Retailers & Distributors, Cruise Lines, Industrial Machinery & Goods, and Real Estate. It is worth noting that while there is some overlap between the two classifications, there are also significant differences, which may impact the interpretation and comparability of ESG data across different platforms. When we conducted our analyses, we considered the industry classifications used by different data providers and frameworks, to ensure that the industries being compared are equivalent.

5.3 Dictionary

This section will detail how we developed our dictionary and the decisions that were made during the creation process. To analyze industry-specific ESG-related language in annual reports, we followed the methodology outlined by Loughran and McDonald (2016), which involves tabulating the occurrence of certain ESG-related bigrams.

5.3.1 Existing Dictionaries

In the realm of textual analysis, sentiment dictionaries are widely used, and there are many established dictionaries available that show words associated with positive or negative sentiment. Loughran and McDonald (2016) word list stands out as one of the most renowned sentiment dictionaries within finance, encompassing a collection of 2329 negative words and 354 positive words.

However, there is currently a limited availability of comprehensive dictionaries specifically focused on ESG-related terminology. Baier et al. (2020) have presented an ESG dictionary consisting of 482 words, all of which pertain to ESG-related topics. Their dictionary, however, lacks industry-specific attributes indicating the relevance of words within different sectors, and it solely comprises single words, or unigrams. In our analysis, we prefer to employ bigrams, which are two-word combinations frequently utilized in textual analysis to capture crucial sequencing information within text documents. Given the scarcity of ESG dictionaries that adequately fulfill our requirements, we have developed a customized dictionary tailored explicitly to our research objectives.

5.3.2 ESG Dictionary

The ESG dictionary used in the content analysis algorithm must consider both the context of the text and the order in which the words appear. As a result, our dictionary contains bigrams rather than unigrams. Our ESG dictionary is developed based on a study by Kolahgar et al. (2021), which identified a comprehensive range of multiword expressions that capture a company's overall communication strategies regarding all financial and operational aspects of the company performance. Since our study is focused on the disclosure of financial materiality in ESG, we created a subset of 1856 ESG-related bigrams that are more specific to this area.

We have created two ESG dictionaries, one in Norwegian and the other in English, because our sample of annual reports is bilingual. By having separate dictionaries for each language, we can ensure that our analysis of ESG disclosures in the annual reports is accurate and comprehensive. The dictionaries contain bigrams related to the three pillars of ESG, which are used to identify and categorize relevant information within the annual reports. By creating language specific ESG dictionaries, we can more effectively analyze the ESG disclosures and gain insights into how companies are addressing these important issues in their reporting.

5.3.3 Pre-Processing

Data pre-processing involves manipulating data prior to its utilization to enhance performance. In the present context, we conducted a pre-processing on the industry reports sourced from SASB to eliminate irrelevant textual attributes that lack informative value for our analysis. To automate this pre-processing task, we employ the *tm* package developed by Feinerer (2020) in the R programming language. This package encompasses a set of functions specifically designed for streamlining pre-processing procedures.

The pre-processing involves several steps. First, numbers are removed as the Accounting Act §3-3C do not require the disclosers to include quantitative measures (Regnskapsloven, 2013). Further, punctuations are removed as they do not offer informative value in the text (Feinerer, 2020). For instance, "Environment!" and "Environment." are not distinguished. Moreover, the "/n" symbol is eliminated, as it has no informative value in the text (Feinerer, 2020).

The next step involves converting all the letters to lower case to avoid the differentiation. Stop words, such as "the" and "is", are removed as they do not provide informative value when searching for ESG related bigrams. Finally, stemming is performed, which involves shrinking words with different endings to a single root to avoid differentiation between words with different endings. However, stemming may have a downside as words with different interpretation may be reduced to the mutual origin (Feinerer, 2020), such as "waiting" and "weighting," which both become "wait”.

Using statistical packages for pre-processing offers a significant time-saving advantage. In English, Porter stemming is commonly used to reduce words to their root form by removing suffixes and prefixes. This algorithm is based on a set of rules and uses linguistic knowledge to determine the correct stem for each word. Porter stemming is widely used because it is fast and relatively accurate, and it can handle most common words and many irregular forms. In Norwegian one often uses Snowball stemming, which is a variant of the Porter algorithm. Snowball is designed specifically for Scandinavian languages, which have more complex inflectional systems than English. Snowball is also based on linguistic rules, but it is more flexible than Porter and can handle a wider range of word forms (Feinerer, 2020).

The reason why Porter stemming is not ideal for Norwegian is that it cannot handle the complex inflectional system of Norwegian. For example, Norwegian has several different forms for each noun, depending on its gender and case. Porter stemming cannot always correctly identify the root form of a Norwegian word, which can lead to incorrect search results or inaccurate analysis of text. However, Snowball stemming has its limits. Like Porter, it is based on a set of rules and cannot handle all irregular forms or idiosyncrasies of the language (Feinerer, 2020). Despite of these challenges we find that Porter stemming is the best alternative for the English version, and Snowball stemming for the Norwegian version, for our purposes.

As previously discussed, our dictionary is based on bigrams, because of the belief that it is essential in conveying information. Utilizing bigrams provides a distinct advantage by enriching our understanding through valuable word context information (Feinerer, 2020). For instance, the term "Child_labor" conveys a distinct meaning that diverges from the individual definitions of "child" and "labor.". On the other hand, utilizing bigrams instead of unigrams could result in sacrificing important information in situations where word order doesn't provide meaningful insight (Feinerer, 2020).

5.3.4 Reducing and Improving the Dictionary

In summary, the process of improving the ESG dictionary involved manually removing irrelevant bigrams from a raw dictionary. This manual process is prone to errors due to subjective assessments (Feinerer, 2020). The most frequently mentioned bigrams from each annual report were identified, and 20% of these bigrams were gathered for each company in the sample. This gave a list of 2482 unique bigrams that were then assessed manually.

In light of on Loughran and McDonald (2016) observation that a limited number of words exert substantial influence on occurrence rate, thorough evaluation was given to the most significant bigrams. Finally, 626 unwanted bigrams were removed manually, leaving 916 subjectively approved unique bigrams in the English dictionary. In the Norwegian dictionary there were included 905 bigrams (See Appendix 1 and 2). The process was necessary to improve the dictionary (Loughran & McDonald, 2016), with the objective of enhancing ESG scoring effectiveness and giving priority to meticulous evaluation of the most important bigrams.

5.3.5 Legal Dictionary

In addition to the ESG dictionary, we have developed a Legal dictionary that is based on the Accounting Act §3-3C (Regnskapsloven, 2013). This is because we recognize that legal requirements possess significant impact on a company's operations, in addition, failing to comply with them can result in legal consequences that can ultimately affect the company's financial performance. As such, we have included legal requirements as part of our qualitative analysis to ensure that companies are not only meeting their ESG goals, but also complying with relevant legal obligations. The aim is that this dictionary also will be a valuable tool when examining what effect mandatory disclosing have.

The Legal dictionary encompasses a broad spectrum of legal subjects that hold relevance for businesses. By analyzing a company's compliance with these legal requirements, we can gain a better understanding of its risk profile and potential exposure to legal sanctions. This, in turn, can help investors and stakeholders make more informed decisions about whether to

invest in or engage with a particular company. Overall, the Legal dictionary is a valuable addition to our analytical tools, helping us to offer a more extensive examination of companies' ESG performance and their respondence to the mandatory disclosing requirements.

As mentioned, our sample of annual reports consists of documents in both languages. Therefore, also the legal dictionary is created in both Norwegian and English. By creating language specific dictionaries, we can more effectively analyze the disclosures and gain insights into how companies are addressing these important issues in their reporting. The English version consist of 17 bigrams, and the Norwegian version consist of 18 bigrams. These are constructed based on the Accounting Act §3-3C.This is because this version is being used as a cut-off point for when legislation made it mandatory to engage in ESG reporting for Norwegian companies (Regnskapsloven, 2013). Therefore, we have included a few, but carefully selected and specific, bigrams in this dictionary (See Appendix 3 and 4).

5.4 Variable Measurement

In this subchapter we will introduce the variable measurements used in this thesis. This refers to the process of quantifying and assigning values to a particular variable of interest. As it allows us to analyze and compare data across different observations, we find this section especially important.

5.4.1 ESG Disclosure and ESG Score

We employed an automated content analysis technique to capture the extent and substance of a company's ESG disclosure that is financially material. To achieve this, we utilized the bag-of-words method, which involves the automatic classification of disclosed information into subject matter categories based on their frequency using a predetermined set of labels. This approach offers several benefits over manual analyses, including a consistent and methodical procedure for all documents, years, and companies included in the sample (Shermis & Burstein, 2013).

We used the dictionary to quantify the frequency of ESG disclosure for each company and year under analysis. The dictionary was based on studies by Kolahgar et al. (2021) and Schiehll and Kolahgar (2021), and grouped into the three ESG pillars (See Appendix 1 & 2). The keyword frequencies were summed for each ESG category to identify the degree of the company's disclosure for that category. By calculating the standardized frequency of each ESG subcategory for each company, we derived the *ESGDisclosure* score - a total ESG disclosure score expressed as an equally weighted arithmetic average of all subcategories, regardless of their materiality (as per Hypothesis 1).

To compute a company's material ESG disclosure score, we used a weighting system based on the SASB Materiality Map, which identifies the ESG subcategories that are prone to have a greater impact on the financial condition or operational performance of a company in regard to the industry in which the focal company operates (SASB, 2023). The material ESG disclosure score, *MaterialESGDisclosure,* was then computed as the weighted average of the disclosed scores by the company in Refinitiv for the SASB identified material ESG disclosure (as per Hypothesis 2).

Furthermore, we computed an alternative measure, labelled the relative material ESG disclosure, *RelativMaterialESGDisclosure*, to compare the material to total ESG disclosure. This variable is the ratio of the MaterialESGDisclosure score to the ESGDisclosure score. These measures are computed in accordance with the analysis presented by Schiehll and Kolahgar (2021). We disaggregated each disclosure score into the three ESG pillars to investigate the differential effect of the different components of the ESG disclosure (as per Hypothesis 3).

5.4.2 Score Validation

In this study, we use an automated content analysis combined with a weighting procedure to identify material ESG issues, ensuring the face validity of their ESG disclosure scores. These scores allowed for accurate distinction of the level and degree of materiality of ESG disclosure among the sample companies, even though they are inherently noisy measures. To provide empirical evidence for the external validity of their scores, we have conducted a series of correlation tests (Wooldridge, 2016). The ESGDisclosure score was positive and significant

correlated with firm-level attributes. There was a 0.5569 correlation with market capitalization, and a 0.5578 correlation with capital structure[16]. These correlations supported the validity of their ESG disclosure scores as reliable measures of the cross-sectional variation[17] in the level and degree of materiality of ESG disclosure for their sample companies.

It is worth emphasizing that the ESG scores used in this study are based on the company's own reporting. This creates potential problems for different types of validity, such as content-, criterion-, and construct validity (Wooldridge, 2016). When discussing Berg et al. (2022) findings, the issue of validity was already brought up, indicating that there may be concerns about the accuracy and reliability of the results. The findings reported by Gibson Brandon et al. (2021) are consistent with these results. To address these concerns, we took measures such as conducting correlation tests and collecting data from an external ESG provider.

5.4.3 Stock Price Synchronicity

To measure the informativeness of stock prices, we followed the same procedures as previous studies, such as Ferreira et al. (2011), who examined the value relevance of various attributes of a company's information environment. Our measure of stock price synchronicity, *Synchronicity*, was obtained by calculating the determination coefficient[18](R^2) value from a regression of the company's return on stock prices on the market- and industry returns, in accordance with Schiehll and Kolahgar (2021) procedure. This indicates the degree to which variations in the company's stock price can be explained by industry- and market-wide information, with a lower R^2 indicating more company-specific relevant information available to investors.

[16] Capital structure is given by Debt/Total assets. The capital structure of a company is important because it can impact the risk and return characteristics of the company, as well as its ability to raise funds for future growth (Hancock & Mueller, 2013).

[17] Cross-sectional variation refers to differences in data between individuals, groups, or entities at a particular point in time (Wooldridge, 2016).

[18] The determination coefficient, also known as R^2, is a statistical metric that quantifies the fraction of variance in a dependent variable that can be elucidated by the independent variable(s) within a model (Wooldridge, 2016).

We use Synchronicity to capture variations in company stock price that may be linked to company-specific ESG information disclosed to the market (Brammer & Pavelin, 2008). We hypothesized that companies that disclose more and material ESG information will have higher stock price informativeness (as per Hypotheses 1 & 2). Synchronicity is calculated using the formula:

$$Synchronicity = LN\left(\frac{R^2}{1-R^2}\right)$$

To account for other factors that may influence stock price informativeness, we also considered several control variables[19] in our empirical analysis. While ownership structure and the composition of the investor base have been found to have significant effects on a company's stock price performance and volatility (Ferreira et al., 2011), it is only relevant when institutional investors are present. In this case, none of the companies in the sample have institutional owners, and thus controlling for institutional ownership is not necessary for the analysis[20].

5.4.4 Price-to-Book ratio and Firm Size

In our study, we followed the approach suggested by Schiehll and Kolahgar (2021) and included firm size and price-to-book ratio of equity as control variables in our empirical models. Firm size and price-to-book have been widely used to proxy for various factors that could influence company's disclosure practices, such as visibility, public pressure, and risk (Brammer & Pavelin, 2008). Specifically, we included the natural logarithm of total assets, *FirmSize,* and the ratio of the price value of equity to the book value of equity, *PricetoBook,* in our analysis, which were assessed at the commencement of the fiscal year. The data on FirmSize and PricetoBook were collected from Refinitiv Eikon.

[19] Control variables refer to supplementary independent variables integrated into an analysis to accommodate potential confounding influences on the association between the dependent variable and the independent variables of focus (Wooldridge, 2016).

[20] According to Wooldridge (2016), it is not necessary to control for variables that are not present in the dataset, as including such variables would not provide any additional information for explaining the variation in the dependent variable.

By controlling for FirmSize and PricetoBook in our analysis, we aim at isolating the effect of other factors on company's disclosure practices and financial performance. Our approach is consistent with the existing literature and enables us to gain a deeper comprehension of the relationship between company's disclosure practices and financial performance (Khan et al., 2016; Piotroski & Roulstone, 2004; Schiehll & Bellavance, 2009; Schiehll & Kolahgar, 2021). This is particularly important given the growing importance of CSR and sustainability for companies and their stakeholders (Baier et al., 2020). By identifying the determinants of company's disclosure practices and financial performance, our study contributes to the ongoing discussion on the value of ESG reporting and value creation for future research and investors.

5.4.5 Analyst Forecast Revisions

This study recognizes the significance of accounting for the influence of analyst forecasting activities on stock price synchronicity. Previous research has shown that there is a significant relationship between the level of analyst coverage and the intensity of analyst activity with the synchronicity of stock returns. This is because analysts perform a essential function in disseminating information across the industry, which contributes to a more efficient market by increasing the flow of information among companies (Piotroski & Roulstone, 2004).

To measure the impact of analyst forecasting activities on stock price synchronicity, we followed the methodology proposed by Piotroski and Roulstone (2004) and included a measure of analyst revision, *TotalRevisions*, in our path model. We calculated TotalRevisions as the natural logarithm of the number of 1-year-ahead earnings forecasts published and rectified for the company, during the last fiscal year. These forecasts were also retrieved from Refinitiv Eikon. By including TotalRevisions in our model, we aim to capture to what degree analyst forecasting activities impact the level of synchronicity in stock returns (Schiehll & Kolahgar, 2021), and ultimately contribute to a more informed and efficient market.

5.4.6 Compliance with the Norwegian Law

This study examines how company's sustainability reporting practices are influenced by the mandatory requirements, established by the Norwegian law. Two primary attributes of companies that prepare sustainability reports in compliance with various standards potentially interfere with this association. First, some of these companies are legally bound to produce reports, whereas voluntary reports are suggested to be more transparent and informative to the market. Second, reports that adhere to a specific set of standards or regulations tend to be more industry specific (Khan et al., 2016).

