Financial Economics

From Tree Huggers to Money Makers:

How ESG Scores Boost Corporate Financial Performance in the EU

Bachelor Thesis 15 hp

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Abstract

This thesis examines the relationship between Environmental, Social, and Governance (ESG) scores and financial performance as measured by both accounting- and market-based measures; Return on Assets and Tobin's Q. The study takes a particular focus on the European Union (EU), more specifically on companies operating in the region and the union's strong commitment to achieving the Sustainable Development Goals (SDGs) and more general efforts towards a more sustainable future. The large and updated dataset of 288 companies enables a more robust basis for conclusions. Eight fixed effects regression models are run to perform causal inference analysis. The results generally indicate a significant and positive impact on both ROA and Tobin's Q, confirming the findings of many previous studies and the hypothesis. Nevertheless, the combined ESG score and the social pillar (S) do not significantly impact Tobin's Q. A key finding is that the environmental pillar reaches significance with a positive impact on both financial performance measures. This result serves as a contribution to existing literature. Overall, the results provide evidence that ESG factors should be considered by both existing shareholders as well as potential investors. Additionally, the study may be of interest to regulators and companies as support for decision-making.

Acknowledgment

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1. Introduction

1.1 Background

Investing based on Environmental, Social, and Governance (ESG) considerations is increasingly crucial in today's world economy. As a result, sustainable investing has grown tremendously and the annual cash flow has increased tenfold since 2018 (Milinchuk, 2021).

The potential reasons behind this are numerous. One is the belief that improvements in ESG factors can positively impact companies' financial performance. The number of publications supporting the idea that investments in ESG outperform their counterparts, both in regard to risk and returns, is increasing. Another reason is the increased interest and involvement in ESG-related issues, such as climate change and social justice. This has led to a growing demand from private and institutional investors seeking to engage with ESG assets. Public policy and legislation can be considered as a third reason. Many countries have enshrined carbon-neutral targets into law (Milinchuk, 2021). The European Union (EU) taxonomy was adopted in June 2020 and is a tool for achieving the EU's climate targets and the objectives of the European Green Deal. It aims to assist investors, companies, and policymakers in identifying and comparing investments based on standardized definitions of the concept *sustainable*. Legislation and policies will evolve and encourage further development in sustainable investing (Regeringskansliet, 2020). While the EU taxonomy focuses on environmental sustainability (E), another tool is available for objectively evaluating a firm, fund, or a security's performance according to environmental, social, and governance criteria, referred to as ESG score (Miller, 2022).

Furthermore, the EU has committed to implementing the Sustainable Development Goals (SDG) in all their policies, and they also encourage and promote all EU countries to follow suit. The SDGs are part of the 2030 Agenda and were established by the United Nations (UN) in 2015, and the EU was instrumental in shaping the action plan. The 17 SDGs, with 169 associated targets, are set to be accomplished by 2030 (European Commission, n.d. a). The goals cover environmental, as well as social, and governance issues. The world's countries collectively seek to fight for *climate action* (goal 13), *no poverty* (goal 1), and *peace, justice and strong institutions* (goal 16) (United Nations, n.d.).

The EU's approach to implementing the 2030 Agenda is clear, focusing on delivering concrete actions to make progress toward the SDGs. Two examples of achieving social objectives are the proposal for a *directive on adequate minimum wages in the European Union* and the communication on a *union of equality* (European Commission, n.d. b). The EU also actively promotes and protects human rights, democracy, and the rule of law worldwide. This field consists of policy areas such as *democracy*, *civil society,* and *peace and security*. Anti-corruption belongs to *democracy* and is considered a prerequisite for achieving the SDGs, and the EU requires all member states to comply with democratic governance. In addition, it supports projects in the field of human rights, fundamental freedoms, and democracy in non-EU member states through The European Instrument for Democracy and Human Rights (EIDHR) (European Commission, n.d. c). Additional actions focusing on the social dimension are the several directives implemented by The EU Commission, such as the *European Framework Directive on Safety and Health at Work*, which is meant to serve as guiding principles to ensure better working conditions throughout the region and regardless of sector. Examples that promote equality and work-life balance are the Pregnant Workers Directive and the newly adapted Women on Boards Directive to reduce gender inequalities (EU Monitor, 2023).

The aforementioned taxonomy is not the only way the EU contributes to a more environmentally sustainable planet. This field includes many policy areas, such as *biodiversity and ecosystems*, *forests*, and *transboundary water cooperation* (European Commission, n.d. d). Another area is *sustainable energy*, for which €3.7 billion from EU development funds were allocated to actions related to this during the years 2014-2020 (European Commission, n.d. e).

The rising profile of ESG puts more pressure on firms to take responsibility and increase their efforts on non-financial factors. The legislation also acts as a driver to achieve more sustainable companies. The EU can adopt EU treaties, binding and not binding, to influence, and sometimes force, its member states, and their companies to work towards common EU objectives, such as those mentioned above. Regulations, directives, decisions, recommendations, and opinions are different types of legislation used (European Union, n.d.). For example, the EU has implemented rules requiring some companies to deliver reports on their social and environmental risks and how people and the environment are impacted by their activities, pushing companies to increase further their efforts related to the governance component. The Corporate Sustainability Reporting Directive (CSRD) came into force in

January 2023 and is part of the European Green Deal. This new directive revises and strengthens the current rules while additional large companies, along with listed SMEs, will be subject to the directive. It will cover around 50 000 companies in total, compared to about 12 000 companies today (European Commission, n.d. f).

The EU taxonomy and CSRD, both elements of the European Green Deal, aim to direct money flow to green and sustainable investments. The new directive will ensure that stakeholders are able to retrieve the necessary information to evaluate potential investment risks related to different aspects of sustainability. In addition, the new rules aim to establish a culture of transparency regarding how people and the environment are impacted by the companies' operations (European Commission, n.d. f).

The growing interest in ESG and sustainable investments is expected to continue consistently from this time on. For instance, ESG investments are projected to more than double before 2026. As a result, ESG investments are expected to correspond to a more significant share of investment portfolios and overall compose 15% of total investments in 2025 (Dow Jones, 2022). Asset managers worldwide are forecasted to increase their ESG-oriented assets under management (AuM) by almost 85% between 2021 and 2026. With a compound annual growth rate (CAGR) of approximately 13%, ESG assets will account for 21.5% of total AuM globally before 2026 (PWC, 2022).

1.2 Problem Description and Problem Analysis

Considering the increased interest in ESG investments, a primary concern is whether ESG scores can be used to explain the financial performance of firms. In addition, in recent years, there have been increased efforts by regulatory bodies such as the European Union to develop guidelines, requirements, and definitions for sustainable business practices. Thus, the study will focus on a current and highly debated topic, where several studies have been conducted in recent years.

The academic research in ESG investments has expanded dramatically, and previous results are mixed, with the majority of studies finding a positive relationship. In contrast, others show an insignificant result or significant, negative relationship between ESG score and financial performance.

Regarding accounting-based performance measures, such as ROA, there seems to be clear evidence that ESG improvements go hand in hand with financial performance, see Alareeni and Hamdan (2020); Aydogmus, Gülay and Ergun (2022). Even if this relationship seems rather straightforward, how the individual pillars respond in such an analysis is quite ambiguous. In addition, many studies do not include contemporaneous data, even if they have been undertaken in recent years. This study contains data from the pandemic years that could potentially give differing results. However, no further connections or, by any means, a deeper analysis of the pandemic will be made.

It should also be noted that some studies, like Velte (2017), find no significant impact of ESG on ROA, even if the study was done on a developed market. The studies done by Duque-Grisales and Aguilera-Caracuel (2021); Giannopoulos, Kihle Fagernes, Elmarzouky and Afzal Hossain (2022) on Latin American and Norwegian companies, two very different markets indeed, contradict the majority of other studies with their findings of a negative impact of ESG. Their findings support that ESG investments only lead firms to incur unnecessary costs. If such a relationship was to be established in this study, would the EU Commission's work be welcomed by the region's companies?

There are mixed results on ESG's impact on the market-based Tobin's Q. Aydogmus, Gülay and Ergun (2022); Giannopoulos et al. (2022) indicate a positive overall causal relationship of ESG. Other studies, like the ones presented in the meta-study by Gillan, Koch and Starks (2021), find the opposite to be true.

Atan, Alam, Said, and Zamri (2018); Velte (2017), have found no significant impact of ESG score on Tobin's Q. The common denominator in these two studies seems to be the relatively small datasets. This analysis thus tries to account for that, and by using the EU and the largest companies in the region, the problems discussed by Atan et al. (2018) are mitigated. The study done by Liu, Wu and Zhou (2022) has a larger dataset than the two other studies but does not find a significant impact of ESG or its individual pillars on Tobin's Q. The ambiguous results of the previous studies make a potential conclusive result to have a meaningful contribution to the literature and can serve as a basis and guiding principle further to support the endeavors of the European Green Deal brought forward by the EU. The problem description can thus be summarized in the following way:

Are the EU initiatives and the implementations by some of the region's largest, most important, and influential companies beneficial for them, both short-term wise indicated by the ROA and/or in the long-term approximated by looking at the impact on Tobin's Q?

1.3 Aim of the Study

This thesis aims to examine the impact of the environmental, social, and governance score (ESG) on the financial performance of companies in the European Union. It will provide an updated and large dataset that will be the basis for justified conclusions.

Prior studies on this topic mainly focus on the relationship between ESG score and financial performance in markets such as the Nordics, Asia, and developing countries. Other studies focus on one specific country, such as the US, Germany, Sweden, Norway, and Malaysia. This study includes another area of interest - the European Union. A similar study based on the EU's actions to test whether ESG scores can explain financial performance has yet to be seen. Considering that the companies used in the analysis are based in the EU region, it will hopefully contribute with empirical evidence that justifies the vast investments and the importance of the EU's work, such as the European Green Deal. Thus, this paper makes a clear contribution to the existing literature by focusing on an area that puts much effort into ESG issues and will be useful for individual companies and the EU.

This thesis can hopefully be used to justify and serve as a solid ground for decision-making in companies deciding to invest in costly and time-consuming projects related to sustainable business practices. As the study aims to prove, these investments and practices will also be needed to remain competitive in the new and more transparent business environment.

2. Theoretical Framework

2.1 Stakeholder Theory

Stakeholder theory stands in contrast to the traditional perspective of profit maximization as the single objective of a firm. In recent years many have come to the realization that a company's responsibility goes further than this and includes more stakeholders than just the shareholders. To quote Freeman, Harrison, Wicks, Parmar and De Colle (2010), "A stakeholder approach to business is about creating as much value as possible for stakeholders, without resorting to tradeoffs." (Freeman et al., 2010, p. 28).