The analysis include a dummy variable that indicate if a company disclose ESG data in compliance with The Accounting Act §3-3C (Regnskapsloven, 2013). This measure is derived from the conclusions drawn in the automated content analysis and is referred to as *LawCompliance* in our analysis. The variable has a higher number of observations than the reports due to legislation that allows certain companies to opt out of disclosing sustainable issues, enabling them to comply with the legislation without reporting. In Table 6 and Figure 9 you can see an overview of the compliance within our sample.

5.4.7 Standard Deviation of Return on Assets

We followed the approach of Schiehll and Kolahgar (2021) in accounting for the noise in financial information as a control variable for the extent of ESG disclosure. It has been suggested that nonfinancial disclosure is driven by the limitations of traditional financial information to accurately reflect a company's economic performance (Schiehll & Bellavance, 2009). Therefore, we included a measure of noise in the financial information by controlling for the standard deviation of the company's return on assets, retrieved from Refinitiv Eikon. This variable is expected to be positively correlated with the extent of ESG disclosure (Schiehll & Kolahgar, 2021). *ROASD* was calculated as the ratio of income prior to financing costs over total assets. This control variable is important as it enables us to separate the impact of ESG disclosure on the company's performance, from the effect of accounting noise. In Appendix 5 we present the mathematical formulas of our control variables defined in this chapter.

6 Results

The aim of this chapter is to present the results obtained through our automated content- and SEM analysis. Our intention is to shed light on the association between companies' ESG disclosures and their effect on stock price informativeness. Specifically, we investigate the validity of four hypotheses that address different aspects of this relationship.

6.1 Descriptive Statistics, Correlations and Covariances

Variable	Obs.	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis
Synchronicity	214	-1.1757	1.6342	-8.5169	5.4217	.1787	.0000
ESGDisclosure	75	.5493	.1674	.1750	.9074	.6286	.2754
EnvironmentalPillar	71	.5576	.2261	.0324	.9796	.9129	.4079
SocialPillar	75	.6207	.2074	.1617	.9068	.1417	.0004
GovernancePillar	75	.5079	.1619	.1883	.9130	.5986	.8191
MaterialESGDisclosure	83	.5524	.2252	.1754	.7765	.0101	.2982
EnvironmentalMaterial	74	.6022	.6626	.0651	.9743	.7004	.9996
SocialMaterial	83	.5875	.1541	.1163	.7963	.0034	.2440
GovernanceMaterial	83	.4845	.0858	.2345	.6546	.0063	.2303
RelativeMaterialESGDisclosure	75	1.0495	.6357	.7650	6.3350	.0000	.0012
ROASD	224	.0002	.0014	0	.0125	.0001	.0000
TotalRevisions	83	.9756	.7087	0	2.4849	.5618	.0080
PricetoBook	166	2.5521	1.8100	.3162	14.8239	.0000	.0000
FirmSize	175	19.4052	2.3372	12.1636	22.8739	.0000	.0569

Table 1 Descriptive Statistics

Table 1 displays descriptive statistics, providing a comprehensive overview of the dataset. The sample's mean ESG disclosure score is 0.5493, reflecting the average performance across the observed companies. The range of ESG scores, from 0.1750 to 0.9074, indicates a significant variation between the best and worst disclosures. While the differences in mean scores for each ESG pillar are relatively small, the environmental pillar stands out with both the lowest and highest scores, offering insights into the developments in that domain of ESG practices.

Skewness is a statistical measure of asymmetry in data distribution, with a zero-value indicating perfect symmetry. Positive skewness suggests a longer right tail, while negative skewness suggests a longer left tail (Wooldridge, 2016). All the skewness values in our dataset are positive and between 0 and 1. This indicates a slight right-skewness in the distribution, suggesting that there is a tendency towards higher values without the presence of significant outliers.

Kurtosis measures the heaviness of distribution tails, where high values indicate more extreme values or outliers, and low values indicate a distribution closer to normal with fewer outliers. A normal distribution has a kurtosis coefficient of 3, representing symmetry and moderate tail behaviour (Wooldridge, 2016). All the kurtosis values in our data are positive and less than 1. This indicates that the distribution has lighter tails compared to a normal distribution, suggesting that the data has fewer extreme values or outliers. Hence, the data exhibits a relatively more moderate tail behaviour.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Synchronicity	1.0000												
(2) ESGDisclosure	0.0078	1.0000											
(3) EnvironmentalPillar	0.0280	0.8376***	1.0000										
(4) SocialPillar	0.0228	0.8241***	0.6503***	1.0000									
(5) GovernancePillar	-0.0022	0.6770***	0.2414**	0.3286***	1.0000								
(6) MaterialESGDisclosure	-0.2537**	0.3410***	0.1953	0.2808 **	0.2608**	1.0000							
(7) EnvironmentalMaterial	-0.2653**	0.0386	0.0309	-0.0318	0.0713	0.9643***	1.0000						
(8) SocialMaterial	-0.0271	0.8200***	0.6607***	0.9426***	0.3591***	0.3639***	0.0189	1.0000					
(9) GovernanceMaterial	0.0004	0.6896***	0.3429***	0.4873***	0.6505***	0.2506**	-0.0416	0.4983***	1.0000				
(10) ROASD	-0.0543	0.1908	0.1070	0.1107	0.2408**	0.0627	-0.0076	0.1545	0.2043*	1.0000			
(11) TotalRevisions	-0.1399	0.1845	0.0930	0.2015	0.0808	0.0050	-0.1628	0.1783	0.0974	-0.0225	1.0000		
(12) PricetoBook	0.1241	-0.1778	-0.1138	-0.2940**	-0.0523	-0.0548	0.0145	-0.0864	-0.0882	0.1889*	-0.1984*	1.0000	
(13) FirmSize	-0.2802***	0.5323***	0.3254**	0.4283***	0.3117**	0.1498	0.1005	0.2458*	0.0749	0.2626**	0.4220***	-0.0963	1.0000

Table 2 Correlation Matrix
**p < 0.10, **p < 0.05, and ***p < 0.01*

Table 2 displays the correlations among variables, and as expected, there are correlations between some variables included that is relatively high. However, this is in line with our expectations and is further elaborated upon later in the chapter. Figure 2 displays covariance values between the control variables (PricetoBook, FirmSize, TotalRevisions, and ROASD) that are included in all the analyses. This means that these variables can have an interdependent effect on the dependent variable (Hancock & Mueller, 2013). From Figure 2, we observe a significant high covariance between FirmSize and TotalRevisions, which aligns with our intuitive expectations. The covariance reaches as high as 0.733, thereby highlighting the advantage of utilizing SEM analysis, which incorporates the relationships among the control variables.

The purpose of presenting this information is to provide a transparent and comprehensive account of the analytical methods and procedures used in the analysis. By reporting the correlation and the covariances between variables, readers can evaluate the reliability and validity of the study's findings and interpretations.

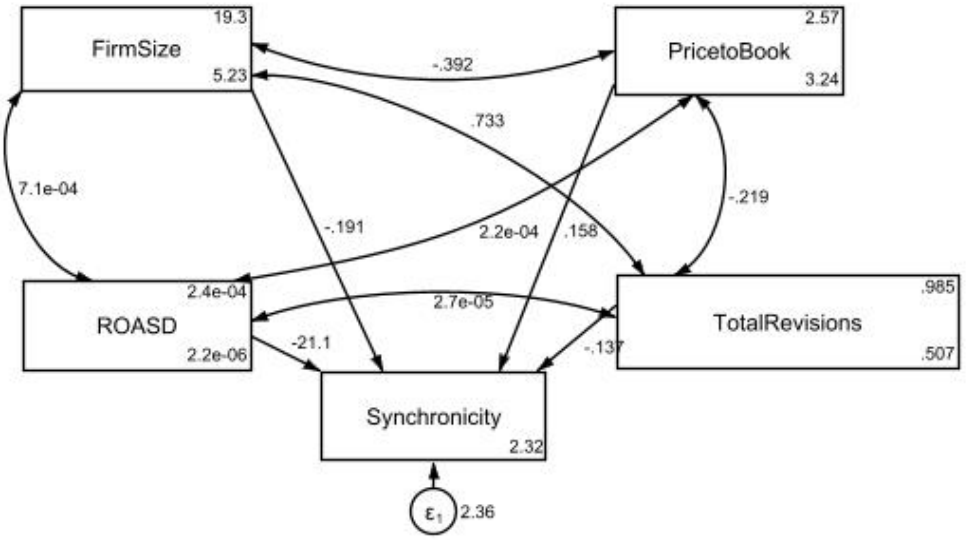

Figure 2 Covariance values between the independent variables included in all the analyzes

As shown in Chapter 5.4 *Variable Measurement,* previous research shows that these control variables have an effect on the dependent variable, Synchronicity (Brammer & Pavelin, 2008; Khan et al., 2016; Piotroski & Roulstone, 2004; Schiehll & Bellavance, 2009; Schiehll & Kolahgar, 2021). Therefore, it is necessary to include them in the analysis to control for their potential confounding effects. Statistical theory suggests that omitting relevant variables from the analysis can lead to biased and inconsistent estimates of the coefficients. This is known as omitted variable bias, which can cause the estimates of the effects of included variables to be either overestimated or underestimated (Wooldridge, 2016). It is still the case that including all relevant independent variables in the analysis, even if they are not statistically significant, can help reduce the possibility of omitted variable bias. Further, provide a more accurate estimation of the true effects of the control variables (Hancock & Mueller, 2013).

6.2 Hypothesis 1

Companies that provide enhanced ESG disclosure have higher stock price informativeness, which will become evident as a negative association with stock price synchronicity.

Tables 3 to 5 display distinct models that examine different variables of interest, and their impact on Synchronicity. While these models share the same dependent variable and several of the same control variables, they diverge in their focus on the ESGDisclosure level, the degree of materiality disclosure, and the degree of relative materiality disclosure. It is worth noting that these models are designed to test the hypotheses formulated in this study and are not intended for other purposes.

	(I)	(II)	(III)	(IV)
EnvironmentalPillar	1.2046 (1.11)			
SocialPillar		2.1637 (1.71)*		
GovernancePillar			1.5407 (1.02)	
ESGDisclosure				2.6796 (1.65)*
PricetoBook	.1719 (1.88)	.2388 (2.32)**	.1753 (1.93)*	.2072 (2.17)**
FirmSize	-.2590 (-2.50)**	-.3109 (-2.79)***	-.2420 (-2.69)***	-.3413 (-2.73)***
ROASD	-24.1861 (-0.33)	-29.0893 (-0.39)	-38.9818 (-0.51)	-37.0604 (-0.50)
TotalRevisions	-.1464 (-0.53)	-.1945 (-0.70)	-.1531 (-0.55)	-.1818 (-0.67)
Const.	3.0538 (1.90)*	3.3499 (2.00)**	2.5817 (1.86)*	3.9268 (2.15)**
Obs.	349	349	349	349
R^2	.1485	.1743	.1584	.1785

Table 3 Synchronicity on ESGDisclosure score and components disclosure scores
**p < 0.10, **p<0.05, and ***p < 0.01. Mark that z-statistics is presented in parentheses.*

The results presented in Table 3, model IV, provide evidence that contradicts Hypothesis 1, which had anticipated a negative association between ESGDisclosure and Synchronicity. The findings suggest that ESGDisclosure do not enable companies to communicate specific information that is reflected in Synchronicity. This effect is manifested as a positive association with Synchronicity, which leads to an increased movement between stock prices and market returns. R^2 for the model is 0.1785, indicating that the model's explanatory power is 17.85%, which is relatively low. This implies that only a modest proportion of the dependent variable's variance can be accounted for by the control variables included in the model, suggesting the need for further investigation or the inclusion of additional variables to enhance the model's predictive accuracy (Wooldridge, 2016).

Specifically, the results indicate that for each percent increase in the ESGDisclosure score, Synchronicity increases by 2.6796 units, resulting in an approximately 13.58%[21] increase in the influence of market and industry returns to explain the variance in stock price. This relationship is statistically and economically significant at a 10% level. The full path model, including covariances and coefficients, are presented in Figure 3. This figure also shows a relatively high covariance of 0.31 between ESGDisclosure and FirmSize, which can suggest a potential reversed relationship, as discussed by Waddock and Graves (1997).

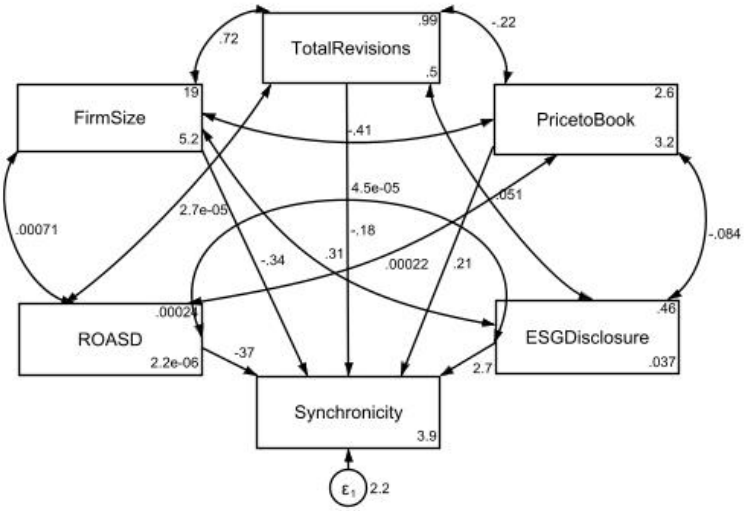

Figure 3 Path Model Synchronicity on ESGDisclosure score

Statistical significance is typically set at a 5% level. Results that are significant at the 10% level are less desirable, because they are less certain and more prone to errors. However, the results can still provide some value as they may suggest a potential relationship between the variables, which can be further explored and studied in future research. Yet, it is generally advisable to aim for a 5% significance level in statistical analyses (Wooldridge, 2016).

Based on our observations from the automated content analysis, the results obtained from the SEM analysis appear to be valid. There is a notable gap in the reporting concerning the economic consequences associated with the implementation of ESG initiatives. The reports primarily focus on topics of societal importance, such as ethics and human rights, rather than factors that directly influence the company's performance, such as emission quotas.

[21] The percentage change is calculated using Wooldridge's (2016) method, with a log-transformed dependent variable. The calculation is given by: $e^{B_i} - 1$.

Moreover, we have observed a significant lack of descriptions regarding ESG initiatives that would directly impact the company's performance, with minimal attention given to their effect on key performance indicators like changes in sales revenue. Note that the observed emphasis on societal issues may not fully capture the comprehensive economic implications of the company's ESG initiatives. Therefore, a more thorough analysis is necessary to assess the true financial effects of these measures on the organization. As a result, it cannot be concluded that companies with enhanced ESGDisclosure have more informative stock prices.

6.3 Hypothesis 2

Companies that prioritize financial materiality in their ESG disclosure will have higher stock price informativeness than those that do not. This higher stock price informativeness will be indicated by a stronger negative association with stock price synchronicity.

	(I)	(II)	(III)	(IV)
EnvironmentalMaterial	1.5760 (-0.24)			
SocialMaterial		1.1846 (0.78)		
GovernanceMaterial			1.3261 (0.56)	
MaterialESGDisclosure				2.0088 (1.08)
PricetoBook	.1517 (1.69)*	.1749 (1.86)*	.1689 (1.84)*	.1726 (1.86)*
FirmSize	-.2473 (-2.66)***	-.2163 (-2.44)**	-.1953 (-2.57)***	-.2260 (-2.55)**
ROASD	-27.0216 (-0.36)	-29.2473 (-0.39)	-30.3651 (-0.40)	-32.5997 (-0.43)
TotalRevisions	-.0677 (-0.24)	-.1500 (-0.54)	-.1520 (-0.55)	-.1220 (-0.44)
Cons.	2.6129 (1.81)*	2.1247 (1.59)	1.7632 (1.09)	1.9254 (1.44)
Obs.	349	349	349	349
R^2	.1540	.1322	.1348	.1363

Table 4 Synchronicity on MaterialESGDisclosure score and components disclosure scores
**p < 0.10, **p<0.05, and ***p < 0.01. Mark that z-statistics is presented in parentheses.*

The results presented in Table 4, model IV, provide evidence that contradicts Hypothesis 2, which anticipated a negative association between MaterialESGDisclosure and Synchronicity. The findings suggest that MaterialESGDisclosure does not enable companies to communicate material specific information, reflected in the stock price synchronicity. This effect is manifested as a positive association with stock price synchronicity, an increased movement between stock prices and market returns. In line with previous findings (Wooldridge, 2016), the R^2 value of 0.1363 once again reflects a relatively low level of explanatory power for the model, indicating that only 13.63% of the dependent variable's variance can be accounted for.

Explicitly, the results indicate that for each one percent increase in the MaterialESGDisclosure score, Synchronicity increases by 2.0088 units, resulting in an approximately 6.45% increase in the influence of market and industry returns to explain the variance in stock price. Further, these results indicate that the relationship is not statistically significant, as the p-value is greater than 0.05 and 0.10. Consequently, we should not rely on these results to make any conclusive statements regarding the impact of ESGDisclosure on company value, as it does not meet the statistical significance threshold. The full path model, including covariances and coefficients, are presented in Figure 4.

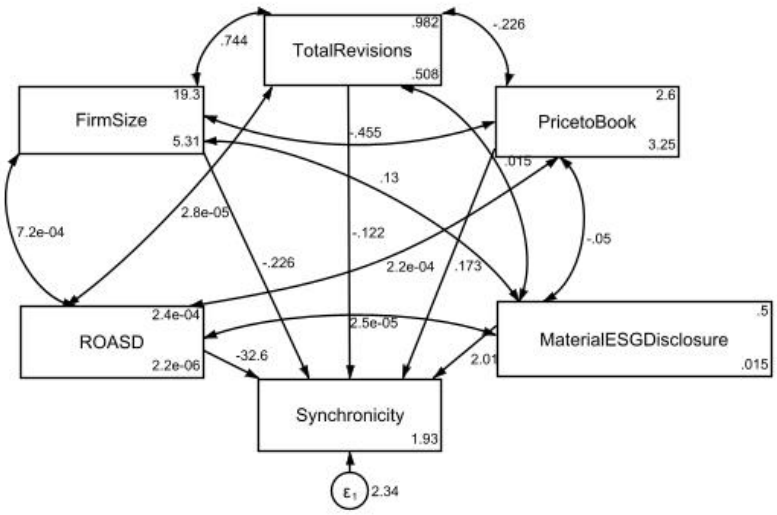

Figure 4 Path Model Synchronicity on MaterialESGDisclosure score

It is intriguing to note that the covariance between the disclosure score and FirmSize has significantly decreased, now resting at a considerably lower level of 0.13. This aligns more closely with the causal relationship utilized by both the shareholder and the stakeholder theory (Freeman, 2010; Friedman, 2002). As previously discussed, our SEM analysis reveals that ESG reporting inadequately incorporates information concerning ESG initiatives that directly impact the company's economic performance. Additionally, the analysis uncovered a limited number of companies reporting on Materiality, which involves assessing the potential impact of ESG factors on the company's financial performance and long-term sustainability. Instead, there is a greater emphasis on areas related to reputation, reflecting our understanding of investor and societal priorities in Norway. As a result, we must assume that the enhanced material ESG disclosure of companies does not necessarily make their stock prices more informative of their future performance.

	(I)
RelativeMaterialESGDisclosure	-1.7106 (-1.02)
PricetoBook	.2152 (2.12)**
FirmSize	-.2249 (-2.72)***
ROASD	-27.9137 (-0.38)
TotalRevisions	-.1721 (-0.63)
Cons.	4.5908 (1.77)*
Obs.	349
R^2	.1662

Table 5 Synchronicity on RelativeMaterialESGDisclosure score and components disclosure scores
**p < 0.10, **p<0.05, and ***p < 0.01. Mark that z-statistics is presented in parentheses.*

The study utilizes the Relative Material ESG Disclosure score, which measures the ratio of material ESG disclosure to total ESG disclosure (See Table 5). This is to examine whether company's disclosure of material ESG information has an incremental effect on stock price informativeness. The results suggest that companies that provide more material than non-material ESG information have an insignificant negative association with Synchronicity, contradicting the argument that materiality increases the informativeness of sustainability reporting. The calculated percent increase in financial materiality of ESG disclosure corresponds to an approximately 0.81% decrease in the unexplained portion of the variation in stock price returns. These results are not statistically significant at the 5% or the 10% level.

In summary, the study finds no statistically significant relationship (on a 5% level) between ESG disclosures and Synchronicity, as well as material ESG disclosures and Synchronicity. Further, the results do not indicate a significant relative relationship between them. These findings align with the results obtained from our automated content analysis, providing a coherent understanding.

6.4 Hypothesis 3

The contribution of individual ESG components to stock price informativeness will vary, which will become evident as a negative association with stock price synchronicity.

The results presented in Table 3, model I to III, do not provide conclusive evidence regarding H3, which anticipated that the contribution of individual ESG components on Synchronicity will vary. To address this hypothesis, we have conducted three separate analyzes. Model I display the results for environmental pillar, model II the results for the social pillar, and model III the governance pillar.

The findings reveal that the EnvironmentalPillar and GovernancePillar of ESG have no statistically significant relationship with Synchronicity. Therefore, any conclusions based on these relationships should be made with caution. However, the study found a statistically significant relationship between Synchronicity and the SocialPillar at a 10% significant level. The results indicate that a one percent increase in the SocialPillar score corresponds to a 2.1637 unit increase in Synchronicity, which subsequently leads to a 7.70% enhancement in the ability of the market and industry returns to account for the variability in stock price. These findings highlight the importance of considering the SocialPillar of ESG in assessing the impact of ESG disclosures on the stock price informativeness of companies. Again, the results are statistically significant at a 10% level, and one needs to consider them with caution. Table 4, models I to III, present consistent path models for the individual material ESG components. The analysis reveals that there are no statistically significant relationships between the individual Material ESG components and stock price synchronicity.

Figure 5 illustrates the full path model encompassing all three ESG Pillars. This model highlights a relatively strong covariance between FirmSize and the Environmental and Social Pillars, while exhibiting a significantly lower covariance with the Governance Pillar. In Figure 6, we present the full path model incorporating the material ESG pillars. Once again, we observe a substantial drop in covariance compared to non-material disclosure (Figure 5), yet the underlying pattern remains consistent. Additionally, when examining these relationships, we note a relatively small R^2 value, with the highest being 17.43%. This implies that the model's explanatory power is limited, suggesting the need for further investigation or the inclusion of additional variables to enhance its predictive accuracy.

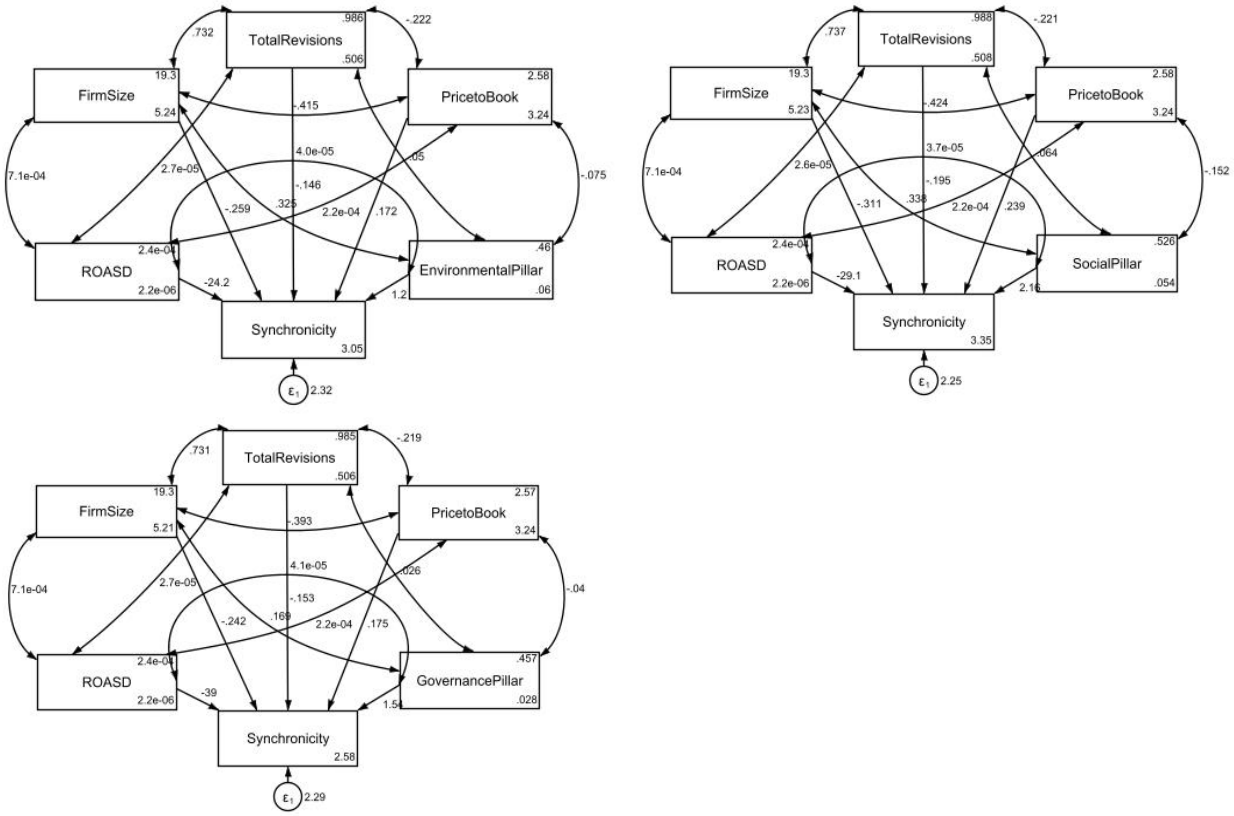

Figure 5 Path Model Synchronicity on ESG Pillar Score

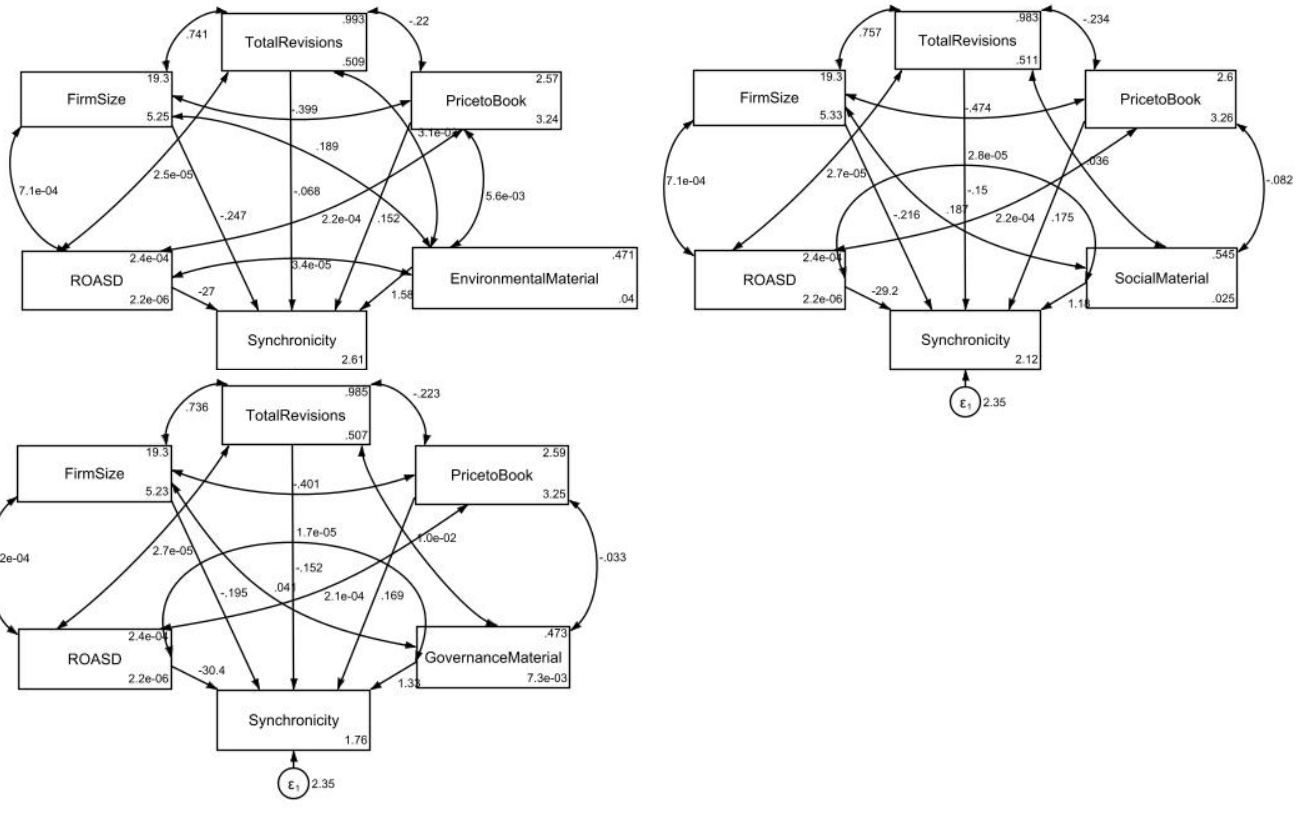

Figure 6 Path Model Synchronicity on Material ESG Pillar Score

Our automated content analysis revealed that the most referenced ESG component was governance, accounting for 38.6% of all ESG components identified. Environmental issues were the second most prevalent, accounting for 33.7%, followed by social issues, accounting for 27.7%. The percentages are shown in Figure 7. The references to each ESG component were also identified and analyzed, providing valuable insights into the ESG reporting practices of Norwegian companies.

The analysis revealed that there were more reports including environmental components, with 246 reports mentioning environmental issues and 5,673 references in total. In comparison, social components were mentioned in 220 reports with 4,631 references, and governance components were mentioned in 210 reports with 6,468 references.

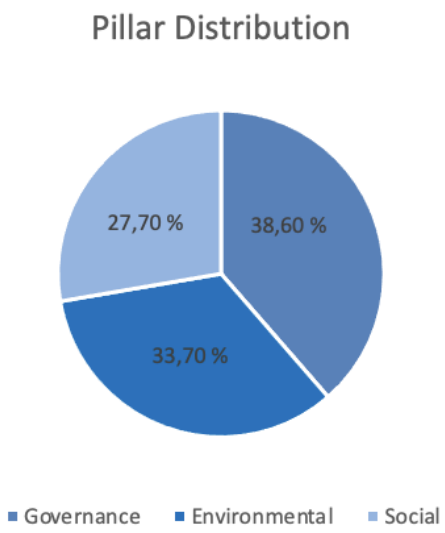

Figure 7 ESG Pillar Distribution

Further, we have developed a summary of the frequently discussed topics across the three ESG pillars in annual- and sustainability reports, presented in Figure 8. Our analysis, based on the qualitative data, highlights the prevalent themes that are covered in both positive and negative contexts. The number displayed in the right corners indicates the frequency with which the topic is addressed in our sample. These numbers are obtained through manual assessment of the results obtained from automated content analysis. Unlike the results in Figure 7, this summary is not based on dictionary words. It is evident that there are several significant topics that are frequently addressed within the SocialPillar. As we have previously demonstrated, this pillar has a notable positive impact on Synchronicity, which could be attributed to the investors' preference for comprehensible and critical topics. In Norway, issues concerning human rights and community involvement are likely to be the top priorities for most investors.