The stakeholder theory states that a company is responsible for generating value not only in terms of financial returns to the owners but also serving a broader range of entities with a stake in the company. These include, among others, investors, suppliers, and employees but also the local communities, governments, and society at large (Freeman et al., 2010, p. 28). This can be directly related to the ESG definition and its components since many of them are measures of how well these parties are considered. In the stakeholder theory, the assumption is that the company's long-term performance will be impacted by the company's ability to adhere to the demands of the various stakeholders, called a stakeholder orientation approach, which includes the interest in sustainability. The various stakeholders can also have differing opinions and inner conflicts, so it is vital for the firm to identify which of the stakeholders yields the most power over the firm (Ferrell, Fraedrich & Ferrell, 2018, pp. 29-34).

Good business ethics and responsible decision-making are vital to a firm's reputation. If the company is to be perceived favorably by investors and stakeholders in general, it needs to act in ". . . a transparent and responsible manner." (Ferrell, Fraedrich & Ferrell, 2018, p. 30). A lousy perception of the firm can be challenging to recover from. For example, suppose one primary stakeholder generally unfavorably perceives the firm. In that case, it is likely to cause a spiraling event of more and more stakeholders losing confidence in the firm, thus resulting in reduced financial performance.

This modern perspective has also led to a change in the information expectations of the stakeholders and has expanded beyond financial information. Therefore, it has become increasingly common for companies to publish non-financial information, such as firms' social and environmental impact. One of the reasons some companies voluntarily choose to report

their ESG practices is to benefit from their strategic and financial advantages, for example through increased brand loyalty and reputation (Şeker & Şengür, 2021).

2.2 ESG Score

In reporting an ESG score, the reporting entity takes into account various factors of how a company manages risk and exposure that are associated with each of the different pillars in the definition of ESG: Environmental (E), Social (S), and Governance (G). ESG can be further interpreted as a measure of accountability, reflecting companies' commitment to non-financial goals (Refinitiv, 2022).

The data source, Refinitiv Eikon, provides one of the most comprehensive ESG sets available, with ESG score divided into three pillars and ten themes:

- Environmental (resource use, emissions, and innovation)
- Social (workforce, human rights, community, and product responsibility)
- Governance (management, shareholders, and CSR strategy)

The data used by the Refinitiv ratings are continuously updated and comprises all public information about a particular company, spanning from annual reports disclosures to recent news regarding the company (Refinitiv, 2022).

As presented in *Table 1* below, Refinitiv divides companies into categories (*grades*): A, B, C, and D, based on their received score. The top scorers are regarded as *ESG Leaders* and the bottom scorers as *ESG Laggards.* Refinitiv's ESG score also provides benchmarks of sectors and countries to make comparisons easier (Refinitiv, 2022). The scores are meant to guide investors looking to invest in companies or funds rated by these agencies. In addition, the companies use ESG scores to assess their risk management success. They can give indications of areas of improvement or where the company performs well relative to their peers (SG Analytics, 2022).

Table 1: ESG Score

Score Range	Grade	Description	
0.00 <= score <= 8.33	D -	""D" score indicates poor relative ESG performance and insufficient degree of transparency in reporting material ESG data publicly."	**ESG Laggards**
8.33 < score <= 16.66	D		
16.66 < score <= 25.00	D +		
25.00 < score <= 33.33	C -	""C" score indicates satisfactory relative ESG performance and moderate degree of transparency in reporting material ESG data publicly."	
33.33 < score <= 41.66	C		
41.66 < score <= 50.00	C +		
50.00 < score <= 58.33	B -	""B" score indicates good relative ESG performance and above-average degree of transparency in reporting material ESG data publicly."	
58.33 < score <= 66.66	B		
66.66 < score <= 75.00	B +		
75.00 < score <= 83.33	A -	""A" score indicates excellent relative ESG performance and high degree of transparency in reporting material ESG data publicly"	
83.33 < score <= 91.66	A		
91.66 < score <= 100.00	A +		**ESG Leaders**

Source: Refinitiv (2022)

Relying on one source for all the data gathered is not entirely without its shortcomings. In an article by Stackpole (2021), a reason for this is presented to be the discrepancy between the different providers. The correlation between the scores of the six most commonly used providers is just 0.61 (Stackpole, 2021). This issue has also been brought up by similar studies, such as Liu, Wu and Zhou (2022), who even performed regressions with different scores to add to the robustness of their results.

ESG is not considered to be a perfect representation of corporate sustainability efforts. Pucker, in his famous article "Overselling Sustainability Reporting" in essence, means that the self-reported data from the corporations themselves, which are the very basis for the ratings given by the reporting entities, are highly susceptible to bias from the corporations themselves trying to paint a picture of a different reality of their endeavors (Pucker, 2021). He argues that these issues are resolved by standardizing the reporting and making it more mandatory than it currently is, even if it is not an end-all solution.

2.3 Return on Assets (ROA)

Return on assets is a financial ratio indicating how profitable a company is related to its total assets. It is frequently used to determine how efficiently companies use their assets to generate profits. A higher ROA indicates that a company more efficiently manages its balance sheet, while a lower ROA means suboptimal performance that can be improved upon. The measure will also likely depend on the company's sector, which means that cross-sector comparisons are of little use. This potential problem will not be an issue in this analysis as the absolute ratio

measure is trivial; it is only included as a dependent variable in the regression analysis. In its simplest form, the ROA is:

$$\frac{Net\ Income}{Total\ Assets}$$

Usually, an average of the total assets over a specific period is used in the denominator. In the numerator, the net income represents the result applicable to the equity investors after all the debt holders and tax authorities have received their share of the company profits. Therefore, it is debatable if it is the correct profit level to include in the ratio. The net income thus pairs with the equity and the total assets on the balance sheet but does not consider the impact of debt financing, which would be taken care of if the interest expenses were added back to the net income (Hargrave, 2022). The analysis will use data from Refinitiv Eikon and thus follow its choices and definition of the ROA calculation.

2.4 Tobin's Q

The market is forward-looking and will value a company based on its prospects of generating cash flows for its investors. The valuation made by the market often differs from the one solely made with an accounting-based methodology since the latter fails to account for those future prospects that the company offers. This is also a frequently used argument for the inclusion of Tobin's Q in similar studies, for example, by Velte (2017).

Tobin's Q is a measurement based on this logic to value a company by comparing the market-based valuation of a company's stock given by market capitalization and its market value of liabilities, both included in the numerator and comparing those to the denominator where the accounting-based value of a company's total assets is found (Tobin & Brainard, 1976). This will create a ratio, which indicates if a company is under- or overvalued compared to the accounting value. In the long run, this is to be interpreted as the replacement value of the firm's assets and the long-term value that investors should put on the company. So, in theory, the long-term value of a given company's Q ratio should be equal to one (Tobin & Brainard, 1976).

Giannopoulos et al. (2022); Velte (2017) both argue that ESG investments can take time to generate results as one argument for their decision to use Tobin's Q. The long-term aspect of the measurement makes it a valid dependent variable to regress on. They also argue that, like

other intangibles, ESG investments and performance might cause the market to value a company higher.

A ratio above one tells that the company has something that the market values, which is not replicated in its financial statement. This could, for example, be some intellectual capital or a brand. Some argue that this could also be seen as a weakness of the measurement when applied to a single company rather than the market as a whole since the value that the market puts on a specific company will be an object for speculation and macroeconomic factors (Market Business News, n.d.). A ratio above one would also indicate to firms that their investments into new assets are worth more than they paid as the replacement cost is lower than what the market would pay. This can further be seen as a sign for the company to invest more (Tobin & Brainard, 1976).

The interpretation of a ratio below one is that the company is better off selling all assets instead of continuing to manage its operations. However, pessimistic market conditions will also lower the overall market Q value and thus affect an individual company. This could give rise to M&A activity in the market since buying the collection of assets, the firm itself, is cheaper than all the assets individually to expand operations (Market Business News, n.d.)

The formula used to calculate the Q ratio is:

$$\frac{Market\ Capitalization + Market\ Value\ of\ Liabilities}{Replacement\ Cost}$$

Market capitalization is calculated as share price times the number of shares outstanding. The market value of liabilities is assumed to equal the book value of liabilities. The replacement cost is given by the total assets of the firm. There is some discrepancy in how to calculate Tobin's Q. Nevertheless, this is similar to how Giannopoulos et al. (2022); Velte (2017) manually calculated it. Some data sources that other studies have used provide a calculated ratio. Refinitiv, used in this thesis, does not.

The limitations and critique of the ratio as a determining factor to use for investment decisions are not a concern in the analysis undertaken in this thesis. Since the goal is just to examine if ESG impacts the ratio, no interpretation of the ratio itself is made.

3. Literature Review

3.1 Summary of Two Meta Studies

The meta-study by **Atz, Clark, Van Holt & Whelan** (2021) examines the relationship between ESG and financial performance from 2015 to 2020. The meta-study continues to develop from a previous study where many researchers established a positive relationship. The researchers argue that it should be re-examined since many changes have occurred during this five-year period, and the question is still actively debated in academia.

The authors divide the different research frameworks into one focusing on studies from the investor's point of view and one where the focus is on the corporation's performance. Over 1000 studies are examined, and both the research frameworks are categorized by studies showing positive, neutral, mixed, and negative relationships. In both frameworks, the researchers found that more than half of the studies, 59% and 58%, respectively, conclude that the relationship between financial performance and ESG performance is positive. A negative relationship is found in 8% and 14% of the studies, respectively.

This meta-study also includes a study of other meta-studies consistent with these findings. Even if all studies tend to point to similar conclusions, the researchers provide reasons why such results should be treated with some care. They argue that the lack of terminology and definitions of ESG is inconsistent, among other things, that the studies done in this research area often use third-party data and that there needs to be more standardization in what data to use.

By examining all the different studies, they can draw some conclusions from their research. For example, they can establish that committing to long-term studies of the relationship made it more likely to estimate a positive relationship. The short-term focused studies were less likely to produce this result. They also find that studies that only focus on the disclosure of ESG measures did not find a positive relationship as often as those that focused more on performance-based measures. The researchers suggest that there needs to be more accompanying information to get more accurate results.

Gillan, Koch and Starks also published a meta-study in 2021. This study has a different structure than Atz et al. (2021). This paper provides an overview of earlier research in corporate finance on ESG/corporate social responsibility (CSR) issues by focusing on the most relevant and discussed issues from various aspects of the firm related to ESG:

1. Firms' ESG/CSR attributes and market characteristics
2. Firms' ESG/CSR practices and boards, executives, and executive compensation
3. Firms' ESG/CSR attributes and ownership characteristics
4. Firms' ESG/CSR attributes and firm risk
5. Firms' ESG/CSR attributes and firm performance and value

Firms' ESG/CSR attributes and firm performance and value is a relevant section for this thesis. The reviewed literature provides dispersed results. Different variables of interest are used in the 38 studies, such as return on assets (ROA), free cash flow, Tobin's Q, and return on equity (ROE). Most exhibit a positive relationship with ESG score, but eight studies produce a strictly negative correlation, while four studies find ambiguous or no effect. Six of the studies use ROA as the variable of interest. Of these, four exhibit a positive relationship, one negative, and one ambiguous effect. This meta-study also includes eight studies with Tobin's Q as the dependent variable, of which five exhibit a positive relationship. One study demonstrates a negative relationship, and one study concludes that there is no effect. In addition, the last study came up with both a positive and negative impact depending on whether the firms are advertising.