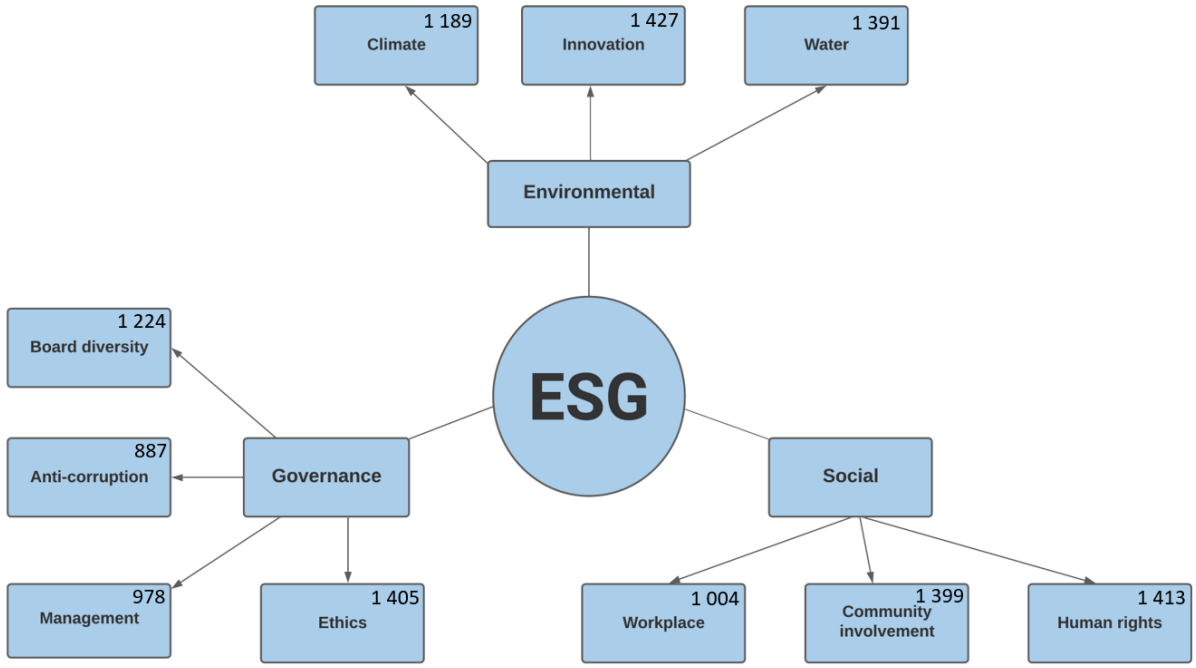

Figure 8 Prevalent themes in the Annual- and Sustainability Reports, with the frequency of the topics.

The findings regarding H3 suggest that the relationship between individual ESG components and stock price informativeness varies, which is evidenced by a positive association with stock price synchronicity. Specifically, the SocialPillar shows a statistically significant positive association with stock price synchronicity at a 10% significance level. Further, the results of the automated content analysis reveal that different themes are important in the reports and that varying amounts of data are reported. Overall, it is challenging to draw a conclusion about a positive association with stock price synchronicity based on these findings, but they do indicate a need for further research in this specific area. We reject the H3 of a negative association, while acknowledging the possibility of different contributions from individual ESG components.

6.5 Hypothesis 4

Norwegian legislation has a significant impact on companies' ESG reporting practices, both qualitatively and quantitatively.

As shown in Table 6, most companies have managed to comply with the requirements set by the Norwegian Accounting Act §3-3C in 2013 (Regnskapsloven, 2013). Based on the results from the automated content analysis, we created the dummy variable LawCompliance, which the model relies on. This proved useful in examining whether companies were within or outside the legal requirements. Derived from the references found, we discovered that most companies were compliant from their inception and almost all companies managed to comply with the legal requirements from its implementation on January 1, 2013. In total, 95.9% of all the yearly reports met all the criteria. Further, we investigated the reasons why the remaining 4.1% do not comply, this will be discussed further in the following chapter.

LawCompliance	Freq.	Percent	Sum.
0	17	4.07	4.07
1	401	95.93	100.00
Total	418	100.00	

Table 6 Law Compliance Statistics

Figure 9 provides a more comprehensive year-to-year overview of whether the various companies have been able to meet the legal requirements from their date of establishment. Among else, both Grieg Seafood ASA and Black Sea Property ASA have struggled with complying with legal requirements in certain years. While Grieg Seafood ASA failed to comply with the requirements in both 2013 and 2014 following a transition to new legislation, Black Sea Property ASA has been unable to meet the requirements since 2015. Both, due to a lack of disclosure in their reports rather than the content of them.

Figure 9 Legal Compliance Status of companies with Legal Reporting Requirements

Further, our analysis has revealed three main areas where companies have failed to comply with legal requirements when disclosing their annual- or sustainability reports. These include the lack of reporting on (1) social conditions within the firm, (2) sustainable development, and (3) negative influence. These findings are particularly interesting as companies tend to report on positive aspects and market conditions but fail to report on their own realities, future plans, and strategies to maintain their results in the long term. It is evident that the absence of such information can limit investors' ability to make informed decisions and affect market efficiency.

As mentioned, with the current state of software, it is still necessary to carefully review the output from automated content analysis in order to generate meaningful results. After conducting a thorough review of the output, we can see that the changes in the legal requirements have evidently influenced the reporting. There has been an increase in the quantity of reporting, but more importantly, there has been a significant improvement in the

quality of reporting. From the period prior to 2013, and through the subsequent legal amendments in 2020 and 2021 (Regnskapsloven, 2013, 2020, 2021), we can observe a shift in the reporting behaviour. A significant shift can be observed in companies' reporting practices, with a notable emphasis on disclosing areas of ESG performance where they fall short. Additionally, there is now a greater requirement for companies to disclose their future plans and goals. While it is evident that the future plans and goals may exhibit greater variation across reports, implying that they may not be as thoroughly developed, this information still holds considerable value for investors. Further, our analysis indicates that the majority of firms only provide minimal comments on the areas where they are underperforming, however it is still reflecting a significant improvement compared to the period prior to the legal requirements.

Based on these findings, it can be concluded that H4 is supported. After a thorough examination of the reports in NVivo we found that the published reports have changed their content and are now directed towards the components required by the law. Further, the trend in Figure 1, along with the findings presented in Table 6 and Figure 9, suggest that companies are increasingly disclosing reports from 2013 to 2021. These results highlight the positive impact of the Norwegian legislation on ESG reporting practices of the companies operating in the country. Hence, the changes in the legal requirements have led to an improvement in the quality and quantity of ESG disclosures.

6.6 Summary Results

The study aimed to examine the relationship between ESG disclosure and stock price informativeness. The results contradict both Hypotheses 1 and 2, which anticipated a negative relationship between both ESG disclosure and material ESG disclosure, to stock price synchronicity. Instead, the findings reveal a positive association, suggesting that companies with enhanced ESG disclosure exhibit lower stock price informativeness. Notably, the study identifies that the social pillar of ESG has a significant positive impact of 10% on stock price synchronicity, whereas the other pillars do not show a significant effect. The study highlights the positive impact of Norwegian legislation on ESG reporting practices of companies and emphasizes the importance of government regulations in driving sustainability reporting.

Although the study did not identify statistically significant relationships between ESG disclosure and informativeness, as well as between material ESG disclosure and informativeness, the results underscore the need for further research in this area. It is important to acknowledge that the absence of statistically significant results does not necessarily imply the absence of a relationship. Instead, it highlights the intricate nature of the topic and the requirement for more comprehensive investigation.

The low R^2 values observed in all the path models indicate that there are other factors that could potentially explain a larger proportion of the variation in the dependent variable. The high covariances between the different ESG disclosures and FirmSize, coupled with the significant drop in covariance between the various material ESG disclosures and FirmSize, suggest an unclear causal relationship as discussed by Freeman (2010), Friedman (2002) & Waddock and Graves (1997). Hence, it is important to note that the results suggest the inclusion of additional variables in the analysis, which were not adequately controlled for in this study. These aspects will be further discussed in Chapter 7 *Discussion*. Nonetheless, the findings offer valuable insights to investors, enabling them to make informed decisions.

7 Discussion

In this chapter, we delve into the implications of the results that we have already presented. Table 7 presents an overview of the results obtained from the empirical study. Specifically, we will discuss these findings in relation to our two research questions, aiming to shed light on their significance and potential impact. By closely examining the data, we hope to offer a comprehensive and nuanced understanding of our research topic. Our overarching goal is to provide insights that can inform future research and contribute to advancing the current discourse in this field.

Hypothesis		Results
H1	*Companies that provide enhanced ESG disclosure have higher stock price informativeness, which will become evident as a negative association with stock price synchronicity.*	*Rejected*
H2	*Companies that prioritze financial materiality in their ESG disclosure will have higher stock price informativeness than those that do not. This higher stock price informativeness will be indicated by a stronger negative association with stock price synchronicity.*	*Rejected*
H3	*The contribution of individual ESG components to stock price informativeness will vary, which will become evident as a negative association with stock price synchronicity.*	*Partially accepted (10% sig.) Differs with a positive association*
H4	*Norwegian legislation has a significant impact on companies' ESG reporting practices, both qualitatively and quantitatively*	*Accepted*

Table 7 Summary of Hypotheses

Research question #1: How does ESG disclosure affect the informativeness of stock prices?

The analyses did find a relationship between ESG disclosure and stock price informativeness. The results indicated an increase in the influence of market and industry to explain the variance in stock price, hence, ESG disclosure have a negative effect on the informativeness of stock prices. As this result only are statistically significant at a 10% level, conclusions need to be taken with caution, and further research is needed in this area. It should be noted that lack of significant results does not necessarily indicate that there is no relationship between the two variables. Instead, it highlights the complexity of the topic and the need for more investigation.

Further, the study's results suggest that there is a varying relationship between individual ESG components and stock price informativeness, as evidenced by a positive association with Synchronicity. The social pillar component demonstrated a statistically significant positive association with stock price synchronicity at a 10% significance level. The study's automated content analysis also revealed that different themes are important in the reports and that varying amounts of data are reported. Although these findings do not conclusively support a positive association with stock price synchronicity, they do indicate the need for further research in this area. The study rejects the hypothesis of a negative association while acknowledging the possibility of different contributions from individual ESG components.

Research question #2: Is financial materiality of ESG disclosure associated with increased stock price informativeness?

The study's findings indicate that there is no statistically significant relationship between material ESG disclosure and stock price informativeness. Similarly, the lack of significant results concerning relative ESG disclosure suggests a similar outcome. Additionally, the results demonstrate a relatively low R^2, which implies that the variables included in the analysis explain only a small proportion of the variation in stock price informativeness. These findings hold important implications for both companies aiming to enhance their sustainability reporting and investors seeking to include ESG factors into their decision-making. Companies may need to reassess their current ESG disclosure practices to ensure they are providing relevant and meaningful information to investors. Equally, investors should carefully consider the limitations of relying solely on ESG disclosure when evaluating the potential impact on stock prices and may need to incorporate other factors into their decision frameworks.

One plausible explanation for the insignificant outcomes of the analysis could be attributed to uncontrolled control variables as indicated by the small R^2, such as human-created effects, that have not been adequately controlled for. In recent years, the Norwegian society has seen a rise in the number of individuals who invest in stocks and funds, regardless of their social status (Sønnervik & Zakariassen, 2022). As discussed in Chapter 1 and 3, these investors

typically own a small share of a company, but together they can account for a significant percentage. In combination with the rising popularity of green funds and stocks, small investors often rely on various sources, including VG and E24 newspapers, to decide where to allocate their funds (Sønnervik & Zakariassen, 2022). This phenomenon is a significant factor that could have impacted the relationship between ESG disclosure and stock price informativeness. As known, prices are highly affected by the market demand, thus all investors will ultimately have an impact on a company´s stock price. Therefore, we see it as valuable for future studies to consider the impact of these evolving investment practices and to develop more robust methodologies to investigate the correlations. In this analysis, considering the high visibility of these industries, this can be especially important.

It is essential to approach the findings of this study with caution due to several factors that could have influenced the results. One such factor is the difference in ESG disclosure practices among various disclosure providers, as noted by Berg et al. (2022). The significant variation in disclosure practices across providers may have contributed to the lack of significant results in this study. Additionally, previous research has highlighted concerns regarding the validity and reliability of ESG disclosure practices (Berg et al., 2022; Gibson Brandon et al., 2021). ESG disclosure is typically self-reported and not independently verified, which leads to issues with validity and reliability, making it difficult for investors to use as a reliable decision-making tool. Baier et al. (2020) suggest that investors are using these metrics to make informed investment decisions. However, this analysis show that one should exercise caution when using ESG disclosure and disclosure providers in research to avoid potential limitations.

Another notable factor to consider is whether our findings can differentiate from others due to country-specific influences. For instance, could the oil price have a greater impact on the stock price of Norwegian companies compared to those in other countries? Alternatively, could the stock price of Chinese and Russian companies be more affected by fluctuations in gold prices than in Norway? Our research fails to adequately address such variations, and similarly, other studies we have examined do not give sufficient attention to this aspect.

Another potential explanation for our study's results is that our sample is subject to mandatory disclosure requirements, while other studies employ samples subject to voluntary disclosure requirements. Our findings contradict with findings in previous research (El-Haj et al., 2019; Gibson Brandon et al., 2021). Khan et al. (2016) suggest that voluntary reports are more transparent and informative to the market. Our findings, however, indicate that the implementation of legislation in Norway, which made ESG disclosure mandatory, resulted in improvements in both the quality and quantity of such disclosure. Our study discloses that ESG reporting do not have a positive impact on stock price informativeness. Therefore, the question becomes whether the importance of ESG diminishes when it becomes widely disclosed by most companies due to mandatory disclosure requirements. In further research it is necessary to clarify the role of ESG disclosure and its impact on value-relevant information, particularly in the context of mandatory versus voluntary disclosure regimes. The recently adopted CSRD by the EU in 2022 (Dir., 2013/34/EU) provides an opportunity to examine potential differences between voluntary- and mandatory disclosure.

If we interpret the results of this study as an indication of a lack of relationship between ESG disclosure and stock price informativeness, or as a positive rather than negative relationship, the findings of Waddock and Graves (1997) may be particularly relevant. They argued that the conventional view of CSR's causal effect on financial performance is incomplete and purpose a reverse causality. The slack recourse theory suggests that profitable companies are more likely to have access to the funds necessary to invest in CSR and are therefore better positioned to excel. The substantial covariance of 0.31 between ESG disclosure and Firm Size serves as a compelling indication supporting the plausibility of this causal relationship. It is essential to recognize the findings of Waddock and Graves (1997), as they can challenge investors' perception of the ESG disclosure relevance.

If we, alternatively, interpret the results of this study as indicative of the shareholder theory, we can see that the pursuit of ESG goals may not necessarily align with the goal of maximizing shareholder profit. As earlier displayed, Friedman (2002) argues that the only duty of companies is to maximize shareholder profit. Our results suggest that the increased disclosure

of ESG factors may not necessarily result in more informative stock prices, or an increase in a company's real value, which can be interpreted as conflicting with the shareholder theory. Additionally, considering that this study was conducted in industries that are highly visible to the public eye, it is valuable for companies to be mindful of their ESG practices and reporting, as it can have a significant impact on reputation and public perception. The significant decrease in covariance observed when transitioning from ESG disclosure to material ESG disclosure on Firm Size, along with the high variability in covariances between the different ESG pillars, can indicate that the causal relationship can vary depending on the specific focus of the disclosure. Overall, our findings suggest that while ESG considerations are increasingly important in the society, they need to be carefully balanced.

Previous research (El-Haj et al., 2019; Gibson Brandon et al., 2021; Khan et al., 2016) has mainly focused on the relationship between ESG disclosure and stock price as a measure of firm performance. However, it is important to differentiate between stock price and stock price informativeness. Stock price informativeness can provide insights into how much of a company's stock price is driven by its unique characteristics and how much is due to broader market trends. While the stock price is more influenced by human-created effects, that does not necessarily reflect the true underlying value of the company. In fact, relying solely on stock price as a measure of firm performance can lead to flawed conclusions, as it fails to capture the full extent of company-specific information that may impact its real value. Simultaneously, it presents a challenge to accurately quantify stock price informativeness while adequately controlling for these influences.