3.2 Overview of Previous Studies

Table 2: Summary of Previous Studies

Authors	Dependent Variable/s	Variable/s of Interest	Study Findings	Market Studied
Aydogmus et al. (2022)	Tobin's Q and ROA	Combined ESG score, E, S, G.	**Positive** and **significant**	Global setting.
Velte (2017)	Tobin's Q and ROA	Combined ESG score, E, S, G.	**Insignificant**	Germany
Giannopoulos et al. (2022)	Tobin's Q and ROA	Combined ESG score	**Negative** for ROA and **positive** for Tobin's Q, both **significant**	Norway
Atan et al. (2018)	Tobin's Q, ROE and WACC	Combined ESG score, E, S, G.	**Insignificant**	Malaysia
Duque-Grisales and Aguilera-Caracuel (2021)	ROA	Combined ESG score, E, S, G.	**Negative** and **significant** impact on ROA	Latin America
Alareeni and Hamdan (2020)	Tobin's Q, ROA and ROE	Combined ESG score, E, S, G.	**Positive** and **significant**	U.S. (U.S S&P 500)
Minutolo et al. (2019)	Tobin's Q and ROA	Combined ESG score	**Positive** and **significant**	U.S. (U.S S&P 500)
Liu, Wu and Zhou (2022)	Tobin's Q and ROA	Combined ESG score, E, S, G.	**Insignificant**	China

Study Findings refer to the result of the combined ESG score. The significance level is 5% or lower.

3.3 Summary of Selected Previous Studies

Atan, Alam, Said and Zamri (2018) attempt to contribute to the ongoing debate on ESG and firm performance by studying a developing country, Malaysia. The researchers acknowledge that there has been an increased number of studies done on developed economies while very few, if any, have been undertaken on countries like Malaysia.

The study aims to provide empirical evidence for the ESG score's impact on firm performance, measured by ROE, Tobin's Q, and WACC. These dependent variables are chosen based on the debate on including accounting and market-based variables to capture both the historical and future performance of the companies in the dataset. The researchers hypothesize a positive relationship between financial performance and ESG score. They include the combined ESG score and the individual components E, S, and G as regressors. As many previous studies have done, the researchers also use firm size and debt-to-equity ratio as control variables.

From the fixed effects regression results, they are not able to establish any significant results on ESG score or for the individual components on Tobin's Q. Using panel data with 162 observations from 54 firms between the years 2010 and 2013, the researchers argue that the

results of the regression analysis are made weaker by the limitations of ESG reporting being a relatively new practice in Malaysian companies at the time of the study. They also argue that, like many other studies have been able to conclude before, the impacts of ESG on firm performance over shorter time horizons are not as likely to be significant as those over longer time horizons.

In the peer-reviewed study by **Aydogmus, Gülay and Ergun** (2022), the researchers analyze the impact of ESG score on financial performance measured by ROA and Tobin's Q. The research question is whether investing in ESG initiatives pays off and if it can be justified to spend time and resources pursuing these endeavors.

The researchers first acknowledge the countless other studies within this field and try to paint a clear picture of various studies using different approaches to answer this question. Most studies that are brought up have established a positive relationship and this result is also argued to be more plentiful than the contrary. However, various market and sector studies have shown negative and mixed results.

The regression with the dependent variables Tobin's Q and ROA all point toward that combined ESG score, social score, and governance score show a positive and statistically significant effect. While both estimation models show significant relationships for these independent variables, the models differ in the significance of the environmental component. They establish a significant relationship for ROA. Although, not for Tobin's Q. The explanation for this outcome is that the investments in environmental measures take time to come to fruition. They also argue that environmental improvements have substantial costs. At the same time, governance and social actions are relatively fast and less costly.

Giannopoulos, Kihle Fagernes, Elmarzouky and Afzal Hossain (2022) aim to see if Norwegian companies' ESG disclosure also has a close link to financial performance over the period 2010-2019. They argue that the trend of the increased importance of ESG disclosure is of genuine interest to study in a developed and oil-exporting country such as Norway, where transparency is vital and significant investments towards sustainability are needed. No prior studies have been done on this particular market to their knowledge.

Like many other studies, they chose to investigate this relationship with ROA and Tobin's Q as measures for financial performance and motivate their inclusion in the same way as previous studies have done, focusing on the importance of one market-based and one accounting-based measure. Even if they choose to use the third-party ESG scores given by Refinitiv, they acknowledge the lack of standardization for CSR in general and that many CSR initiatives are not captured by the ESG score. They then argue briefly about the EU taxonomy's function in resolving this issue.

Based on their presentations of previous studies and since they have found such a variance of impacts of ESG on financial performance, their hypothesis is just developed as whether there is a significant relationship or not; no direction is hypothesized. They specifically state that the short-term financial performance might be more likely to be insignificant as ESG investments are more likely to take time to see results and are thus more likely to be incorporated in the market valuations as measured by Tobin's Q

From the 67 Norwegian companies that are found on Refinitiv with reported ESG activities in 2019, all that do not have the entire reporting history are excluded. This resulted in the final dataset of 20 Norwegian companies and 200 observations in total. The quantitative approach is used, and the model is based on prior empirical research. The control variables are, for example, based on the Atan et al. (2018) study.

The study results show a mixed relationship between the two outcome variables. ESG is found to have a negative impact on ROA, and the magnitude compared to other studies is also stronger. For Tobin's Q, the result indicates the opposite causal effect, a higher ESG score causes the market to increase firm valuation. Both models have low R-squared, which they note has frequently been the case in prior studies.

The mixed results are explained by referring to previous literature that explains that ROA is the short-term measurement directly impacted by the costs incurred by investing in ESG improvements. Nonetheless, the positive coefficient for Tobin's Q is more in line with the previous arguments about how the market values ESG investments and improvements.

To conclude, they proved their hypothesis that there is a significant impact of ESG on financial performance. However, they are aware that their results will suffer from some limitations due

to the relatively small sample size. Even if they argue that Norway is at the forefront of sustainability, many companies lack reporting history. Another limitation is the lack of standardization for ESG scores, which could have meant that another source for the scores had yielded different results.

Velte (2017) aims to investigate whether ESG performance, measured by combined ESG score and each individual component, has an impact on financial performance based on data from German companies. The dependent variables ROA and Tobin's Q are included in the models as proxies for financial performance. The choice of ROA is justified by its common use and support from previously published studies. Tobin's Q is argued to be necessary to include since accounting-based variables often are affected by decisions regarding earnings management. The time period used is 2010-2014, and the dataset includes about 400 observations. The regression models include control variables often used in the field of research, such as R&D expenses, beta, total debt to total assets (leverage), and total assets (size).

The study focuses on the 10% significance level and analyzes the results accordingly. At the 10% significance level, all four independent variables are significant for ROA. In contrast, none of them are significant for Tobin's Q. At a 5% significance level, only the governance pillar in the model with ROA as the dependent variable reaches significance. This result is supported by an analysis that it may be due to the long practice of Germany's corporate governance reporting since the implementation of the Code 2002. Another discussed explanation is the enhanced value relevance for firms' various stakeholders.

The general limitations of the study partially explain the insignificant impact of the ESG scores on Tobin's Q. For example, the relatively small sample of a short-term period is explained to provide limited insight into the changes in the regulatory framework brought about by increased stakeholder management incentives that were implemented after the financial crisis of 2008/2009. These consequences are argued to be more plausible to be evident in terms of more long-term studies.

3.4 Hypothesis

Based on the increased importance and growth of ESG and results from previous studies carried out in this field of research, the hypothesis of this thesis will be built upon the consensus that ESG score has a positive relationship with firms' financial performance. This is expected to be shown by positive and significant coefficients of the variables of interest in both models.

As the dataset is generated from companies based in EU member states, the various measures and legislations made by the EU governing bodies will most likely have an effect on the companies studied during the period of interest for the study. The EU's work should reasonably lead to companies working towards higher ESG scores. In addition, a high ESG score should be associated with high financial performance, i.e., a positive relationship. Therefore, the null hypothesis that is tested by the regressions of the thesis is the following:

H_0: ESG score has negative or no effect on firms' financial performance[1].

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[1] Financial performance measured by ROA and Tobin's Q.

4. Method

4.1 The Method in General

The study is based on a quantitative method with several Ordinary Least Squares (OLS) regression models. More specifically, multiple linear regression models are used since the models include more than two regressors. The four OLS assumptions: functional form, exogeneity, full rank (no perfect multicollinearity), and random sampling are assumed to hold in order to perform statistical inference to draw conclusions about the population from the random sample obtained (Stock & Watson, 2019, pp. 225-227). The dataset is analyzed using a state-of-the-art statistical software package, STATA. The notion of *ceteris paribus* is utilized to establish the effect of the independent variable, ESG, or any of its individual components, on financial performance.

4.1.1 Justifications for the Fixed Effects Model

Servaes and Tamayo (2013) established that it is essential to control for firm-specific effects as their results when omitting this differed from when included, i.e., in their case, a question of establishing significance. Choi and Wang (2009); Velte (2017) also assume firm-specific effects in their respective model specifications.

Plotting the residuals against the independent and control variables shows a correlation between the error term and the variables used in the regression model. This indicates that there is panel heterogeneity and an endogeneity problem present (Daniels & Minot, 2020, p. 242). This also justifies the decision to use the fixed effects regression to mitigate the presence of OV bias, i.e., the endogeneity problem.

Running the command *xtreg* in STATA and applying the fixed effects option will include an entity fixed effects that in this study is firm-specific, i.e., something that differs across firms but is likely to remain fixed within a firm across time (Stock & Watson, 2019, pp. 367-369). This could be a firm-specific trait that impacts the ESG and/or other regressors. Firms have different attitudes and values toward ESG. For example, this is likely to remain rigid and not change over time, even if it differs between firms. This reasoning and assumption would also mean that the random effects model would be inappropriate to use since this assumes that firm-specific effects are uncorrelated with the regressors (Torres-Reyna, 2007).

Table 3: Hausman Test

Dependent Variable	Test Result	Chi-Square Statistic	p-value
ROA	Random Effects	5.49	0.4825
TobinsQ	Fixed Effects	27.48	0.0001

The Hausman test can sometimes be used to strengthen the choice of model. Although *Table 3* points towards the random effects model as the most appropriate estimation model with ROA, the reasoning that firm-specific effects are present makes the choice of the fixed effects model valid[2]. Another consideration to have in mind is the results from the Ramsey RESET test for linearity, see *Appendix 1*. The null hypothesis is rejected at 5% significance level, meaning that the models have omitted variables[3]. Regressing with an entity-specific fixed effect can, as stated above, be used to mitigate this (Stock & Watson, 2019, p. 367).