Our findings suggest that the impact of ESG disclosure on stock price informativeness is not statistically significant, which implies that companies should exercise caution when interpreting their stock prices as an indicator of true underlying value. In light of the potential fragility of prices, driven by human-created effects, the "boost" in prices can be volatile and unpredictable. Therefore, it is crucial to consider multiple measures of firm performance, including non-financial disclosures, to arrive at a more comprehensive understanding of a company's true value. Our analysis also reveals distinct covariances between Firm Size and

ESG disclosure as well as Material ESG disclosure, adding weight to the current ongoing discussion. These results suggest that the reasoning presented by Gibson Brandon et al. (2021) regarding the reporting of ESG information as a means of providing reliable information to stakeholders may be partially invalidated. Ultimately, the results call for further investigation into the relationship between ESG disclosure and stock price, preferably stock price informativeness, to gain a more nuanced understanding of the relation between sustainability reporting and firm performance.

7.1 Validity

Regarding the internal validity of our analysis, it is important to acknowledge that the ESG score we used may have limitations in terms of its validity. Further, our study has a minor sample bias as we only included companies in the Consumer Staples and Consumer Discretionary sectors. This tendency has been observed in several other studies on the subject. Our research is based on a score provider with a limited ESG database, comprising solely of companies that have voluntarily disclosed their ESG performance to the exact provider. Further, the control variable accounts for only a limited proportion of the variability observed in stock price informativeness.

Despite these limitations, we took specific measures such as creating suitable dictionaries, including all reports in both Norwegian and English, using OIM standard errors, and controlling for variables that could explain returns. However, given the few statistically significant results and considering other factors that could affect stock price informativeness, we must question the internal validity of these findings. Nevertheless, our results contribute to highlighting different issues in the ESG literature and can be valuable for future research on the topic.

In regard to the external validity of our research, our findings cannot be generalized across different markets or periods without further testing. We have a small sample size, consisting of only two industries. Additionally, ESG studies have low external validity in general as the mechanisms within the ESG field can vary widely between markets and periods. Annual report designs, norms, and public acceptance in other countries may differ from those in Norway, resulting in different patterns of ESG disclosures and potentially different outcomes.

In conclusion, despite the limitations in both internal and external validity, our study contributes to the ongoing discussion regarding the challenges with the existing literature on ESG and the need for further research on this topic. Specifically, our study provides a nuanced understanding of the value and relevance of ESG information for investors by examining the relationship between ESG disclosure and stock price informativeness. By doing so, our study sheds light on the limitations of using stock price as the sole measure of firm performance and the unabsorbed volatility in the measure.

8 Conclusion and Future Research

We employed an automated content analysis and a structural equation modeling analysis to examine the impact of companies' ESG disclosure on stock price informativeness. The analyses are performed under the research questions;

Research question #1: How does ESG disclosure affect the informativeness of stock prices?
Research question #2: Is financial materiality of ESG disclosure associated with increased stock price informativeness?

In this study, the structural equation modeling analysis was performed to test the research question. This analytical approach was chosen due to its ability to account for the covariance between variables in the model and control for measurement error and biases. One of the major advantages of SEM is its capacity to model multiple relationships among variables simultaneously, which allowed us to test our complex theoretical models. Additionally, we utilized content analysis to conduct a comprehensive search of companies' ESG disclosure. This approach provided us with valuable insights into the reporting practices, enabled us to identify different reporting patterns, and allowed us to assess the impact of legislation on ESG disclosure. By combining these analyses we were allowed to generate findings that can inform the development of policies aimed at improving ESG reporting and accountability.

Our study examined the relationship between ESG disclosure and material ESG disclosure on stock price informativeness, and the results suggest that companies should exercise caution when interpreting their stock prices as a true reflection of their underlying value. We found that neither ESG disclosure nor material ESG disclosure had a statistically significant impact on stock price informativeness, which is contrary to several publications. This may be due to other spurious effects, human-created effects that cause volatile and unpredictable prices, the differences between voluntary and mandatory disclosure, the validity of disclosure providers, or the opposite causal effect presented by Waddock and Graves (1997). Our results highlight the need for further investigation into the relationship to gain a more nuanced understanding of the relation between sustainability reporting and firm performance. It is also worth noting that these reasons have not been ruled out in previous research.

8.1 Policy Implications

Our findings show that there may not be a causal relationship between ESG disclosure and stock price informativeness, which may be due to spurious effects that cause unpredictable prices. Further, we have highlighted that differences between voluntary and mandatory disclosure, validity of disclosure providers, or opposite causal effect, may also have an impact on the results. These factors have not been considered in previous research and should be further investigated.

Our contribution with this master's thesis lies in uncovering significant gaps in the research field. We refer to previous literature on the subject, which shows limited consistency between results and causal relationships. Further, we emphasize that several previous studies may suffer from validity issues due to their insufficient explanatory power. We also demonstrate a notable distinction between stock price and stock price informativeness, highlighting that current prices may be influenced by a "boost" that does not accurately reflect the true underlying value of a company. Therefore, we argue that these findings will be of great interest to current and potential investors.

8.2 Future Research

As our study suggests, the measurement of stock price informativeness is of great importance in the evaluation of the true underlying value of a company. In our opinion, this concept has not received enough attention in previous research. Future research should explore the impact of other effects and correct the limitations of previous research to gain a more nuanced understanding of the relation between sustainability reporting and firm performance. Further, future research should seek to expand the dataset to test for differences in industry/sector, and possible differences between countries. This would provide a more comprehensive understanding of the relationship between ESG disclosure and stock price informativeness.

8.3 Limitations

Our study is constrained by the small sample size of the population due to time constraints, which limited our ability to thoroughly examine variables such as industry/sector differences and cross-country comparisons. To further explore the meaning of these results, expanding the dataset would be beneficial. Additionally, including other control variables could be valuable. However, due to time constraints it is not an option for this thesis. Further, we decided to use month-end stock price, market-, and industry returns in calculating stock price synchronicity, while the ESG score is released at a year-end. This may explain why our lagged variables exhibit a stronger significance, although we have used a one-year lag to prohibit this.

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Appendix

Appendix 1: ESG Dictionary

Environmental Pillar:

'energi_consumpt' 'energi_purchas' 'fuel_usag' 'steam_energi' 'grid_electr' 'total_energi' 'renew_energi' 'wind_energi' 'solar_energi' 'bio_mass' 'renew_fuel' 'green_energi' 'green_power' 'low_impact' 'impact_hydropow' 'kilowatt_hour' 'water_energi' 'cubic_meter' 'water_sourc' 'rainwat_collect' 'wast_water' 'water_util' 'non_freshwat' 'water_risk' 'high_baselin' 'total_wat' 'water_manag' 'manag_risk' 'discharg_wat' 'clean_wat' 'waterstress_region' 'drought_region' 'imping_environ' 'risk_impact' 'climat_chang' 'water_cost' 'regul_agenc' 'water_permit' 'waterright_permit' 'control_temperatur' 'control_wat' 'greenhous_gas' 'gas_emiss' 'reduc_wat' 'reduc_withdraw' 'reduc_consumpt' 'water_recycl' 'metric_ton' 'sustain_ingredient' 'phase_out' 'packag_recycl' 'packag_renew' 'renew_material' 'risk_manag' 'purpos_transport' 'distribut_packag' 'transport_packag' 'environmen_claim' 'pre_consum' 'post_consum' 'recycl_material' 'recover_material' 'manufactur_process' 'materi_dispos' 'primari_materi' 'maste_stream' 'materi_rework' 'materi_regrind' 'institut_facil' 'live_sourc' 'biolog_origin' 'fossiliz_materi' 'organ_materi' 'raw_product' 'reus_uniess' 'origin_purpos' 'undergo_degrad' 'compost_materi' 'vivbl_residu' 'distinguish_residu' 'toxic_residu' 'optim_packag' 'altern_materi' 'packag_durabl' 'optimization_hygin' 'packag_target' 'packag_footprint' 'maintain_wat' 'maintain_groundwat' 'continu_monitor' 'hazard_materi' 'hazard_chemic' 'hazard_substanc' 'usag_chemic' 'restrict_substanc' 'ban_chemic' 'product_lifecycl' 'product_plan' 'priorit_ch' 'chem_reduct' 'materi_assess' 'materi_substitut' 'disclos_test' 'manag_practic' 'target_elim' 'assess_reason' 'safe_usag' 'pend_regul' 'anticip_regul' 'limit_us' 'environ_harm' 'specifi_chemic' 'class_chemic' 'environmental_requirenment' 'emission_atmosphere' 'kyoto_protocol' 'carbon_dioxide' 'nitrous_oxide' 'hydrofluoro_carbon' 'selfur_hexafloride' 'carbon_equival' 'dioxid_equival' 'compensate_emiss' 'climat_disclosur' 'disclosur_standard' 'disclos_emiss' 'perluoro_carbon' 'reduct_target' 'strategi_target' 'renew_power' 'green_produc' 'hydro_energi' 'biomass_energi' 'low_hydropow' 'hydro_pow' 'amount_wate' 'surface_rainwat' 'fresh_wat' 'impact_climat' 'less_wat' 'water_return' 'aquatic_imping' 'water_practic' 'tradeoff_org' 'storag_manur' 'wastewater_handel' 'land_treatment' 'land_practic' 'soil_assess' 'risk_assess' 'appli_crop' 'appi_hay' 'pastur_land' 'graz_land' 'graz_forest' 'graz_cropland' 'hayed_cropland' 'concentr_feed' 'animal_feed' 'phytosanitari_measur' 'protect_plantlif' 'total_carcass' 'poultr_produc' 'anim_handel' 'transport_condit' 'slaughter_faciliti' 'use_hormon' 'lifestock_suppli' 'feed_risk' 'breed_risk' 'graze_risk' 'availabil_water' 'ecosystem_manag' 'biodiversity_manag' 'energy_sourc' 'nature_loss' 'renewable_biomass' 'fossil_fuel' 'transpotation_fuel' 'heat_oil' 'reduce_quantiti' 'reduce_fuel' 'fuel_standard' 'bio_fuel' 'absorb_heat' 'releas_heat' 'ozone_deplet' 'chemic_destruct' 'stratospher_ozon' 'natur_reaction' 'chlorofluoro_carbon' 'hydrochlorofluoro_carbon' 'methul_bromid' 'carbon_tetachlorid' 'geotherm_energi' 'forest_initi´ 'forest_council' 'forest_certif' 'organic_scop' 'sustainable_fish' 'sustainable_harvest' 'freerange_environment' 'tighten_regul' 'transport_cost' 'food_avail 'protein_typ' 'nitrogen_trifluorid' 'emiss_methan' 'emiss_hydrofluorcarbon' 'emiss_perfluorocarbon' 'ton_carbon' 'publish_time' 'global_warm' 'chang_ipcc' 'ass_report' 'gross_emiss' 'atmosphere_account' 'reduc_emiss' 'scope_emiss' 'corporate_account' 'corporate_report' 'report_standard' 'internation_aerospac' 'environment_group' 'direct_emiss' 'combustion_score' 'environment_protection' 'protect_agenc' 'petroleum_industri' 'waste_manag' 'waste_activity' 'emiss_data' 'financi_data' 'environment_report' 'environment_informat' 'natur_capit' 'busi_impact' 'emiss_reduct' 'disclosur_program' 'emiss_monitor' 'emiss_trade' 'amount_gigajoul' 'percent_renew' 'fuel_purchas' 'produc_renew' 'lifecycle_greenhous' 'lifecycle_gas' 'oper_energy' 'purchas_electr´ 'energi_inform' 'energi_certif' 'water_withdram' 'water_consum' 'baselin_wat' 'sourc_wet' 'sourc_river' 'sourc_lake' 'sourc_ocean' 'sourc_groundwat' 'sourc_rainwat' 'water_collect' 'directli_stor' 'obtain_wat' 'geolog_survey' 'water_regul' 'primi_drink' 'water_evapor' 'evaporate_use' 'evaporate_discharg' 'world_resourc' 'discharg_wastewat' 'water_resource' 'environment_constraint' 'water_stres' 'regulatori_constraint' 'withdraw_sourc' 'collect_directli' 'water_footprint' 'analyz_water' 'water_us' 'water_quantiti' 'qualiti_permit' 'qualiti_standard' 'violat_standard' 'total_exceed' 'concentr_pollut' 'specifi_pollut' 'suppli_farm' 'cost_agricultur' 'environment_damag' 'product_sourc' 'biofuel_ingredi' 'environment_impact' 'primari_forest'

'groundwater_qualiti' 'pest_manag' 'pest_solut' 'palm_oil' 'rainforest_allianc' 'captur_fish' 'crop_product' 'environment_standard' 'address_deforest' 'altern_crop' 'agricultur_raw' 'genet_modifi' 'modifi_organ' 'requir_label' 'countri_restrict' 'countri_ban' 'region_ban' 'suspend_import' 'biodivers_impact' 'eu_direct' 'downstream_custom' 'process_food' 'food_compani' 'food_retail' 'identifi_crop' 'crop_cultiv' 'crop_grown' 'climat_scenario' 'crop_region' 'priorit_crop' 'crop_insur' 'improv_ecosystem' 'resourc_institut' 'wast_gener' 'discard_environ' 'hazard_wase' 'material_reduce' 'recover_product' 'energy_recovery' 'combustible_wast' 'recover_heat' 'waste_framework' 'air_pollut' 'physic_limit' 'limit_access' 'critic_miniral' 'materi_cobalt' 'materi_fluorspar' 'materi_gallium' 'materi_germanium' 'materi_graphit' 'materi_indium' 'materi_magnesium' 'materi_niobium' 'materi_tantalum' 'materi_tungsten' 'platinum_metal' 'rare_element' 'earth_element' 'stock_pile' 'environment_label' 'envirnment_declar' 'green_grid' 'environment_consider' 'regin_humid' 'averag_temperatur' 'groundwater_stress' 'regionallevel_carbon' 'statelevel_carbon' 'level_carbon' 'carbon_legisl' 'carbon_price' 'carbon_intens' 'heavi_fuel' 'heavi_oil' 'eco_system' 'cultur_valu' 'bio_divers' 'biobas_plast' 'neg_impact' 'environment_polici' 'environment_measur' 'outdoor_area' 'weather_condit' 'access_water' 'flood_zone' 'move_equipment' 'indoor_qualiti' 'environment_qualiti' 'nitrogen_oxid' 'marin_diesel' 'metal_palladium' 'metal_iridium' 'metal_rhodium' 'metal_ruthenium' 'metal_osmium' 'element_scandium' 'elem_lanthanum' 'elem_lanthanid' 'elem_cerium' 'elem_praseodymium' 'elem_neodymium' 'elem_promethium' 'elem_samarium' 'elem_europium' 'element_gadolinium' 'element_terbium' 'element_dysprosium' 'element_holmium' 'element_erbium' 'elem_thulium' 'elem_ytterbium' 'elem_lutetium'

Social Pillar:

'entity_produc' 'consum_wat' 'potenti_impact' 'shortterm_strategi' 'tran_fat' 'longterm_strategi' 'scope_strategi' 'scope_goal' 'manag_plan' 'start_year' 'target_year' 'land_us' 'certif_program' 'food_ingredi' 'cost_food' 'total_cost' 'packag_materi' 'number_notic' 'notic_violat' 'violat_receiv' 'food_issu' 'safeti_issu' 'hygen_practic' 'product_label' 'product_allerg' 'allergen_label' 'product_contamin' 'food_administr' 'drug_administr' 'section_notic' 'product_withhold' 'product_suspens' 'civil_action' 'crimin_action' 'remov_produc' 'caus_ill' 'consum_ill' 'seri_ill' 'seri_fatal' 'signific_outcom' 'legal_proceed' 'promot_health' 'promot_nutrit' 'scope_product' 'label_claim' 'market_claim' 'result_risk' 'longterm_health' 'receiv_concern' 'consum_consern' 'media_televi' 'media_radio' 'media_internet' 'healthi_diet' 'diet_children' 'target_index' 'public_avail' 'consern_manag' 'futur_risk' 'fair_trade' 'code_conduct' 'work_age' 'risk_worker' 'social_respons' 'public_locat' 'public_disclosur' 'baseline_stress' 'worker_right' 'substitut_crop' 'working_condition' 'safeti_requirenment' 'excessive_overtime' 'worker_wage' 'worker_compensation' 'underage_labor' 'forced_labor' 'disciplinary_practice' 'freedom_association' 'worker_involvment' 'worker_communication' 'worker_treatment' 'worker_development' 'anti_harassment' 'anti_abuse' 'termination_policies' 'retrenchment_policy' 'health_condition' 'safety_conditions' 'thirdparty_vendors' 'direct_supplier' 'external_responsibility' 'zero_tolerance' 'core_violation' 'local_law' 'audit_standard' 'measure_compliance' 'global_scope' 'gross_valu' 'farmstead_safeti' 'animal_produc' 'animal_protein' 'animal_mortal' 'slaughter_livestock' 'sanitari_measur' 'animal_safeti' 'plant_safeti' 'protect_human' 'protect_animal' 'financial_condit' 'medic_antibiot' 'animal_typ' 'receiv_antibiot' 'antimicrobi_drug' 'medic_important' 'animal_medicin' 'human_medicin' 'protein_produc' 'record_incident' 'first_aid' 'fatal_rate' 'fulltim_employe' 'parttim_employe' 'direct_employe' 'sesonal_employe' 'chronic_respieatori' 'chemical_burn' 'inflammation_tract' 'acute_bronchiti' 'subacute_bronchiti' 'lung_diseas' 'lung_function' 'dust_syndrom' 'health_studi' 'tran_program' 'pork_produc' 'cage_fre' 'free_environ' 'unlimit_access' 'access_food' 'anim_welfar' 'welfar_standard' 'beef_produc' 'cust_injuri' 'harm_peopl' 'safeti_incident' 'facil_safeti' 'appropri_build' 'capac_space' 'sprinkler_system' 'fire_suppress' 'fire_equipt' 'suppress_equipt' 'standard_test' 'standard_mainten' 'standard_inspect' 'qualiti_assur' 'safeti_inspect' 'followup_inspect' 'initi_inspect' 'routin_conduct' 'loss_consci' 'healthcar_profession' 'identifi_vulner' 'student_privaci' 'demogaph_data' 'identifi_inform' 'person_inform' 'gender_data' 'ethnic_data' 'disabil_data' 'ownership_data' 'employ_status' 'social_secur' 'medic_inform' 'educ_inform' 'financi_inform' 'employ_inform' 'lifestyl_inform' 'electron_inform' 'privaci_risk' 'share_inform' 'grant_cons' 'data_breach' 'breach_identifi' 'sensit_inform' 'incorr_data' 'food_wast' 'socioeconom_factor' 'influenc_price' 'intern_trade' 'label_issu' 'materi_box' 'plastic_contain' 'charit_org'

'dump_land' 'dump_sea' 'unsalebl_food' 'local_health' 'state_health' 'safeti_recall' 'private_label' 'brand_name' 'violative_product' 'health_consequence' 'nutrient_claim' 'nutrient_content' 'misbranded_label' 'overtime_houer' 'cost_sensit' 'profit_margin' 'labor_dispute' 'enforc_employment' 'work_stoppage' 'labor_violation' 'employment_discrimin' 'violating_wages' 'violation_overtime' 'age_discrimination' 'disability_discrimin' 'harass_discirimn' 'national_discrimn' 'origin_discrimn 'pregnancy_discrimn 'color_discirimn' 'race_discirimn' 'sex_discrimn' 'general_function´ 'manag_goal' 'manag_strategi' 'disclos_strategi' 'disclos_target' 'ongo_activ' 'target_absolut' 'enabl_reduct' 'audit_result' 'action_plan' 'global_aquacultur' 'process_standard' 'agricultur_produ' 'recogn_food' 'legal_action' 'migrant_employe' 'work_injuri' 'result_death' 'restrict_work' 'medic_treatment' 'health_car' 'occup_safeti' 'health_administr' 'determin_ill' 'determin_injuri' 'work_fatal' 'person_injuri' 'social_impact' 'workforc_train' 'child_labor' 'labor_practic' 'respons_soi' 'hire_labor' 'high_sever' 'underage_child' 'child_worker' 'immedi_danger' 'danger_lif' 'labor_right' 'communiti_right' 'harmful_labor' 'workforc_health' 'human_right' 'motor_vehicl' 'vehicl_equip' 'motor_safeti' 'vehicl_safeti' 'fuel_effici' 'hybrid_technolog' 'advanc_technolog' 'fuel_ technolog' 'combust_effici' 'cool_system' 'increas_loyalti' increac_confid*' 'empolye_engag' 'reserch_studi' 'gender_repres' 'racial_group' 'ethnic_group' 'equal_opportun' 'minimum_wag' 'wage_regul' marin_transport' 'rail_transport' 'marin_secur' 'marin_nautur' 'suspici_death' 'sexual_assult' 'fail_sanit' 'fail_inspect' 'schedul_inspect' 'unannounc_inspect' 'sea_far' 'seafar_wag' 'shoresid_empolye' 'houer_work' 'houer_rest' 'condit_recommend' 'requrenments_impos' 'survey_requiren' 'materi_damag' 'ship_collis' 'damg_infrastructur' 'due_dilig' 'incentiv_sustain 'improv_sustain' 'sustain_impact' 'safeti_cultur' 'healthcar_cost' 'safety_protocol' 'semi_truck' 'agricultur_equip'*

Governance Pillar:

'financ_constrain' 'liabil_risk' 'reput_risk' 'increas_cost' 'oper_cost' 'impact_cost' 'impact_revenu' 'impact_reput' 'signific_risk' 'correct_action' 'correct_plan' 'elimin_caus' 'global_standard' 'regulatori_control' 'total_revenu' 'revenu_sale' 'sale_produc' 'contain_label' 'label_wrapp' 'artifici_sweeten' 'elimin_fat' 'satur_fat' 'benefica_nutrient' 'nutrient_vitamin' 'nutrient_calcium' 'nutrient_iron' 'nutrient_protein' 'nutrient_fiber' 'ad_sugar' 'self_regulatori' 'civil_penalti' 'monatari_liabil' 'correct_advertis' 'advertis_remedi' 'label_market' 'market_practic' 'content_claim' 'health_claim' 'unfair_claim' 'deceptive_claim' 'regulatori_proceed' 'legal_fee' 'chang_oper' 'chang_train' 'chang_technolog' 'handl_distribut' 'intend_purpos' 'distribut_chain' 'suppli_avail' 'consum_accept' 'product_effici' 'social_standard' 'priorit_food' 'suppli_agreement' 'ingredi_price' 'action_remov' 'remov_hazard' 'hazard_product' 'initiate_recall' 'government_agency' 'unit_recall' 'percentage_voluntar' 'caus_recall' 'number_recall' 'mandatory_standard' 'compani_violat' 'futur_produc' 'stop_sale' 'product_safeti' 'adjudc_proceed' 'issu_settel' 'product_categi' 'busi_segment' 'oper_region' 'product_us' 'corpor_polici' 'corpor_contract' 'hazard_data' 'legal_definit' 'financi_report' 'financi_control' 'chang_reduction' 'statutory_permit' 'statutory_regul' 'permanent_req' 'daili_load' 'maximum_load' 'penalty_ord' 'jurid_ord' 'continous_discharg' 'dry_measur' 'liquid_measur' 'nutrient_manag' 'collect_manur' 'treat_manur' 'agronom_manur' 'manure_handel' 'data_report' 'secur_risk' 'data_risk' 'secur_procedur' 'intern_control' 'system_exploit' 'organiz_asset' 'unauthor_disclosur' 'modif_info' 'select_partner' 'select_technolog' 'exte_framework' 'secur_tehniqu' 'system_reqire' 'data_vulner' 'data_privaci' 'describ_scope´ `violations_adver' 'violations_market' 'facil_cost' 'growth_revenu' 'fleet_vehicl' 'track_fuel' 'track_expenc' 'fuel_expenc' 'retail_locat' 'process_substanc' 'semiprocess_substanc' 'ined_part' 'technolog_advantag' 'over_product' 'critic_violat' corporate_account' 'corporate_report' 'report_standard' 'local_regul' 'ongo_activ' 'target_absolut' 'enabl_reduct' 'risk_filter' 'water_tool' 'qualiti_permit' 'qualiti_standard' 'measur_frequenc' ' prohibit_violat' 'weekli_averag' 'monthli_averag' 'global_aquacultur' 'process_standard' 'audit_result' 'action_plan' 'distribut_produ' 'safeti_manag' 'work_rel' 'entity_payrol' 'materi_breach' 'system_break' 'low_risk' 'audit_complianc' 'extrem_weather' 'weather_event' 'implementat_system' 'discuss_risk' 'discuss_opportun' 'research_develop' 'requir_label' 'disclos_list' 'disclos_regul' 'trade_restrict' 'restrict_import' 'eu_regul' 'health_concern' 'result_oper' 'eu_direct' 'critic_material' 'inhibit_law' 'limit_competit' 'energi_data' 'carbon_legisl' 'access_energi' 'energi_expens' 'extern_energi' 'direct_fuel' 'build_age' 'oper_hour' 'estim_energi' 'energi_benchmark' 'resource_efficiency' 'measur_sustain' 'new_technolog' 'recycl_technolog'

Appendix 2: ESG Ordbok

Miljømessige faktorer:

`energi_forbruk´ `kjøp_energi´ `drivstoff_forbruk´ `damp_energi´ `total_enegi´ `fornybar_energi´ `vind_energi´ `sol_energi´ `bio_mass´ `forbybart_drivstoff´ `grønn_energi´ `grønn_kraft´ `kraft_produkt´ `lav_påvirkning´ `påvirk_vindkraft´ `vann_energi´ `kubikk_met´ `vann_kild´ `oppsaml_regnvann´ `avløp_vann´ `vann_verk´ `ikke_ferskvann´ `vann_risik´ `utslipp_vann´ `vannstress_områd´ `tørke_områd´ `miljø_påvirkning´ `risiko_påvirkning´ `klima_endring´ `vann_kostnad´ `regulerende_etat´ `vann_lisens´ `vannrettighet_lisens´ `temperatur_kontroll´ `vann_kontroll´ `ansvarlig_risik´ `omfang_mål´ `reduser_vann´ `reduser_uttak´ `reduser_forbruk´ `vann_resirkul´ `areal_bruk´ `energi_produks´ `drivhus_gass´ `gass_utslipp´ `sertifiserings_program´ `betyd_risiko´ `eliminer_årsak´ `påvist_avvik´ `global_standard´ `metrisk_tonn´ `kunstig_søtningsmidl´ 'trans_fett' `eliminert_fett´ `mettet_fett´ `ut_fas´ `bærekraft_ingrediens´ `tilsettningsstoff_standard´ `total_vekt´ `primær_emballasje´ `sekundær_emballasje´ `beskyttelses_materiale´ `resirkuler_emballasje´ `fornybar_emballasje´ `fornybart_materiale´ `formål_transport´ `håndter_distrib´ `distribusjon_emballasj´ `transport_emballasj´ `miljø_påstand´ `før_forbruk´ `etter_forbruk´ `resirkuler_materi´ `gjenvunnet_materi´ `produksjon_prosess´ `materialet_kass´ `primær_materi´ `hoved_strøm´ `omarbeidet_materi´ `industrielt_materi´ `slutt_bruk´ `tiltenkt_formål´ `distribusjons_kild´ `levende_kild´ `biologisk_opprinn´ `fossiliser_materi´ `organisk_materi´ `rå_var´ `gjenbruk_materi´ `opprinnelig_formål´ `bruk_produkt´ `uorganisk_forbind´ `nedbrytbar_materiale´ `nedbrytbart_avfall´ `gjennkjennbar_rest´ `giftig_rest´ `optimalisering_emballasj´ `alternativ_materi´ `tilgang_forsyning´ `emballasje_holdbar´ `forbruker_aksept´ `hygien_optimalisering´ `emballasj_mål´ `emballasj_avtrykk´ `produkt_effektiv´ `vann_oppretthold´ `grunnvann_oppretthold´ `kontinuerlig_overvåke´ `prioritert_matvar´ `forsyn_avtal´ `ingrediens_pri´ `fjern_tiltak´ `fjern_farl´ `produkt_sikker´ `produkt_livsstilssyklus´ `produkt_planlegg´ `prioritert_kjemikali´ `kjemisk_reduksjon´ `material_evaluering´ `material_utskift´ `målrettet_eliminer´ `kommende_regulering´ `forventet_regulering´ `begrens_bruk´ `miljø_skad´ `marked_etterspør´ `spesifik_kjemikali´ `klassifiser_kjemikali´ `global_omfang´ `utslipp_atmosfær´ `kyoto_protokoll´ `karbon_dioksid´ `lyst_gass´ `hydrofluor_karbon´ 'karbon_ekvivalent' 'dioksid_ekvivalent' 'kompensert_utslipp' 'klima_avslør' 'avsløring_standard' 'endring_reduksjon' 'perluoro_karbon' 'reduksjon_mål' 'fornybar_kraft' 'grønt_produkt' 'hydro_energ' 'biomasse_energ' 'lav_vannkraft' 'vann_kraft' 'mengd_vann' 'overflate_regnvann' 'fersk_vann' 'klima_påvirkning' 'mindre_vann' 'vann_mul' 'vann_praks' 'daglig_belastning' 'maksimal_belastning' 'kontinuer_utslipp' 'tørr_mål' 'væske_volum' 'total_slakteavfall' 'protein_produksjon' 'støv_syndrom' 'dyre_kraft' 'avl_risik' 'beit_risik' 'tilgjengelig_vann' 'energi_kild' 'økosystem_forvaltning' 'mangfold_forvaltning' 'natur_tap' 'anlegg_utgift' 'flåte_kjøretøy' 'sporing_utgifter' 'drivstoff_utgifter' 'fornybar_biomasse' 'fossil_brensel' 'transport_brensel' 'fyring_olje' 'reduser_mengde' 'reduser_drivstoff' 'drivstoff_standard' 'bio_drivstoff'' 'absorberer_varme' 'angi_varme' 'ozon_reduser' 'kjemisk_nedbryting' 'stratosfærisk_ozon' 'naturlig_reaksjon' 'klorfluor_karbon' 'hydroklorfluor_karbon' 'metylbomid_karbon' 'karbon_tetraklorid' 'kuld_tap' 'geometrisk_energi' 'økolog_omfang' 'bærekraftig_fisk' 'bærekraftig_høst' 'frittgående_høns' 'frittgående_miljø' 'stram_regulering' 'nitrogen_trifluorid' 'emisjon_metan' 'emisjon_hydrofluorkarbon' 'emisjon_perfluorkarbon' 'tonn_karbon' dat' 'global_oppvarm' 'ipcc_rapport' 'atmosfære_regnskap' 'redusere_utslipp' 'omfang_utslipp' 'miljø_vern' 'avfall_håndtering' 'avfall_aktivitet' 'utslipp_data' 'naturlig_kapital' 'virksomhets_påvirkning' 'utslipps_reduksjon' 'livssyklus_klimagasslipp' 'livssyklus_gass' 'produsere_fornybar' 'kvalifisert_kild' 'vann_uttak' 'vann_forbruk' 'basislinje_vann' 'våtmar_kilde' 'elv_kild' 'sjø_kild' 'innsjø_kild' 'grunnvann_kild' 'regnvann_kild' 'vann_saml' 'lagr_direkt' 'skaff_vann' 'vann_forsyn' 'lokal_regul' 'geologisk_undersøk' 'vann_regul' 'primær_drikkevann' 'vann_fordamp' 'fordamp_bruk' 'fordamp_utslipp' 'verdens_ressurs' 'risik_verktøy' 'demp_risik' 'utslipp_avløpsvann' 'vann_ressurs' 'miljø_begrens' 'vann_stress' 'regulatorisk_begrensning' 'global_akvakultur' 'landbruk_produkt' 'anerkjent_matvar' 'tilbaketrekke_produkt' 'distribuert_produkt' 'ingredis_biodrivstoff' 'urørt_skog' 'grunnvann_kvalit' 'skadedyr_bekjemp' 'skadedyr_løsning' 'økologisk_system' 'palme_olje' 'ansvarlig_soyaproduksjon' 'regnskog_allianse' 'fisk_fangst' 'miljø_standard' 'miljø_praksis' 'umiddelbar_skade' 'vesentlig_brudd' 'systematisk_svikt' 'lav_risiko' 'miljø_ansvar' 'ekstrem_vær' 'vær_hendelse'