It is also worth mentioning that several studies have identified pitfalls and limitations of using fixed effects estimations. Hill, Davis, Roos and French (2020) discuss 12 drawbacks such as unobserved heterogeneity, low statistical power, and imprecise coefficient interpretations. One additional concern is that the risk of reverse causality may be greater in fixed effects than in standard OLS estimations. The mentioned explanation for this is that fixed effects estimations rely solely on intertemporal variation (Collischon & Eberl, 2020). The authors in both studies do not discourage the use of fixed effects models but instead promote more critical applications. Based on the data in this study, the fixed effects model is still considered preferable and is used with prudence.

4.1.2 Standard Errors

Serial correlation implies that observations at different points in time are correlated and is often a problem in time-series studies. Autocorrelation is an example of serial correlation, which relates to the correlation between two consecutive time periods. It is expected that today's and tomorrow's outcomes are correlated (Stock & Watson, 2019, p. 375). It is economically intuitive to assume that companies investing in ESG improvements will likely continue to build upon these investments when they further develop their efforts. This is reinforced by the Wooldridge test, see *Appendix 2,* for autocorrelation in panel data in STATA, which shows that the null hypothesis of no first-order autocorrelation is rejected. This result represents

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[2] Discussed with the method help teacher, Aineas Mallios.
[3] This test, like the following *Wooldridge*, *Breusch–Pagan/Cook–Weisberg* and *VIF*, is only tested on the two main models with the combined ESG score as independent variable after discussion with the method help teacher, Aineas Mallios.

overall autocorrelation in the models but also to some individual variables such as change in revenues.

The Breusch–Pagan/Cook–Weisberg test for heteroskedasticity is performed to determine whether heteroscedasticity is present in the regression models, see *Appendix 3*. The null hypothesis of constant variance is rejected, and it can be concluded that there is heteroscedasticity in the error term in both main regression models.

For serially correlated panels, is it usual to assume that certain blocks (clusters) of observations exhibit correlation. Clustered standard errors allow for heteroskedasticity and arbitrary correlation within a cluster but assume that errors are uncorrelated across clusters (Stock & Watson, 2019, p. 376). Economic intuition and the tests serve as justification to use clustered standard errors in the regression models. Hence all regressions in the framework of this thesis are run with clustered standard errors (on firm level).

4.2 Data
4.2.1 Data Source
The dataset used for this thesis was generated using the screener function in Refinitiv Eikon. Refinitiv provides data for over 99% of the world's market cap and is the most comprehensive financial time series database with 70 years of information available. In addition, Refinitiv offers one of the world's most extensive ESG databases in the industry that covers more than 80% of the global market cap, containing more than 450 different ESG metrics (Refinitiv, n.d.). This extensive coverage, along with other features, makes Refinitiv a widely used data source for academic research but also by market professionals. Refinitiv will suffice all the data needed to conduct this thesis, and this is considered an advantage since different ESG score providers calculate ESG scores based on different models. Obtaining ESG scores and all dependent and control variables from one database creates objectivity and comparability.

4.2.2 Sample Data

<div align="center">Table 4: Sample Data</div>

Sample Period	2015-2022
Number of Companies	288
Number of Countries	14
Total Observations	2304
Number of Companies by Country	
Austria	7
Belgium	11
Denmark	20
Finland	15
France	62
Germany	49
Ireland	11
Italy	16
Luxembourg	6
Netherlands	23
Poland	5
Portugal	3
Spain	23
Sweden	37

Source: Refinitiv Eikon

Before the dataset was generated, several filters were applied. The first filter used was the inclusion into the STOXX Europe 600 index to generate a subset of 600 European corporations. These corporations, operating in different industries, cover approximately 90% of the free-float market capitalization of the European stock market (Qontigo, 2023). The choice of including larger companies is based on that it would be more difficult to obtain data from smaller companies, especially reported ESG scores.

Subsequently, a filter of *country of incorporation* was applied to exclude all the companies not based in an EU member country. For instance, all 128 companies based in the UK and included in the index are excluded from the dataset. The variables gathered for the analysis are collected on a yearly basis and eight fiscal years in total (2015-2022). Because some companies lacked extensive reporting history of ESG scores, a decision was made to exclude all companies that did not have data on ESG scores for all eight years. The sample data, presented in *Table 4* above, consists of 288 companies from 14 countries in the EU and some countries have more representation in the dataset. This is further discussed in section *6.2 Limitations of the Study.* The dataset includes 2304 observations in total pre winsorization.

Since the data was collected as cross-sectional data, where each observational unit (company) has a time dependence, commands in STATA were used to transform the data from a wide shape into a long shape to make panel-data-specific regression analysis possible.

4.3 Model Specification

Below are the specified regression models that are the foundation for the causal analysis.

$$ROA_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 lTotalA_{it} + \beta_3 lCapex_{it} + \beta_4 Beta_{it} + \beta_5 DE_{it} + \beta_6 ChangeRev_{it} + \varepsilon_{it}$$
$$ROA_{it} = \beta_0 + \beta_1 E_{it} + \beta_2 lTotalA_{it} + \beta_3 lCapex_{it} + \beta_4 Beta_{it} + \beta_5 DE_{it} + \beta_6 ChangeRev_{it} + \varepsilon_{it}$$
$$ROA_{it} = \beta_0 + \beta_1 S_{it} + \beta_2 lTotalA_{it} + \beta_3 lCapex_{it} + \beta_4 Beta_{it} + \beta_5 DE_{it} + \beta_6 ChangeRev_{it} + \varepsilon_{it}$$
$$ROA_{it} = \beta_0 + \beta_1 G_{it} + \beta_2 lTotalA_{it} + \beta_3 lCapex_{it} + \beta_4 Beta_{it} + \beta_5 DE_{it} + \beta_6 ChangeRev_{it} + \varepsilon_{it}$$

$$TobinsQ_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 lTotalA_{it} + \beta_3 lCapex_{it} + \beta_4 Beta_{it} + \beta_5 DE_{it} + \beta_6 ChangeRev_{it} + \varepsilon_{it}$$
$$TobinsQ_{it} = \beta_0 + \beta_1 E_{it} + \beta_2 lTotalA_{it} + \beta_3 lCapex_{it} + \beta_4 Beta_{it} + \beta_5 DE_{it} + \beta_6 ChangeRev_{it} + \varepsilon_{it}$$
$$TobinsQ_{it} = \beta_0 + \beta_1 S_{it} + \beta_2 lTotalA_{it} + \beta_3 lCapex_{it} + \beta_4 Beta_{it} + \beta_5 DE_{it} + \beta_6 ChangeRev_{it} + \varepsilon_{it}$$
$$TobinsQ_{it} = \beta_0 + \beta_1 G_{it} + \beta_2 lTotalA_{it} + \beta_3 lCapex_{it} + \beta_4 Beta_{it} + \beta_5 DE_{it} + \beta_6 ChangeRev_{it} + \varepsilon_{it}$$

4.4 Variables

The regression models used in this thesis are adopted and modified based on prior studies presented throughout the initial pages of the thesis. The models regress on commonly used measures for approximating financial performance. The independent variables will allow for analysis of the overall impact of ESG as well as the individual pillars to show their specific effects. Control variables are chosen from the consensus of importance from previous literature. A description of each variable is presented in *Table 5* below.

Table 5: Variables

Variable (name in code)	Description
Dependent Variables	
Return on Assets (ROA)	"This value is calculated as the Income After Taxes for the fiscal period divided by the Average Total Assets and is expressed as percentage. Average Total Assets is the average of Total Assets at the beginning and the end of the year."
Tobin's Q (TobinsQ)	Calculated as the sum of Company Market Capitalization and Total Liabilities divided by Total Assets
Independent Variables	
ESG Combined Score (ESG)	"Refinitiv ESG Combined Score is an overall company score based on the reported information in the environmental, social and corporate governance pillars (ESG Score) with an ESG Controversies overlay."
Environmental Pillar Score (E)	"The environmental pillar measures a company's impact on living and non-living natural systems, including the air, land and water, as well as complete ecosystems. It reflects how well a company uses best management practices to avoid environmental risks and capitalize on environmental opportunities in order to generate long term shareholder value."
Social Pillar Score (S)	"The social pillar measures a company's capacity to generate trust and loyalty with its workforce, customers and society, through its use of best management practices. It is a reflection of the company's reputation and the health of its license to operate, which are key factors in determining its ability to generate long term shareholder value."
Governance Pillar Score (G)	"The corporate governance pillar measures a company's systems and processes, which ensure that its board members and executives act in the best interests of its long term shareholders. It reflects a company's capacity, through its use of best management practices, to direct and control its rights and responsibilities through the creation of incentives, as well as checks and balances in order to generate long term shareholder value."
Control Variables	
Total Assets (lTotalA)	"Represents the total assets of a company."
Change in Revenues (ChangeRev)	"Represents change in revenue from all of a company's operating activities after deducting any sales adjustments and their equivalents."
Beta (Beta)	"CAPM Beta. A measure of how much the stock moves for a given move in the market. It is the covariance of the security's price movement in relation to the market's price movement. Based on data availability, various look back periods can be used to calculate it. In order of preference, Beta 5Y monthly, Beta 3Y weekly, Beta 2Y weekly, Beta 180D daily, Beta 90D daily are used in the calculation."
Total Debt to Total Equity (DE)	"This is the ratio of Total Debt as of the end of the fiscal period to Total Equity for the same period and is expressed as percentage."
Capital Expenditures (lCapex)	"Capital Expenditures encompass all expenditures for factories and equipment for the defined fiscal period that have a useful life of more than one year. Defined fiscal year should be in the range of 11-13 months, defined fiscal interim should be discrete."

All definitions except for Tobin's Q are quoted directly from Refinitiv Eikon.

4.4.1 Dependent Variables

The dependent variables are Return on Assets (ROA) and Tobin's Q and are included in the regression models to represent financial performance. One accounting-based measure (ROA) and one market-based variable (Tobin's Q) are selected in accordance with other studies such as Minutolo, Kristjanpoller and Stakeley (2019); Velte (2017).

ROA has been widely used in previous research, which can be seen in *Table 2*, as an appropriate measure of financial performance when examining the impact of ESG score. There are arguments that Tobin's Q allows for a longer time horizon to be examined than the ROA, which is more of a short-term measure of financial performance. Regressing on the market-based and forward-looking Tobin's Q is suitable in order to provide a more comprehensive study since some of the ESG implementations, especially those related to the environmental pillar, can take more time to come to fruition.