'integrert_skadedyrbekjempelse' 'adressere_avskoging' 'alternativ_avling' 'land_restriksjon' 'land_forbud' 'region_forbud' 'begrens_import' 'helse_bekymring' 'påvirke_biodiversitet' 'klima_scenario' 'avling_region' 'prioritert_avling' 'forbedr_økosystem' 'ressurs_institutt' 'avfall_generert' 'kast_miljø' 'farlig_avfall' 'redusert_materialbruk' 'gjenvunnet_produkt' 'energi_utvikling' 'brennbar_avfall' 'gjenvinn_varm' 'drivstoff_effektivitet' 'luft_forurensning' 'hybrid_teknologi' 'avansert_teknologi' 'drivstoff_teknologi' 'forbrenning_effektivitet' 'kjøle_system' 'kritisk_material' 'begrenset_tilgang' 'kritisk_mineral' 'kobolt_material' 'fluoritt_material' 'gallium_material' 'germanium_material' 'grafitt_material' 'indium_material' 'magnesium_material' 'niobium_material' 'tantalum_material' 'volfarm_material' 'platina_matall' 'jord_element' 'miljø_merk' 'miljø_deklarasj' 'energ_data' 'grønt_nettverk' 'miljø_hensyn' 'regional_fukt' 'gjennomsnitt_temp 'grunnvann_belast' 'karbon_utslipp' 'karbon_nivå' 'karbon_lovgivning' 'karbon_pris' 'karbon_intensitet' 'fly_fart' 'sjø_transport' 'jernbane_transport' 'biobasert_plast' 'tungt_drivstoff' 'maritim_sikker' 'marint_miljø' 'øko_system' 'biologisk_mangfold' 'materiell_skad' 'skips_kollisjon' 'skad_infrastruktur' 'natur_gass' 'hemmende_lov' 'tilgang_energ' 'negativ_innvirkning' 'miljø_politikk' 'miljø_tiltak' 'utedørs_område' 'direkt_brennstoff' 'gjennomgått_renovering' 'bygg_alder' 'drift_timer' 'vær_forhold' 'aktsomhets_krav' 'anslått_energi' 'tilgang_vann' 'ressurs_effektiv' 'måle_bærekraft' 'stimulering_bærekraft' 'bærekraft_påvirkning' 'miljø_kvalit' 'flom_son' 'beredskaps_plan' 'flytte_utstyr' 'nitrogen_oksid' 'marine_diesel' 'metall_palladium' 'metall_iridium' 'metall_rhodium' 'metall_ruthenium' 'metall_osmium' 'grunnstoff_scandium' 'grunnstoff_lanthan' 'grunnstoff_lanthanid' 'grunnstoff_praseodym' 'grunnstoff_neodym' 'grunnstoff_proethium' 'grunnstoff_samarium' 'grunnstoff_europium' 'grunnstoff_gadolinium' 'grunnstoff_terbium' 'grunnstoff_dysprosium' 'grunnstoff_holmium' 'grunnstoff_erbium' 'grunnstoff_thulium' 'grunnstoff_ytterbium' 'grunnstoff_lutetium'

Sosiale faktorer:

`rent_vann´ `antall_varsl´ `varsl_overtred´ `mottatt_overtred´ `mat_problem´ `sikkerhets_problem´ `hygienisk_praksis´ `produkt_merk´ `produkt_allerg´ `allergen_merk´ `produkt_forurens´ `mat_administrasjon´ `legemiddel_administrasjon´ `sanksjon_varsel´ `produkt_tilbakehold´ `produkt_suspensjon´ `regulatorisk_kontroll´ `sivil_rettsak´ `strafferettslig_tiltak´ `fjern_produkt´ `forårsak_sykdom´ `forbruker_syk´ `alvorlig_sykdom´ `fremm_hels´ `fremm_ernær´ `innehold_merkelapp´ `etikett_innpakning´ `produkt_omfang´ `etikett_krav´ `markedsføring_krav´ `mottatt_bekymr´ `forbruker_bekymr´ `bekymr_håndte´ `etiket_transpa´ `tilsvarende_diett´ `diett_retningslinj´ `retningslinj_barn´ `sunn_diett´ `barn_diett´ `tilgjeng_offent´ `mål_indeks´ `offentl_inntekt´ `sivil_straff´ `korrigere_reklam´ `reklam_rettsmidl´ `etikett_merke´ `selv_reguler´ `marked_pris´ `innhold_ansv´ `helse_påstand´ `urimelig_påstand´ `villedende_påstand´ `økonomisk_forpliktelse´ `regulatorisk_prosedyre´ `juridisk_gebyr´ `sosial_standard´ `arbeids_ald´ `alvorlig_skad´ `risiko_arbeid´ `samfunn_ansvar´ `offentlig_sted´ `offentlig_gjør´ `grunnlegg_stress´ `arbeidstak_ret´ `erstatning_avling´ `farlig_produkt´ `initi_tilbakekald´ `myndighets_organ´ `enhet_tilbakekalt´ `prosentandel_frivill´ `årsak_tilbakekalling´ `antall_tilbakekalling´ `obligatorisk_standard´ `brudd_begått´ `menneske_hels´ `uønsket_bivirkning´ `produkt_kategori´ `drifts_områd´ `produkt_bruker´ `arbeid_forhold´ `sikkerhet_krav´ `miljø_krav´ `overdreven_overtid´ `arbeid_lønn´ `arbeid_kompensasjon´ `arbeid_mindreårig´ `tvang_arbeid´ `disiplinær_praksis´ `frihet_organiser´ `arbeidstaker_innvolver´ `arbeidstaker_kommunik´ `behandling_arbeidstak´ `arbeidstaker_utvikl´ `anti_mobbing´ `anti_misbruk´ `oppsigelse_politikk´ `nedbemann_politikk´ `helse_tilstand´ `sikkerhet_tilstand´ `tredjepart_leverandør´ `direkt_leverandør´ `ekstern_ansvar´ 'tilbakelevering_vann' 'avveining_organisasjon' 'næringsstoff_håndter' 'innsamling_gjødsel' 'behandling_gjødsel' 'lagring_gjødsel' 'bruk_gjødsel' 'håndtering_avløpsvann' 'håndtering_gjødsel' 'gårdsbruk_sikkerhet' 'behandling_land' 'landbruk_praksis' 'behandling_praksis' 'jord_vurder' 'risik_vurder' 'dyre_produk' 'animalsk_protein' 'dyre_dødel' 'dyrket_avl' 'brukt_høy' 'beite_områd' 'beitet_skog' 'dyrket_mark' 'høstet_mark' 'konsentrert_for' 'dyre_for' 'kadaver_vekt' 'slaktet_husdyr' 'sanitære_tiltak' 'plantesanitære_tiltak' 'dyre_sikkerhet' 'plante_sikkerhet' 'beskytt_mennesk' 'beskytte_dyr' 'beskytt_planteliv' 'medis_antibiotik' 'dyre_type' 'mottatt_antibiotik' 'antimikrobiell_medisin' 'medis_virkn' 'dyr_medisin' 'mennesk_medisin' 'registrerbar_hendelse' 'første_hjelp' 'død_rate' 'heltid_ansatt' 'deltid_ansatt' 'direkte_ansatt' 'sesong_ansatt' 'kronisk_luftveissykdom' 'betennelse_luftvei' 'akutt_bronkitt' 'subakutt_bronkitt' 'lunge_sykdom' 'lunge_funksjon' 'støv_syndrom' 'helse_studier' 'svinekjøtt_produkt'

'fritt_gående' 'tilgang_mat' 'dyre_velferd' 'velferds_standard' 'storfekjøtt_produkt' 'fjørfe_produkt' 'dyre_behandling' 'transport_betingels' 'slakter_anlegg' 'husdyr_tilførsel' 'for_risik' 'melke_kyr' 'drift_forhold' 'bevisshet_tap' 'helse_personell' 'student_personvern' 'samle_informasjon' 'demografisk_data' 'person_identifiserbar' 'person_informasjon' 'kjønn_data' 'alder_data' 'etnisk_data' 'data_funksjonshemning' 'eierskap_data' 'ansettelse_status' 'sosial_trygghet' 'medisinsk_informasjon' 'utdanning_informasjon' 'økonom_informasjon' 'ansettelse_informasjon' 'livsstil_informasjon' 'elektronisk_informasjon' 'personvern_risik' 'student_bolig' 'butikk_lokasjon' 'sosioøkonomisk_faktor' 'påvirke_pris' 'international_handel' 'veldedig_organisasjon' 'dumping_land' 'dumping_sjø' 'alvorlig_overtred' 'lokal_helse' 'statlig_helse' 'tilbakekalling_produkt' 'privat_merkevar' 'bryt_regl' 'helse_konsekvens' 'nærings_påstand' 'nærings_innhold' 'feilmerk_etikett' 'skog_råd' 'skog_sertifisering' 'mat_avfall' 'behandle_stoff' 'behandlings_middel' 'mat_olje' 'ikke_spiselig' 'mat_pris' 'tilgjengelighet_mat' 'protein_typ' 'publisering_dat' 'lokal_samfunn' 'kommunal_bruker' 'vann_rett' 'uttak_kild' 'påvirkning_ansvar' 'ledelses_mål' 'ledelse_strateg' 'avslør_strateg' 'avslør_mål' 'pågående_aktivit' 'absolutt_mål' 'mulig_reduksj' 'risiko_filt' 'vann_verktøy' 'vann_avtrykk' 'analyser_vann' 'vann_mengd' 'kvalitets_tilat' 'kvalitet_standard' 'overstredels_standard' 'total_overskrid' 'anerkjenn_handling' 'lav_kvalit' 'måle_frekven' 'begrens_overtred' 'ukentlig_gjennomsnitt' 'månedlig_gjennomsnitt' 'konsentrasjon_stoff' 'konsentrasjon_forurens' 'mat_risik' 'revisjons_result' 'migrant_arbeid' 'arbeids_skad' 'dødelig_utfall' 'begrenset_arbeid' 'medisink_behandl' 'helse_tjenest' 'arbeids_sikker' 'helse_administrasjon' 'påvis_skad' 'påvis_sykd' 'arbeids_ulyk' 'person_skad' 'sikkerhet_styr' 'arbeids_relat' 'enhets_lønn' 'sosial_påvirkning' 'opplæring_arbeidsstyrk' 'barne_arbeid' 'arbeid_praksis' 'mennesk_rettigheter' 'arbeidsstyrke_helse' 'identifiser_avling' 'nedstrøms_kund' 'bearbeid_mat' 'kunde_tillitt' 'leverandør_tillitt' 'øke_tillitt' 'forsknings_studie' 'ufrivillig_oppsigelse' 'ufrivillig_nedbemmaning' 'kjønn_reparasjon' 'etnisk_gruppe' 'like_muligheter' 'ansatt_ressurser' 'planlagt_inspeksj' 'uanmeldt_inspeksj' 'arbeid_tid' 'hvil_tid' 'pålagt_krav' 'inspeksjons_krav' 'helsetjeneste_kostnad' 'sikkerhets_protokoll' 'landbruks_utstyr'

Styrings faktorer:

`økonomisk_begrensning´ `vann_kostnad´ `regulerende_etat´ `omdømme_risik´ `økt_kostnad´ `drift_kostnad´ `potensiell_påvirkning´ `påvirkning_kostnad´ `påvirkning_inntekt´ `påvirke_omdømm´ `kortsiktig_stratgi´ `langsiktig_strategi´ `omfang_strategi´ `forvaltning_plan´ `start_år´ `mål_år´ `korriger_tiltak´ `korrigerings_plan´ `markedsfør_produkt´ `betydelig_resultat´ `rettslig_prosess´ `total_omsetning´ `salg_inntekt´ `salg_produkt´ `gunstig_næringsstoff´ `næringsstoff_vitamin´ `næringsstoff_kalsium´ `næringsstoff_jern´ `næringsstoff_protein´ `næringsstoff_fiber´ `tilsatt_sukk´ `resulter_risik´ `langsikt_helse' `risiko_styr´ `mat_relevan´ `formell_hels´ `ernæring_initiativ´ `regionalt_program´ `internationalt_program´ `nationalt_program´ `bransje_spesifikk´ `potensielle_allergen´ `gluten_fri´ `betydelig_klag´ `betydelig_søksmål´ `fremtidig_risik´ `media_tv´ `media_radi´ `media_internet´ `fremme_produkter´ `endring_drift´ `endring_opplæring´ `endring_teknologi´ `fare_data´ `tilgang_forsyning´ `rettferdig_handel´ `etisk_kodeks´ `forsyn_avtal´ `ingrediens_pri´ `prioritert_kjemikali´ `obligatorisk_standard´ `fremtid_prod´ `stans_salg´ `produkt_sikker´ `avgjør_prosedyr´ `utstedt_forlik´ `ledelses_praksis´ `null_tolerans´ `kjerne_brudd´ `lokal_lov´ `lønns_revisj´ `revisjon_standard´ `måle_etterlev´ 'brutto_verd' 'finansiell_rapport' 'finansiell_kontroll' 'strategi_mål' 'lovbestemt_tilat' 'lovbestemt_reguler' 'permanent_krav' 'juridisk_definisjon' 'straffe_ordr' 'juridisk_ordr' 'økonom_tilstand' 'opplæring_program' 'rapportert_dat' 'kjemisk_forbedring' 'kunde_skad' 'skad_mennesk' 'sikkerhet_hendel' 'fatilitets_sikkerhet' 'passende_bygning' 'kapasitet_plass' 'sprinkler_system' 'brann_slukk' 'brann_utstyr' 'slukke_utstyr' 'standard_testing' 'standard_vedlikehold' 'standard_inspeksjon' 'kvalitet_sikring' 'sikkerhet_inspeksjon' 'oppfølging_inspeksjon' 'første_inspeksjon' 'rutinemessig_gjennomfør' 'ansatt_plassering' 'identifisert_sårbar 'data_sikker' 'sikker_risik' 'data_risik' 'sikker_prosedyr' 'inter_kontroll' 'system_utnytt' 'organisasjo_tilgang' 'endring_informasjon' 'valg_partner' 'valg_teknologi' 'eksternt_rammeverk' 'sikkerhets_teknikk' 'system_krav' 'data_sårbar' 'personvern_data' 'beskriv_omfang' 'personvern_risik' 'dele_informasjon' 'gi_samtykke' 'data_innbrudd' 'identifiserte_brudd' 'sensitiv_informasjon' 'unøyaktig_data' 'brudd_reklame' 'brudd_markedsføring' etikett' 'overtid_tim' 'kostnad_sensitivitet' 'fortjenest_margin' 'håndhev_etterspørsel' 'arbeids_konflikt' 'håndhev_ansett' 'arbeids_stans' 'brudd_arbeidsmijølov' 'diskiminer_arbeidsplass' 'brudd_lønn' 'brudd_overtidsbestemm' 'brudd_arbeidsbestemm' 'alder_diskrimin' 'diskriminer_funksjonsevn' 'diskriminer_trakasser' 'nasjonalitet_diskriminer' 'diskriminer_opprinn' 'diskriminer_gravidit' 'farge_diskriminer'