The choice to regress on Tobin's Q follows the approach made in many previous studies, such as Atan et al. (2018); Giannopoulos et al. (2022); Velte (2017). The aspect of including a market-based measurement to investigate the impact of ESG on firms' financial performance makes Tobin's Q a suitable variable despite its weaknesses as a ground for investment decision indications. An alternative dependent variable would have been the price-to-book ratio. However, one cannot see how this would not have similar shortcomings to Tobin's Q, presented in section *2.4 Tobin's Q.*

4.4.2 Independent Variables

The independent variables are combined ESG score, environmental score, social score, and governance score. The scores range from zero to one hundred, corresponding to different grades. A higher score indicates better management of environmental, social, and governance risks of the company/country compared to its peers.

The combined score and the different pillars are each tested separately. Aydogmus, Gülay and Ergun (2022) justify this separation with the relatively high correlation between these variables. Separately testing the ESG pillars against the dependent variables can also provide a deeper insight into how each component contributes to the overall ESG score. The results can differ widely between the different components. For example, investments included in the environmental component may be more substantial and require considerable time to have an

effect. Alareeni and Hamdan (2020) exhibit significant results in their study with ROA as the dependent variable, where the effects of the independent variables differ in sign and magnitude. For instance, the combined ESG score and governance pillar have positive coefficients, while environmental and social pillars have negative coefficients.

All four independent variables are lagged by one year, which is consistent with prior studies done by Choi and Wang (2009); Velte (2017) that suggest that ESG-related investments do not impact performance in the period in which they were made but will impact the next period.

4.4.3 Control Variables

Relevant control variables are vital in order to make a reliable regression analysis. Control variables are not the objects of interest when making causal inference analysis. Nevertheless, they still serve an essential purpose. Including appropriate control variables in the regression model is one way of mitigating the effect of omitted variable bias (OV bias) (Stock & Watson, 2019, pp. 260-261). There are likely other factors that impact a company's ESG score, which are necessary to explicitly account for in the regression model to avoid OV bias. If omitted, it would likely impede the interpretation of the causal effect of the variable of interest.

The choice of control variables is inspired by previous literature and studies done. There seems to be a consensus of some control variables that are frequently used in an abundance of studies, but also some that are more specific to a particular study. Most models tend to control for size and leverage since they have been shown to be highly correlated with the ESG components. Aydogmus, Gülay and Ergun (2022); Atan et al. (2018); Clarkson, Li, Richardson and Vasvari (2008); Fischer and Sawczyn (2013), among others, control for size by including the reported total assets in the model. This is common since large companies generally disclose more information related to ESG. This reasoning is made by Clarkson et al. (2008); Giannopoulos et al. (2022); Atan et al. (2018). The company size is expressed as the natural logarithm of the company's total assets since there is a large discrepancy between the companies in the dataset. These disparities are presented in *Table 6* below.

Leverage, as measured by the debt-to-equity ratio, is included in the regression since it is likely to influence both the financial performance and the ESG score. Clarkson et al. (2008) motivate the choice of including leverage as a control variable by the previous work done in the 1980s by Leftwich, Watts, Jerold and Zimmerman (1981), who, in brief, were able to establish that

companies with higher leverage have more incentives as well as a need for more transparency and disclosure of information. In short, as leverage increases, so does the voluntary disclosure of information. Atan et al. (2018); Giannopoulos et al. (2022) also justify the inclusion of the control variable by stating that it is likely to influence financial performance.

Beta is included in the model to account for the systematic risk of the various companies. Fischer and Sawczyn (2013); Velte (2017) both argue for the inclusion of this control variable along with the debt-to-equity ratio to cover both the systematic and the unsystematic risk that impact the ESG score.

Many previously published studies include variables related to the company's capital investment. Clarkson et al. (2008) used the capital intensity as well as percentage of new property, plant, and equipment (PPE), while other studies have utilized R&D-related variables. Fischer and Sawczyn (2013); Velte (2017) argue that R&D expenses are a good measure of innovation. The lack of data in Refinitv on R&D expenses is one reason why the broader measure capital expenditures was used instead. Although it does not really measure the same thing, it is categorically a valid control variable to include in the regression models. As with total assets, this variable has also been transformed into the natural logarithm to reduce the skewness of the data, which is in line with what most, if not all, of the studies mentioned above, have done.

Change in revenues is included to account for growth of the given company. Liu, Wu and Zhou (2022) argue that growth leads to the need for more working capital investments which in turn has an impact on the ESG implementation that a company can engage in.

4.5 Descriptive Statistics

All variables included in the regression model are continuous. To eliminate the outliers, all variables are winsorized at 3.5% and 96.5% level. Post winsorization, the sample consists of approximately 2100 observations for each variable. *Table 6* provides further in-depth descriptive statistics. It presents the mean, minimum value, maximum value, and standard deviation of all variables. The 1st, 25th, 50th, 75th, and 99th percentile is also shown for all variables.

Table 6: Descriptive Statistics

| Variables | Obs. | Mean | Std. Dev. | Min | Max | Percentiles | | | | |
						1%	25%	50%	75%	99%
Dependent Variables										
ROA	2136	0.045	0.037	-0.024	0.166	-0.016	0.014	0.040	0.065	0.150
TobinsQ	2137	1.517	0.677	0.819	4.325	0.853	1.018	1.274	1.744	3.719
Independent Variables										
ESG	2144	64.292	14.174	26.894	87.322	30.544	54.038	66.406	76.068	86.102
E	2144	70.675	18.999	16.218	95.997	18.560	60.049	75.291	85.396	95.483
S	2144	73.694	15.933	25.702	95.535	29.329	64.871	77.229	85.944	94.899
G	2144	62.393	19.284	18.425	91.879	20.526	47.879	65.153	79.076	90.993
Control Variables										
TotalA	2137	6E+10	1E+11	2E+09	7E+11	2E+09	8E+09	2E+10	5E+10	5E+11
DE	2124	0.979	0.814	0.026	4.297	0.050	0.410	0.719	1.309	3.690
Beta	2117	0.978	0.330	0.338	1.804	0.378	0.725	0.954	1.218	1.744
Capex	2065	8E+08	1E+09	1E+07	8E+09	2E+07	1E+08	4E+08	9E+08	6E+09
ChangeRev	2065	0.068	0.125	-0.246	0.515	-0.198	-0.005	0.052	0.131	0.453

Total assets (TotalA) and Capital expenditures (Capex) are expressed in the same currency, Euro. Return on assets (ROA) and Tobin's Q (TobinsQ), Debt-to-equity (DE) and Change in revenues (ChangeRev) are also calculated from data expressed in euros.

The average value for the ROA is almost 5%, which is generally considered a good measure (Birken & Curry, 2021). Even if this varies considerably for sectors, the EU companies included in the dataset deliver respectable returns on the usage of their assets. Compared to other studies, ROA is here expressed in decimal form. In other studies, 5% ROA is expressed as 5.0, which leads to a difference in the magnitude of the coefficients compared to this study. This is taken into account in section 5.2.1 *The Impact of ESG Factors on Firms' Financial Performance (ROA)* and 6.1 *The Results* when the magnitude is compared and interpreted.

Notably, the mean value of Tobin's Q seems to indicate that the EU companies included in the dataset are generally overvalued according to the Q theory. As for the combined ESG score and the individual pillars, since the mean value is in the third quartile for all measures, companies in the EU are above average and considered to have a good level of ESG reporting material publicly available (Refinitiv, 2022). It should be noted that even if the data is winsorized for the most extreme outliers, there are still considerable differences between the minimum and maximum scores.

A mean debt-to-equity ratio close to one indicates that EU firms are not over- or under-leveraged. Even if this ratio differs between sectors, the extreme values for the lower and upper ends are noticeable in how much they differ. The perceived idiosyncratic risk is thus widely spread.

An average of the variable beta close to one is to be expected. This value will also differ from sector to sector, as seen in the minimum and maximum. Most of the lowest reported betas belong to utility companies such as Elia Group SA, while some of the highest beta values belong to more cyclical companies.

5. Results

5.1 Correlation Results

Table 7: Pearson Correlation Matrix

Variables	ROA	Tobin's Q	ESG	E	S	G	lTotalA	lCapex	Beta	DE	ChangeRev
ROA	1.000										
TobinsQ	0.594	1.000									
ESG	0.082	0.056	1.000								
E	-0.110	-0.110	0.484	1.000							
S	-0.010	0.036	0.563	0.535	1.000						
G	-0.061	-0.075	0.447	0.224	0.288	1.000					
lTotalA	-0.450	-0.451	-0.031	0.316	0.173	0.138	1.000				
lCapex	-0.100	-0.223	0.133	0.353	0.316	0.177	0.395	1.000			
Beta	-0.161	-0.236	-0.023	0.115	0.088	0.127	0.198	0.103	1.000		
DE	-0.368	-0.248	0.003	0.086	0.074	0.039	0.286	0.137	0.101	1.000	
ChangeRev	0.194	0.111	-0.024	-0.089	-0.067	-0.034	-0.041	-0.022	0.000	0.054	1.000

Table 7 provides the Pearson Correlation Matrix for each variable included in the regression models. As the table shows, there is a weak correlation between the dependent and independent variables. The correlation between the dependent variables, i.e., ROA and Tobin's Q, is the strongest one in the table above. This is reasonable as they both measure financial performance. However, this correlation does not affect the reliability of the analysis since the variables are not included in the same regression models.

The second strongest correlation is between total assets and financial performance measures. This negative correlation indicates that larger companies have lower market valuations than their assets but also report lower returns. This might be because these companies are likely more mature and have lower risk and, thus, a lower required return.

The combined ESG score and the individual pillars are correlated as expected since Refinitiv weights the individual pillars to calculate the combined score. Including the combined score together with individual pillars in the same regression models would cause multicollinearity. Furthermore, this would risk that the coefficients for at least one regressor will be inaccurately estimated (Stock & Watson, 2019, pp. 230-231). The correlation problem is mitigated by running different regression models for each individual ESG score.

In addition to the correlation matrix, variance inflation factor (VIF) tests are run to ensure that the models do not contain multicollinearity issues. The reported values, see *Appendix 4*, from the VIF tests hover around the value one, which is preferable and confirms that multicollinearity is not a problem in the regression models (Daniels & Minot, 2020, p. 236).

5.2 Regression Results

To reiterate, the combined ESG score and the three pillars are separately included as variables of interest together with the control variables; total assets, capital expenditures, beta, debt-to-equity, and change in revenues to test the hypothesis. All four variables of interest are expected to show a positive and statistically significant relationship with the dependent variable used in the two estimation models. This is primarily based on the findings of prior studies, the increased interest in ESG investments, the stakeholder theory, and the reasoning presented about the EU's extensive work and impact. Only the results that have significance on the 5% level or lower will be interpreted and developed further in section 6.1 *The Results*.