'rase_diskriminer' 'kjønns_diskriminer' 'generell_diskrimine' 'transport_kost' 'vurdering_rapport' 'brutto_utslipp' utslipp' 'omfang_utslipp' 'bedrift_regnskap' 'bedrifts_rapport' 'rapportering_standard' 'internasjonal_luftfart' 'miljø_organisasjon' 'forbrenning_score' 'finansiell_data' 'miljø_rapport' 'miljø_informasjon' 'utslipp_monito' 'utslipp_handel' 'mengde_gigajule' 'prosentandel_fornybar' 'operasjonell_energi' 'kjøp_elektrisitet' 'energi_informasjon' 'energi_sertifik' 'handling_plan' 'global_akvakultur' 'prosseserings_standard' 'landbruk_kostnad' 'tilbaketrekke_produkt' 'juridisk_handl' 'migrant_arbeid' 'leid_arbeidskraft' 'forsynings_kjede' 'kontrakt_basis' 'fare_liv' 'umiddelbar_skade' 'skade_samfunn' 'vesentlig_brudd' 'systematisk_svikt' 'lav_risiko' 'samfunns_rettighet' 'implementerings_system' 'genetisk_modifisert' 'modifisert_organisme' 'kreve_merking' 'midlertidig_importsats' 'offentliggjøre_forskrift' 'handels_restriksjon' 'eu_forskrift' 'eu_dirktiv' 'kjøretøy_utstyr' 'kjøretøy_sikkerhet' 'begrens_konkurrans' 'mistenk_dødsfall' 'seksuelt_overgrep' 'mangelfull_sanit' 'mangelfull_inspeksj' 'energi_typ' 'energi_leverandør' 'energi_kund' 'gjeldende_vilkår' 'eiendom_investering' 'aktsomhets_krav' 'sikkerh_kultur' 'gjennvinnings_teknologi'

Appendix 3: Legal Dictionary

`social_condit´ `extern_enviro´ `extern_consider´ `report_result´ `report_separ´ `not_attach´ `report_period´ `report_standard´ `accord_framework´ `sustain_develop´ `account_compani´ `social_respons´ `work_enviro´ `effect_enviro´ `effect_produc´ `effect_societi´ `negat_influenc´

Appendix 4: Juridisk Ordbok

`sosial_forhold´ `ytre_miljø´ `hensyn_miljø´ `ytre_hensyn´ `rapport_resultat´ `opplys_særskilt´ `ikke_vedlagt´ `rapporterings_period´ `rapporterings_standard´ ihenhold_rammeverk´ `bærekraftig_utvikling´ `regnskapsplikt_firma´ `samfunn_ansvar´ `arbeids_miljø´ `virkning_miljø´ `virkning_produksjon´ `virkning_samfunn´ `negativ_påvirkning´

Appendix 5: Calculations of Control Variables

Price-to-Book:

$$PricetoBook = \frac{Price\ value\ of\ equity}{Book\ value\ of\ equity}$$

Firm Size:

$$FirmSize = \ln\left(Total\ assest\right)$$

Total Revisions:

$$TotalRevsions = \ln(nr.of\ 1 - year - ahead\ earnings\ forecast\ reviced)$$

Standard Deviation of Return on Assets:

$$ROASD = \frac{Income\ prior\ to\ financing\ costs}{Total\ assets}$$

Appendix 6: Goodness-of-fit Tests

In this appendix, we present the goodness-of-fit tests conducted to assess the suitability of the Structural Equation Modeling analysis for our research.

Stability analysis of simultaneous equation systems:

Eigenvalue stability condition

Eigenvalue	Modulus
0	0

stability index = 0
All the eigenvalues lie inside the unit circle.
SEM satisfies stability condition.

The *estat stable* test was performed to assess the stability of parameter estimates over time in the panel data structure. A result of 0 indicates no significant change in parameter estimates over time, and the model can be considered stable. This implies that there are no systematic changes in model parameters over time and that the analysis can be relied upon to predict and explain events in the panel data structure. However, a result of 0 does not necessarily imply that the model is perfect, and other sources of uncertainty or errors in the analysis may still exist (Wooldridge, 2016).

Equation-level goodness of fit:

Dependent variables	Variance Fitted	Predicted	Residual	R-squared	mc	mc2
Observed Synchronic~y	**3.094634**	**.1633022**	**2.931332**	**.0527695**	**.229716**	**.0527695**
Overall				**.0527695**		

mc = Correlation between dependent variable and its prediction.
mc2 = mc^2 is the Bentler–Raykov squared multiple correlation coefficient.

The *estat eqgof* command tests the goodness-of-fit of a model by evaluating the equality of its residual variances across groups of observations defined by the levels of the independent variables. The overall result is a measure of the goodness-of-fit of the entire model, with a lower value indicating a better fit (Wooldridge, 2016). The overall result is 0.0527, which suggests that the model has a relatively good fit.

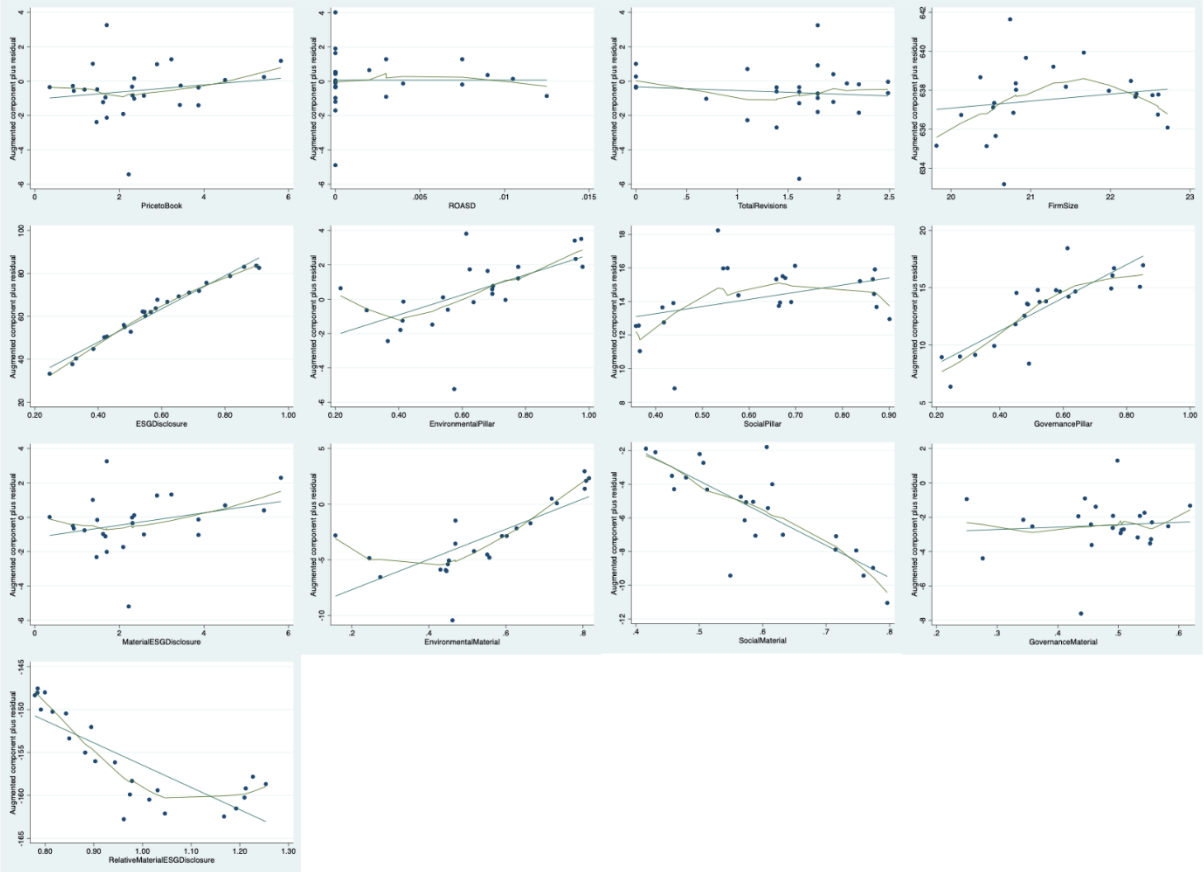
Goodness-of-fit based on residuals:

Fit statistic	Value	Description
Size of residuals		
SRMR	**0.000**	Standardized root mean squared residual
CD	**0.048**	Coefficient of determination

The *estat gof, stats(residuals)* command is used to test two indices, the standardized root mean square residual (SRMR) and the critical N index (CD). The SRMR measures the average difference between the observed correlations and the correlations predicted by the model. A low SRMR value indicates a good fit between the model and the data. The CD measures the minimum sample size for which the model is expected to provide a satisfactory fit. A CD value less than or equal to 0.1 suggests that the model is suitable for the sample size used in the analysis (Wooldridge, 2016). In this case, the SRMR value of 0.000 indicates a very good fit between the model and the data, as the value is almost zero. The CD value of 0.048 suggests that the model is well-suited for the sample size used in the analysis.

Appendix 7: Diagnostic Tests

Linearity:



To evaluate the linearity assumption in our analysis, we performed an assessment of the acprplot, which is presented above. The findings indicated that some variables showed signs of nonlinearity, while others demonstrated a strong linear relationship. To account for these nonlinear relationships, we precisely identified and defined the interactions between latent variables and observed indicators (Wooldridge, 2016). Consequently, we have taken the necessary steps to rigorously adherence to the linearity assumption in our SEM analysis.

Normality:

Variable	Obs	W	V	z	Prob>z
Synchronicity	214	0.9534	7.365	4.610	0.0001
ESGDisclosure	75	0.9863	0.889	-0.257	0.6012
EnvironmentalPillar	71	0.9823	1.101	0.209	0.4172
SocialPillar	75	0.9291	4.611	3.337	0.0004
GovernancePillar	75	0.9847	0.995	-0.012	0.5048
MaterialESGDisclosure	83	0.5495	31.870	7.601	0.0000
EnvironmentalMaterial	74	0.3107	44.388	8.274	0.0000
SocialMaterial	83	0.9210	5.589	3.778	0.0001
GovernanceMaterial	83	0.9591	2.895	2.334	0.0098
RelativeMaterialESGDisclosure	75	0.2552	48.492	8.474	0.0000
PricetoBook	224	0.7943	26.108	7.435	0.0000
FirmSize	83	0.9354	8.587	4.914	0.0000
ROASD	166	0.6713	54.135	9.236	0.0000
TotalRevisions	175	0.9661	2.399	1.921	0.0274

We meticulously assessed the normality assumption in our data using the Shapiro-Wilk test at a 5% significance level. The majority of p-values associated with the test were below 0.05, providing substantial evidence against the null hypothesis of normality. To address this issue, we employed OIM (Robust) standard errors, which can effectively handle violations of normality (Hancock & Mueller, 2013). Consequently, despite the violation of this assumption, our use of OIM standard errors ensures the validity and reliability of our results.

Absence of multicollinearity:

Variable	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)
(I) ESGDisclosure	1.63								
(II) EnvironmentalPillar		1.27							
(III) SocialPillar			1.36						
(IV) GovernancePillar				1.52					
(V) MaterialESGDisclosure					1.06				
(VI) EnvironmentalMaterial						1.08			
(VII) SocialMaterial							1.16		
(VIII) GovernanceMaterial								1.11	
(IX) RelativeMaterialESGDisclosure									1.25
PricetoBook	1.24	1.25	1.34	1.27	1.22	1.23	1.27	1.22	1.23
FirmSize	2.24	1.98	1.69	2.07	1.96	1.81	1.96	1.98	1.81
ROASD	1.85	1.93	1.86	1.84	1.86	1.81	1.98	1.86	1.85
TotalRevisions	1.22	1.22	1.28	1.22	1.46	1.45	1.53	1.46	1.23
Mean VIF	1.63	1.53	1.51	1.58	1.51	1.48	1.58	1.53	1.48

To evaluate the presence of multicollinearity, we employed Variance Inflation Factor (VIF) statistics (Wooldridge, 2016). After an examination, it was determined that none of the VIF values exceeded the threshold of 5. Thus, based on this rigorous analysis, we can confidently conclude that multicollinearity is absent (Wooldridge, 2016), affirming the fulfillment of the underlying assumption.

Homoscedasticity:

```
Breusch–Pagan/Cook–Weisberg test for heteroskedasticity
Assumption: i.i.d. error terms
Variables: All independent variables

H0: Constant variance

F(11, 15) =   1.76
 Prob > F = 0.1525
```

```
White's test
H0: Homoskedasticity
Ha: Unrestricted heteroskedasticity

   chi2(26) =  27.00
Prob > chi2 = 0.4093
```

To examine the presence of heteroscedasticity, both White's test and the Breusch Pagan test were employed. The results of White's test indicated that the hypothesis of homoscedasticity could not be rejected, as the chi-squared statistic of 27.00 yielded a p-value of 0.4093. Similarly, the Breusch-Pagan test, which assessed the assumption of constant variance, produced an F-statistic of 1.76, resulting in a p-value of 0.1525. These findings suggest that there is no significant evidence to support the presence of heteroscedasticity in the model (Wooldridge, 2016). Consequently, through this thorough analysis, we can assert with confidence that multicollinearity is not present, thereby confirming the fulfillment of the underlying assumption.

Absence of endogeneity:

```
Test of H0: Difference in coefficients not systematic

    chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
            =   0.49
Prob > chi2 = 0.9740
```

We utilized the Hausman test to assess endogeneity. This test compares estimates obtained from a model assuming endogeneity (control function approach) with estimates from a model assuming exogeneity (ordinary least squares regression). The null hypothesis is that the variables in the model are exogenous and not affected by endogeneity (Wooldridge, 2016).

Our Hausman test yielded a probability of 0.9740, surpassing the conventional significance level of 0.05. Therefore, based on the evidence we cannot reject the null hypothesis of endogeneity (Wooldridge, 2016). Consequently, the assumptions necessary for our SEM analysis are met, suggesting that the variables in our model are exogenous and unaffected by endogeneity. By employing this statistical approach, we accounted for potential endogeneity, ensuring the validity and reliability of our SEM findings.

No model misspecification:

Testing for model misspecification in SEM analysis is a challenging task due to the complex nature of these models (Hancock & Mueller, 2013). With a Cronbach's alpha coefficient of 0.71 and the inclusion of other presented goodness-of-fit tests and diagnostic analyzes, our rigorous evaluation provides valuable insights into the suitability of our SEM model. However, it is important to recognize that assessing model misspecification in SEM involves intricate relationships among variables, making it difficult to identify all potential sources of misfit. Even small deviations from the true model can have substantial effects on the results. In this multivariate framework, accurately evaluating model misspecification requires careful consideration and exploration of various diagnostic techniques (Hancock & Mueller, 2013). Despite these challenges, our comprehensive assessment contributes to a deeper understanding of the appropriateness of our SEM model for the research objectives at hand.

Appendix 8: Summary of Sample Data – Companies and Industry

Company Name	Indusry
Arctic Fish Holding AS	Consumer Staples
Aker Biomarine ASA	Consumer Staples
Andfjord Salmon AS	Consumer Staples
Atlantic Sapphire ASA	Consumer Staples
Austevoll Seafood ASA	Consumer Staples
Biofish Holding AS	Consumer Staples
Black Sea Property AS	Consumer Discretionary
Elektroimportoren AS	Consumer Discretionary
Europris ASA	Consumer Discretionary
Gigante Salmon AS	Consumer Staples
Grieg Seafood ASA	Consumer Staples
Gyldendal ASA	Consumer Discretionary
Havila Kystruten AS	Consumer Discretionary
Hynion AS	Consumer Discretionary
Ice Fish Farm AS	Consumer Staples
Icelandic Salmon AS	Consumer Staples
Kid ASA	Consumer Discretionary
Kongsberg Automotive ASA	Consumer Discretionary
Komplett ASA	Consumer Discretionary
Leroy Seafood Group ASA	Consumer Staples
Lumarine AS	Consumer Staples
Lumi Gruppen AS	Consumer Discretionary
Masoval AS	Consumer Staples
Mowi ASA	Consumer Staples
Norcod AS	Consumer Staples
Nordic Halibut AS	Consumer Staples
Norpalm AS	Consumer Staples
Orkla ASA	Consumer Staples
Proximar Seafood AS	Consumer Staples
SalMar ASA	Consumer Staples
Salmon Evolution ASA	Consumer Staples
Sats ASA	Consumer Discretionary
Statt Torsk ASA	Consumer Staples
XXL ASA	Consumer Discretionary