5.2.1 The Impact of ESG Factors on Firms' Financial Performance (ROA)

Table 8: ROA Fixed Effects Regression Results

	1	2	3	4
ESG	0.000238***			
	(7.17e-05)			
E		0.000220**		
		(0.000104)		
S			0.000358***	
			(9.05e-05)	
G				0.000142**
				(6.94e-05)
lTotalA	-0.0167***	-0.0196***	-0.0216***	-0.0187***
	(0.00505)	(0.00524)	(0.00513)	(0.00534)
lCapex	0.00598**	0.00869***	0.00831***	0.00781***
	(0.00246)	(0.00296)	(0.00287)	(0.00273)
Beta	-0.00719*	-0.00788*	-0.00855*	-0.00674
	(0.00411)	(0.00451)	(0.00439)	(0.00426)
DE	-0.0148***	-0.0144***	-0.0149***	-0.0141***
	(0.00315)	(0.00321)	(0.00324)	(0.00326)
ChangeRev	0.0479***	0.0519***	0.0522***	0.0511***
	(0.00676)	(0.00699)	(0.00692)	(0.00674)
Constant	0.325***	0.337***	0.382***	0.340***
	(0.106)	(0.111)	(0.106)	(0.113)
Observations	1185	1193	1185	1175
R-squared	0.156	0.158	0.171	0.15
F-statistic	16.79	18.64	18.79	16.54
Prob > F	0.0000	0.0000	0.0000	0.0000
#Companies	222	221	218	224

Clustered standard errors in parentheses

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

The outputs from the fixed effects regressions on the dependent variable ROA, presented in *Table 8*, give indications that the hypothesis is validated, both for the combined ESG score and all its individual components. This result has been found to be quite rare in previous studies.

Focusing on the combined ESG score, the null hypothesis of neutral or negative impact of ESG score on ROA is rejected. The positive sign means that a unit increase in a firm's combined ESG score results in a 0.0238 percentage points increase in ROA. The magnitude is relatively small. This is also the case in the study by Aydogmus, Gülay and Ergun (2022), who, although finding a positive and significant coefficient, also find a negligible economic impact.

The second regression model with the environmental pillar (E) as the independent variable yields a result consistent with the hypothesis: E has a positive and significant impact on ROA. The coefficient is 0.00022, meaning that the economic significance is relatively small in absolute terms. Alareeni and Hamdan (2020); Aydogmus, Gülay and Ergun (2022); Liu, Wu and Zhou (2022), have established significant results for this component's impact on ROA. They have also reached similar magnitude when expressed in the same unit.

The social pillar (S) is included as the independent variable of the third regression model. This variable has a coefficient of 0.000358 and is statistically significant, i.e., supporting the hypothesis. This result demonstrates that an increase in social score by one unit increases ROA by 0.0358 percentage points. The magnitude is small in absolute terms but is consistent with the abovementioned studies.

The fourth and last model with ROA as the dependent variable includes the governance pillar (G) as the independent variable. This variable is statistically significant, and the coefficient is 0.000142, i.e., a one-unit increase of G increases ROA by 0.0142 percentage points.

The control variables used in the regressions above yield similar results for both the combined ESG score and the individual pillar scores. All control variables, except for beta, are significant. An increase in total assets, i.e., an increase in the firm's size, indicates that ROA will decrease. Since this variable is logarithmized, it means that a one percent increase in total assets will have a negative impact on ROA in percentage points units. Capital expenditures, also in a log transformation, indicates a positive ROA unit change when a firm's capital expenditures increase by one percent in a fiscal year.

Debt-to-equity, used as a proxy for leverage, represents that a one-unit increase in leverage will decrease the ROA, given by the percentage point decrease seen in all the specified models. If the change in revenue from the previous year changes by one unit, then the ROA will be impacted positively. Beta is not found to impact ROA in any of the four regression models significantly. Therefore, the systematic risk measured by beta cannot be interpreted.

Looking at each model's total observations, it deviates substantially from the winsorized dataset. This is due to missing values and automatic corrections made by STATA. Nonetheless,

1200 observations are still classified as a large dataset. Compared to previously published studies such as Duque-Grisales and Aguilera-Caracuel (2021); Giannopoulos et al. (2022); Velte (2017), the study is deemed to contain enough data to be representative and to draw general conclusions.

The R-squared is low in absolute terms in all four regression models which is consistent with, and discussed in, Giannopoulos et al. (2022). However, this does not need to be emphasized in fixed-effect regressions. Instead, the focus is on the overall regression F-statistic that tests the joint hypothesis that all slope coefficients are equal to zero[4]. In all eight regression models, this null hypothesis is rejected at a 5% significance level, evidencing that the explanatory power of the different models is high.

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[4] Discussed with the method help teacher, Aineas Mallios.

5.2.2 The Impact of ESG Factors on Firms' Financial Performance (Tobin's Q)

Table 9: Tobin's Q Fixed Effects Regression Results

	1	2	3	4
ESG	0.00209*			
	(0.00120)			
E		0.00437**		
		(0.00180)		
S			0.00173	
			(0.00130)	
G				0.00264**
				(0.00123)
lTotalA	-0.0240	-0.0226	-0.00190	-0.0647
	(0.133)	(0.142)	(0.138)	(0.138)
lCapex	0.0232	0.0383	0.0313	0.0470
	(0.0397)	(0.0414)	(0.0395)	(0.0410)
Beta	-0.128*	-0.141**	-0.108	-0.147**
	(0.0684)	(0.0687)	(0.0688)	(0.0668)
DE	-0.0393	-0.0456	-0.0509	-0.0348
	(0.0395)	(0.0396)	(0.0399)	(0.0402)
ChangeRev	0.171**	0.186**	0.171**	0.217***
	(0.0744)	(0.0796)	(0.0723)	(0.0802)
Constant	1.713	1.236	1.035	2.170
	(2.823)	(3.026)	(2.983)	(2.929)
Observations	1174	1180	1172	1163
R-squared	0.021	0.033	0.019	0.031
F-statistic	3.19	4.20	2.93	3.89
Prob > F	0.0050	0.0005	0.0091	0.0010
#Companies	220	219	216	222

Clustered standard errors in parentheses

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

Table 9 above shows the outputs of the fixed effects regressions with Tobin's Q as the dependent variable, which give more contrasting results than the regressions with ROA. The first regression with the combined ESG score as the independent variable does not give a significant result at the 5% level. This is consistent with the results from Atan et al. (2018); Liu, Wu and Zhou (2022); Velte (2017) and it means that there is not have sufficient evidence to reject the null hypothesis. Hence, this result is not further interpreted. The same reasoning applies to the social pillar (S) that is included as the independent variable of the third regression model.

The second model shows that the environmental score is statistically significant, with a coefficient of 0.00437. The interpretation is that an increase of E by 1 unit will increase Tobin's Q by 0.00437 units. This result is rare and can only be found in the study done by Alareeni and Hamdan (2020), who also report a more substantial magnitude of 0.124.

The fourth and last model with Tobin's Q as the dependent variable includes the governance pillar (G) as the independent variable. This variable is statistically significant with a coefficient of 0.00264, i.e., a one-unit increase of G increases Tobin's Q by 0.00264 units. This result supports the hypothesis. The economic significance is relatively small in absolute terms but is consistent with Aydogmus, Gülay and Ergun (2022). Alareeni and Hamdan (2020) reaches a slightly stronger impact.

There are also differing conclusions for the control variables compared to the ROA results. Significance is only indisputable for the change in revenues, where all the models show significance at least a 5% level. An increase of change in revenues will positively impact financial performance measured by Tobin's Q. Beta also shows significance for two of the models, which also happens to be the same ones that display significance for the variables of interest. A higher beta, i.e., systematic risk, will impact the market valuation negatively, as seen by the decrease in Tobin's Q when beta increases by one unit.

Size, leverage, and capital expenditures do not have significant evidence that they impact Tobin's Q individually. However, a test of joint significance for all the control variables in all the respective regression models shows that joint significance of the control variables can be established at least a 5% level. The control variables' joint impact on Tobin's Q is thus not zero, as the null hypothesis suggests.

The R-squared is also very low in absolute terms in all these four regression models. As mentioned above, this is consistent with prior studies. The tests for model significance evidence that the explanatory power of the different models is high.

5.3 Robustness Checks

Two additional robustness tests are run to increase confidence in the results presented in the previous section before drawing any conclusions. The first test is conducted to examine whether the results change under different model specifications and is performed by including

two interaction variables in both estimation models. The interaction terms are *intESGlTotalA* and *intESGChangeRev*, defined as the product of the combined ESG score and total assets/change in revenues. Furthermore, the test is run on the two main regression models with the combined ESG score as the independent variable.

Table 10: Robustness Test 1

VARIABLES	(1) ROA	(2) TobinsQ
L.ESG	0.00308**	0.0334
	(0.00131)	(0.0276)
lTotalA	-0.0114**	0.0418
	(0.00533)	(0.150)
lCapex	0.00636**	0.0265
	(0.00245)	(0.0395)
Beta	-0.00731*	-0.131*
	(0.00401)	(0.0676)
DE	-0.0145***	-0.0377
	(0.00304)	(0.0384)
ChangeRev	-0.0236	-0.297
	(0.0269)	(0.401)
intESGlTotalA	-0.000122**	-0.00133
	(5.44e-05)	(0.00114)
intESGChangeRev	0.00111***	0.00725
	(0.000412)	(0.00608)
Constant	0.193*	0.0968
	(0.117)	(3.291)
Observations	1,185	1,174
R-squared	0.168	0.026
#Companies	222	220

Clustered standard errors in parentheses

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

Consistent with the initial models, the regressions that include the interaction variables also yield results that the combined ESG score is significant and positive in the model with ROA but not significant with Tobin's Q, which can be seen in *Table 10*. The two interaction terms are also significant but not interpreted since it is outside the scope of the thesis and would not add anything further to the robustness of the results. In conclusion, this test indicates that the results are robust and inferences hold.

Adding regressors like the ones above does not, in any way, change the results of the models or the interpretations of these. Instead, the test improves the reliability. Another test can be conducted to investigate if the results change when some control variables are removed from the regression models. All the studies used to originate the final model have two specific control variables in common, size and leverage. Therefore, another robustness test was performed by running regressions excluding all control variables except the control for size and leverage.

Table 11: Robustness Test 2

VARIABLES	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(1) TobinsQ	(2) TobinsQ	(3) TobinsQ	(4) TobinsQ
L.ESG	0.000162**				0.00171*			
	(7.26e-05)				(0.001000)			
L.E		7.48e-05				0.00297**		
		(8.38e-05)				(0.00126)		
L.S			0.000128				0.00185	
			(8.34e-05)				(0.00123)	
L.G				8.85e-05				0.00214**
				(6.35e-05)				(0.00104)
lTotalA		-0.0119***	-0.0133***	-0.0115**	-0.0444	-0.0443	-0.0320	-0.0575
	(0.00456)	(0.00436)	(0.00474)	(0.00466)	(0.0863)	(0.0881)	(0.0889)	(0.0860)
DE	-0.0134***	-0.0129***	-0.0131***	-0.0135***	-0.0254	-0.0286	-0.0322	-0.0268
	(0.00298)	(0.00308)	(0.00302)	(0.00324)	(0.0291)	(0.0291)	(0.0294)	(0.0296)
Constant	0.312***	0.335***	0.363***	0.324***	2.486	2.393	2.169	2.761
	(0.106)	(0.101)	(0.109)	(0.108)	(2.017)	(2.053)	(2.072)	(2.006)
Observations	1,547	1,564	1,549	1,543	1,547	1,562	1,548	1,544
R-squared	0.061	0.054	0.057	0.054	0.006	0.010	0.005	0.010
#Companies	260	260	258	262	259	259	257	261

Clustered standard errors in parentheses

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

The results in *Table 11* are still consistent with the findings for the two main models regressing on the combined ESG score. In contrast, there were conflicting conclusions for the individual pillars, where most lose their significance when the control variables are excluded. This indicates valid reasoning for their inclusion in the original model which can, at the same time, reduce the risk of omitted variable bias.

6. Discussion

6.1 The Results

As mentioned above, the majority of previous studies have shown a positive relationship between financial performance variables, such as ROA and Tobin's Q, and ESG score. Nevertheless, obtaining significant results on the combined ESG score and all three pillars has proven extremely rare, as demonstrated by Aydogmus, Gülay and Ergun (2022); Velte (2017). The findings in this paper are consistent with previous studies. Out of eight regression models, a total of six results are significant; all four in the estimation model with ROA as the dependent variable and two out of four in the model with Tobin's Q. The rejection of the null hypothesis indicates that ESG scores boost corporate financial performance in the EU, although the effect is small. The reasons for this can be many but are beyond the scope of this thesis. From a theoretical point of view, most of the results support the stakeholder theory. Considering more parties who have an interest in the company will make the firm more profitable, thus serving the stakeholders, including the company's owners.

An important difference between the two estimation models is that the combined ESG score is insignificant when Tobin's Q is the dependent variable. This result is contrary to Giannopoulos et al. (2022); Velte (2017) who both argue for the inclusion of Tobin's Q as it is forward-looking and thus more appropriate since it may take time for ESG investments to yield results. One explanation for the mixed results could be that the financial performance measures are constructed differently. ROA is solely based on historical data (accounting data), while Tobin's Q is related to the company's prospects according to the stock market. Therefore, it is feasible that different results are obtained when using these two variables. Somewhat more difficult to explain is the economic intuition that the combined ESG score is significant in the model with ROA but not with Tobin's Q. Since market capitalization, which is included in the formula for Tobin's Q, is a direct implication of the share price of a given company, the volatile market conditions under the Covid-19 pandemic can make interpreting the effect of just ESG somewhat troublesome. Most other studies recited in this thesis have not used data for the pandemic years, either by conscious choice or because they were published earlier. This could explain why the result for Tobin's Q differs from other studies, such as Giannopoulos et al. (2022), which only included the years 2010 up until 2019.

The environmental pillar has been proven to be especially elusive. The sign and magnitude usually differ, and several studies do not reach significant results. Aydogmus, Gülay and Ergun (2022) report a positive and significant relationship between the environmental pillar and ROA but do not reach the same significant result with Tobin's Q. Velte (2017) does not reach significant results for the environmental pillar in either of the two estimation models. Contrary to these previously published studies, the results of this study establish a significant impact of the environmental pillar score on financial performance variables, both the accounting-based and the market-based measure. An additional contrast is that these regression results show a positive impact compared to Alareeni and Hamdan (2020); Liu, Wu and Zhou (2022) who reach a significant and negative impact on ROA.

In their meta-study, Atz et al. (2021) report that improved financial performance due to ESG becomes more evident over a longer time horizon, especially for the environmental pillar. Atan et al. (2018); Velte (2017) include a shorter time period in their studies than this one, and do not get significant results. The longer period examined in this thesis could be one explanation for the significant results of both estimation models.

Although environmental projects generally take longer time to have an impact, some projects can be expected to produce faster results. These projects could explain the significant result of the regression model with ROA as the dependent variable and the environmental pillar as the independent variable. As explained in section 4.2.1 *Data Source*, *resource use* is one of three themes of the environmental component. A potential explanation of this expedited outcome could be additional cost reductions that come as a result of more efficient energy usage and resource management that increase the environmental pillar score and thus also positively impact the ROA. To conclude, these results can be interpreted as indicating that there are environmental projects that have a positive impact even in the shorter term. This result is in direct contrast to the discussion in previous studies examined that reach insignificant results or significant but negative impact on financial performance.

In recent years, there has been an extensive focus on environmental issues. Various stakeholders have placed increasing demands on companies to operate with the environment in mind. The market's valuation of companies that invest in environmental improvements can be demonstrated by an increased Tobin's Q, all else being equal. A positive coefficient for the environmental pillar on Tobin's Q would, as the hypothesis states, mean that improvements

done by a given company positively impact the valuation the market determines. This result also aligns with the outcome by Alareeni and Hamdan (2020). Since the market is forward-looking, investments made today are likely to be considered in the future cash flows that these can bring. The EU:s substantial steps to create a sustainable finance ecosystem with the European Green Deal create a framework while forcing companies to adhere to it. The regression results seem to indicate that investors value the firm's ability to implement and develop their adherence to these frameworks, proxied by the environmental pillar of the ESG score.

The estimation results also suggest a significant and positive relationship exists between the governance pillar and financial performance, measured by ROA and Tobin's Q. These results are consistent with Alareeni and Hamdan (2020); Aydogmus, Gülay and Ergun (2022). Liu, Wu and Zhou (2022); Velte (2017) also show a significant and positive relationship with ROA, but no significance for the model with Tobin's Q. An interesting contrast to the result of this study can be found in Duque-Grisales and Aguilera-Caracuel (2021), who provide evidence of a negative and significant impact on ROA. The regression results from *Table 8* and *Table 9* indicate that governance disclosure is essential in improving firms' financial performance in the best interests of different stakeholders, confirming the stakeholder theory. *ESG reporting and transparency* is included in the theme *CSR strategy,* and this is further discussed by Alareeni and Hamdan (2020), who state that a high governance score can mean that these companies provide more useful information to their stakeholders. This can reduce information asymmetry while simultaneously supporting firms to enhance their operations. This discussion would then further support the relevance of the initiatives made by the European Commission regarding the CSRD, which aims for greater harmonization and increased transparency.

Based on the regression results, the social pillar is only found to significantly and positively impact ROA. This is well aligned with the results from Alareeni and Hamdan (2020); Aydogmus, Gülay and Ergun (2022) but in contrast to Duque-Grisales and Aguilera-Caracuel (2021) that found a significant but negative relationship. The positive relationship supports the stakeholder theory and the importance of good business ethics and responsible decision-making in order to improve and maintain a sound reputation. An alternative interpretation of the result could be that it supports the EU's work to successfully implement measures to promote and ensure that human rights and working conditions are maintained and respected throughout the region. Liu, Wu and Zhou (2022) comment on their lack of significant results by explaining

that social responsibility has not been given enough attention in China. In contrast, the result of this study may show that it is advantageous in the EU as seen through the positive impact on financial performance as measured by ROA.

6.2 Limitations of the Study

The analysis in this thesis points toward conclusive results and is in line with most previous studies on the subject. Nevertheless, some limitations should be considered, and it is remiss not to present such potential shortcomings.

One should have in mind the general shortcomings of fixed effect estimations presented in section *4.1.1 Justifications for the Fixed Effects Model*, especially the possibility of reverse causality when taking part of this study. For instance, it is ambiguous whether the results obtained provide the causal effect of ESG score on financial performance or if financial performance instead affects the firm's ability to achieve higher ESG score. In any case, the direction of causality is extremely difficult to determine and therefore not developed any further in this study.

Another possible limitation could be that many companies lack an extensive reporting history of ESG. The initial objective was to use a more extensive period. Since many have argued that ESG improvements and investment take time to see fruition, future studies with more data available might give a stronger indication of the causal relationships.

The data is assumed to be normally distributed because of the sample size. However, the data does show skewness when plotted, and a test for normality was performed, confirming this to be the case. All the variables used are gathered from real-life data and cannot be expected to be perfectly normally distributed. To mitigate this, transformations were done to some variables. Regarding potential limiting factors concerning the data itself, it should also be noted that the thesis tries to infer properties on the entire population of EU companies using a dataset containing 14 member countries out of 27. The dataset is also obtained by examining an index including some of the region's largest companies. This could lead to potentially misleading results when looking at the population level when the smaller companies and companies located in any of the other 13 member states are excluded. Another similar potential shortcoming could be that some countries have more representation in the dataset, for example, France with 62 of 288 companies. In other words, sample bias could lead to conflicting and

misleading results. It should be noted that most, if not all, other studies similar to this one, have the same issue.

Additionally, many studies have been done in this field before, and although the Refinitiv ESG score is widely used, it has its limitations. For one, the score is meant to be used as a proxy for a given company's CSR performance. Many have argued that the score does not give a complete picture of a company's efforts in its CSR strategy. How the reported score is constructed also gives room for manipulation that a company can use to affect its score without necessarily becoming more sustainable, as mentioned in section 2.2 *ESG Score*. Using Refinitiv as the sole provider of the ESG score used in the study also gives room for speculation about what a different provider's score would have meant for the causal analysis.

7. Conclusions

7.1 A Summary of the Most Important Results

This study attempts to complement the existing studies examining the impact of ESG performance on firms' financial performance. The emphasis is on firms in the EU region, and by using an updated and current dataset, the objective is to contribute to previous literature and further strengthen the notion of the positive impact of sustainability. Beyond the stakeholder theory, another dimension incorporated in this study is the EU's extensive work and the power it yields over the region's member states and companies.

The results found in the study are generally in line with previous literature, with the majority finding a positive relationship between a company's ESG implementation success and disclosure and financial performance, as the stakeholder theory suggests. However, it should be reiterated that the economic significance is small but consistent with the magnitude found in previous studies with significant and positive coefficients. The results of this study are strengthened by the two robustness tests on the two estimation models. It is thereby confirmed that there is sufficient evidence to conclude that modern corporations in the EU region answer to a broader circle of parties. Previously published studies do not reach the same conclusive evidence regarding the impact of the environmental pillar on both short- and long-term financial performance. The finding can further support the vast resources and time spent by the European Commission on developing and drafting legislative guidance and adherence for the region's companies.

This study can be a guiding principle for legislators and companies to support decision-making regarding potential ESG investments. In addition, it provides a more comprehensive and informative basis for investment decisions by both existing shareholders as well as potential investors.

7.2 Suggestions for Further Research

The combined ESG score and the environmental pillar have been the focus of numerous recent articles, and based on the previous studies observed, it can be concluded that the social and governance components are rarely analyzed in depth. In other words, there is much to investigate regarding these pillars and the opportunity to dive deeper into the respective theme.

Future studies could also include a categorization of companies and examine whether the effect on financial performance differs according to this. One suggestion is to divide companies based on ESG grade (D-A) and examine how an increased ESG score affects financial performance, given that the company currently has a lower/higher ESG score. Another classification could be based on sectors and with the purpose of examining whether the market considers ESG investments more important for some companies than others. Similar studies have been done in the past but not focusing solely on companies in the European Union.

Previous studies seem to mainly focus on a single market; a country or a region. It could be of interest to conduct a comparative study between two markets. For example, to develop what is discussed in section 6.1 *The Results* regarding China and the EU. Finally, there is a lack of studies focusing on developing countries, probably due to the unavailability of data. This data will probably be available in the future. It will then also be possible to conduct studies over more extended periods on companies in countries that have recently started to be assigned ESG scores, such as Malaysia.

References

Atan, R., Alam, M., Said, J. & Zamri, M. (2018). The impacts of Environmental, Social and Governance Factors on Firm Performance: Panel Study on Malaysian Companies. *Management of Environmental Quality: An International Journal.*

Atz, U., Clark, C ., Van Holt, T & Whelan, T. (2021). ESG and financial performance: Uncovering the Relationship by Aggregating Evidence from 1,000 Plus Studies Published between 2015-2020. *NYU|Stern Center for Sustainable Business.*

Aydogmus, M., Gülay, G. & Ergun, K. (2022). Impact of ESG performance on firm value and profitability. *Borsa Istanbul Review*

Alareeni, B. A., & Hamdan, A. (2020). ESG impact on performance of US S&P 500-listed firms. *Corporate Governance: The International Journal of Business in Society.*

Birken, E. G., & Curry, B. (2021) Understanding Return on Assets (ROA). *Forbes advisors, 6.* https://www.forbes.com/advisor/investing/roa-return-on-assets/

Choi, J., & Wang, H. (2009). Stakeholder relations and the persistence of corporate financial performance. *Strategic management journal, 30*(8), pp. 895-907.

Clarkson, P. M., Li, Y., Richardson, G. D., & Vasvari, F. P. (2008). Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis. *Accounting, organizations and society*, *33*(4-5), 303-327.

Collischon, M., & Eberl, A. (2020). Let's talk about fixed effects: Let's talk about all the good things and the bad things. *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie*, *72*(2), 289-299.

Daniels, Lisa, and Nicholas W. Minot. *An Introduction to Statistics and Data Analysis Using Stata : From Research Design to Final Report*. 2020. Print, p. 236, 242.

Dow Jones (n.d.). *Beyond Buzzwords: An Outside-In Approach to ESG and Long-Term Investing Trends.*
https://visit.dowjones.com/esg/content/beyond-buzzwords/

Duque-Grisales, E., & Aguilera-Caracuel, J. (2021). Environmental, social and governance (ESG) scores and financial performance of multilatinas: Moderating effects of geographic international diversification and financial slack. *Journal of Business Ethics, 168*(2), 315-334.

European Commission (n.d. a). *Sustainable Development Goals*.
https://international-partnerships.ec.europa.eu/policies/sustainable-development-goals_en

European Commission (n.d. b). *EU holistic approach to sustainable development*.
https://commission.europa.eu/strategy-and-policy/international-strategies/sustainable-development-goals/eu-holistic-approach-sustainable-development_en

European Commission (n.d. c). *Democracy*.
https://international-partnerships.ec.europa.eu/policies/peace-and-governance/democracy_en

European Commission (n.d. d). *Policies*.
https://international-partnerships.ec.europa.eu/policies_en

European Commission (n.d. e). *Sustainable energy*.
https://international-partnerships.ec.europa.eu/policies/climate-environment-and-energy/sustainable-energy_en

European Commission (n.d. f). *Corporate sustainability reporting.*
https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en

EU Monitor (2023, March 17). *How the EU improves workers' rights and working conditions*.
https://www.eumonitor.eu/9353000/1/j9vvik7m1c3gyxp/vkyhnfcdtny2?ctx=vk4jic6t1dxz

European Union (n.d.). *Types of legislation*.
https://european-union.europa.eu/institutions-law-budget/law/types-legislation_en

Ferrel, O.C., Fraedrich, J. & Ferrel, L. (2018). *Business Ethics, 12th Edition.* Cengage

Fischer, T. M., & Sawczyn, A. A. (2013). The relationship between corporate social performance and corporate financial performance and the role of innovation: Evidence from German listed firms. *Journal of management control, 24*, 27-52.

Freeman, R. E., Harrison, J. S., Wicks, A. C., Parmar, B. L., & De Colle, S. (2010). *Stakeholder theory: The state of the art*. Cambridge University Press.

Giannopoulos, G., Kihle Fagernes, R. V., Elmarzouky, M., & Afzal Hossain, K. A. B. M. (2022). The ESG disclosure and the financial performance of Norwegian listed firms. *Journal of Risk and Financial Management, 15*(6), 237.

Gillan, S., Koch, A. & Starks, L. (2021), Firms and social responsibility: A review of ESG and CSR research in corporate finance. *Journal of Corporate Finance, 66*, 101889

Hargrave, M. (2022, June 14). *Return on Assets (ROA): Formula and 'Good' ROA defined*. Investopedia.
https://www.investopedia.com/terms/r/returnonassets.asp

Hill, T. D., Davis, A. P., Roos, J. M., & French, M. T. (2020). Limitations of fixed-effects models for panel data. *Sociological Perspectives*, *63*(3), 357-369.

Leftwich, R. W., Watts, R. L., & Zimmerman, J. L. (1981). Voluntary corporate disclosure: The case of interim reporting. *Journal of accounting research*, 50-77.

Liu, H., Wu, K., & Zhou, Q. (2022). Whether and How ESG Impacts on Corporate Financial Performance in the Yangtze River Delta of China. *Sustainability*, *14*(24), 16584.

Market Business News (n.d.). *What is q theory? Definition and meaning*.
https://marketbusinessnews.com/financial-glossary/q-theory-definition-meaning/

Milinchuk, A. (2021, September 5). *The Growth of Sustainable Investing*. Entrepreneur.
https://www.entrepreneur.com/money-finance/the-growth-of-sustainable-investing/379892

Miller, J. (2022, December 14). *ESC Score*. Corporate Finance Institute.
https://corporatefinanceinstitute.com/resources/esg/esg-score/

Minutolo, M. C., Kristjanpoller, W. D., & Stakeley, J. (2019). Exploring environmental, social, and governance disclosure effects on the S&P 500 financial performance. *Business Strategy and the Environment, 28*(6), 1083-1095.

Pucker, K. P. (2021). Overselling sustainability reporting. *Harvard Business Review*, *99*(3), 134-143. https://hbr.org/2021/05/overselling-sustainability-reporting

PWC (2022, October 10). *ESG-focused institutional investment seen soaring 84% to US$33.9 trillion in 2026, making up 21.5% of assets under management: PwC report*.
https://www.pwc.com/gx/en/news-room/press-releases/2022/awm-revolution-2022-report.html

Qontigo (2023). *Broad Indices STOXX Europe 600 Index*.
https://www.stoxx.com/document/Bookmarks/CurrentFactsheets/SXXGR.pdf

Refinitiv (2022). *Environmental, Social and Governance (ESG) Scores from Refinitiv*.
https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf

Refinitiv (n.d.). *Refinitiv Eikon - Your trusted source of financial data, news and analysis*.
https://www.refinitiv.com/content/dam/marketing/en_us/documents/brochures/eikon-overview-brochure.pdf

Regeringskansliet (2020). *En taxonomi för hållbara investeringar*.
https://www.regeringen.se/regeringens-politik/finansmarknad/taxonomi-ska-gora-det-enklare-att-identifiera-och-jamfora-miljomassigt-hallbara-investeringar/

Şeker, Y., & Şengür, E. D. (2021). The Impact of Environmental, Social, and Governance (ESG) Performance on Financial Reporting Quality: International Evidence. *Ekonomika, 100*(2), 190-212.

Servaes, H., & Tamayo, A. (2013). The impact of corporate social responsibility on firm value: The role of customer awareness. *Management science*, *59*(5), 1045-1061.

SG Analytics (2022, September 15). *ESG Score - Definition, Process, Implications & Purpose.*
https://www.sganalytics.com/blog/what-is-esg-score-and-how-is-it-calculated/

Stackpole, B. (2021, December 6). *Why sustainable business needs better ESG rating*. MIT Sloan.
https://mitsloan.mit.edu/ideas-made-to-matter/why-sustainable-business-needs-better-esg-ratings

Stock, H. J. & Watson, W. M. (2019). *Introduction to Econometrics 4th Edition*. Pearson.

Tobin, J., & Brainard, W. C. (1976). Asset markets and the cost of capital.
https://www.researchgate.net/publication/4743481_Asset_Markets_and_the_Cost_of_Capital

United Nations (n.d.). *The 17 Goals*. https://sdgs.un.org/goals

Velte, P. (2017). Does ESG performance have an impact on financial performance? Evidence from Germany. *Journal of Global Responsibility*.

Appendix

Below are the tests that were run on the models/data to test whether they/it contain/contains omitted variables, autocorrelation, heteroscedasticity, and multicollinearity.

Appendix 1: Ramsey RESET Test

Dependent Variable	F-statistic	Prob > F
H0: Model has no omitted variables		
ROA	2.84	0.0366
TobinsQ	7.53	0.0001

Appendix 2: Wooldridge Test

Dependent Variable	F-statistic	Prob > F
H0: No first-order autocorrelation		
ROA	15.901	0.0001
TobinsQ	70.93	0.0000

Appendix 3: Breusch-Pagan/Cook-Weisberg

Dependent Variable	Chi-Square Statistic	Prob > Chi-Square
H0: Constant variance		
ROA	50.04	0.0000
TobinsQ	97.95	0.0000

Appendix 4: Variance Inflation Factor (VIF)

Dependent Variable	Variable	VIF	1/VIF
ROA	ESG	1.02	0.984677
	lTotalA	1.78	0.562454
	lCapex	1.74	0.573266
	DE	1.08	0.925274
	Beta	1.03	0.970417
	ChangeRev	1.01	0.994334
	Mean VIF	1.28	
TobinsQ	ESG	1.02	0.984409
	lTotalA	1.74	0.573673
	lCapex	1.71	0.583094
	DE	1.08	0.928380
	Beta	1.03	0.974694
	ChangeRev	1.01	0.991367
	Mean VIF	1.26	