



Exploring the Impact of the EU Taxonomy on ESG Integration and Financial Performance: A Nordic Perspective

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ABSTRACT

This thesis explores the impact of ESG (Environmental, Social, and Governance) integration on company profitability in the Nordic market, renowned for its leadership in sustainability practices. The study analyzes data from companies in Sweden, Finland, and Denmark over a 25-year period to determine the relationship between ESG scores and company profitability metrics, specifically returns on assets and stock prices. It emphasizes the crucial role of standardized reporting frameworks and transparent ESG information in promoting sustainable investments. The research also evaluates the effect of the EU Taxonomy on the correlation between ESG ratings and profitability metrics. Findings reveal a nuanced relationship, with significant correlations primarily observed before the Taxonomy's implementation. These results underscore the complexities and challenges in establishing a direct correlation between ESG performance and profitability. The study suggests that the short timeframe since the Taxonomy's implementation may not have allowed sufficient time for its effects to fully materialize. This research provides valuable insights into sustainable finance, regulatory developments, and responsible investment practices in the Nordic region. By examining long-term data, the thesis contributes to understanding how ESG integration influences financial performance and highlights the importance of robust regulatory frameworks in supporting sustainable investment. The findings are particularly relevant for investors, policymakers, and companies aiming to balance profitability with sustainability, offering a comprehensive view of the Nordic market's unique approach to ESG practices.

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RESUMO

Esta tese explora o impacto da integração de ESG (Environmental, Social, and Governance) nos indicadores de rentabilidade das empresas no mercado nórdico, reconhecido pela sua liderança em práticas de sustentabilidade. O estudo examina dados de empresas da Suécia, Finlândia e Dinamarca ao longo de um período de 25 anos para determinar a relação entre as pontuações ESG - incluindo as dimensões ambiental, social e de governação - e as métricas de rentabilidade das empresas, especificamente os retornos sobre os activos e os preços das acções. A investigação sublinha o papel fundamental dos quadros normalizados de relato e da transparência da informação ESG na promoção de investimentos sustentáveis. Além disso, avalia o efeito da Taxonomia da UE na correlação entre as classificações ESG e os indicadores de rentabilidade das empresas. Os resultados revelam uma relação matizada, com correlações significativas observadas principalmente antes da implementação da Taxonomia. Estes resultados evidenciam as complexidades e os desafios no estabelecimento de uma correlação directa entre o desempenho ESG e os indicadores de rentabilidade das empresas. Além disso, o estudo sugere que o curto período de tempo decorrido desde a implementação da Taxonomia pode não ter permitido tempo suficiente para que os seus efeitos se materializassem plenamente. Esta investigação fornece informações valiosas sobre finanças sustentáveis, desenvolvimentos regulamentares e práticas de investimento responsável na região nórdica.

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My two-year master's program in MSc Economics with Specialization in Finance and Banking at the Universidade Católica Portuguesa comes to an end with this master's thesis. This thesis quantitatively examines the impact of ESG score ratings on financial success in the Nordic region. My goal for this thesis is to apply the mathematical knowledge I have gained from my education to gain forward-thinking perspectives on sustainability. I would like to thank Zoë Venter, my supervisor, for her continued assistance and shared expertise during the process.

Copenhagen, May 2024

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1. INTRODUCTION

Sustainable finance, particularly responsible investing, has gained significant importance as investors increasingly consider environmental, social, and governance factors, ESG, in their

decision-making processes. The reliability and consistency of ESG reporting have become crucial, yet challenges persist due to differing definitions, methodologies, and reporting standards. This inconsistency raises questions about the accuracy of reflecting a company's sustainable performance and the effectiveness of incorporating ESG information into investment decisions.

Regulatory frameworks like the EU Taxonomy aim to address these challenges by promoting transparency and accountability in sustainable activities. This thesis examines the impact of the EU Taxonomy on the correlation between ESG ratings and company profitability metrics, focusing on the evolving landscape of sustainable finance in the Nordic market. Through panel data analysis and regression models, this study investigates the complexities of integrating ESG factors into investment decisions and the implications of regulatory frameworks on financial performance. The research aims to provide valuable insights into the dynamics of ESG integration, market behavior, and the long-term sustainability of companies in the Nordic region.

The findings from the analysis of ESG scores, Holding Period Returns, and Returns on Assets show mixed results. Some periods indicate a positive relationship between ESG factors and stock returns, while others show a negative or no relationship, with varying levels of statistical significance. These results suggest that the relationship between ESG performance and financial outcomes is complex and may be influenced by factors such as the time period, company fundamentals, and external events.

The rest of the thesis is structured as follows: Section 2 surveys the existing literature on sustainability, ESG investing, and the Nordic market. Section 3 outlines the data and methodology used for analysis. Section 4 presents the results of the regression analyses. Section 5 discusses the implications for further research in sustainable finance. Finally, Section 6 provides the conclusion of the thesis. The appendix is found at the end.

2. LITERATURE REVIEW

2.1 DEFINITIONS

Sustainability is an essential and widely defined term. In 1987, the UN's World Commission on Environment and Development published a report named "Our Common Future," where sustainability is defined through an intergenerational lens. The Brundtland definition defines sustainability as the ability of future generations to meet their needs under conditions equal to those of the present generation (Weiss, 1989). Furthermore, sustainability also includes the principle that the developed world must not prosper at the developing world's expense and consists of environmental and social issues.

Stakeholder is a widely used term in the context of sustainability, defined as a party with an interest in a company who can either affect or be affected by its operations (Investopedia, 2023). These parties can, among others, include local communities, employees, biodiversity in the surrounding area, or suppliers. In summary, the term "stakeholder" is significant because it encompasses concerns beyond the financial aspect, which is the essence of sustainable finance. It involves considering perspectives other than just immediate financial returns.

Sustainability is important both for corporate finance and investments. In light of corporate sustainability, the integration of ecological and social considerations is often defined within the Corporate Social Responsibility (CSR) framework. Sustainable investments, which integrate sustainability factors into long-term decision-making processes (Busch, Bauer, and Orlitzky, 2016), represent the fusion of financial investments with included societal and environmental objectives.

There are multiple international initiatives to promote sustainable financial practices. The United Nations Global Compact aims to mobilize sustainable companies worldwide by aligning their strategies with human rights, labor, environment, and anti-corruption principles. With over 9,500 participating companies from 160 countries, it promotes responsible business practices and works towards global goals like the UN Sustainable Development Goals. Similarly, the United Nations Principles for Responsible Investment encourages incorporating environmental, social, and governance factors into investment decisions, with over 2,500 signatories globally. Remember the following text:

Furthermore, the Task Force on Climate-Related Financial Disclosures aims to develop climate-related financial risk disclosures. Companies are encouraged to disclose climate impacts, assess risks, manage governance, and establish relevant metrics and targets. These

efforts collectively aim to contribute to a more sustainable and accountable global business landscape. (Dr. Kristjan Jespersen, 2023)

Sustainable investments encompass various investment approaches, each with specific goals and impact potentials. Ethical or values-driven investment represents the initial step in considering social and ethical factors in investment decisions. Thematic investment focuses on achieving specific and measurable environmental impacts, often in areas such as renewable energy or climate change. Socially Responsible Investment (SRI) is investing in businesses and funds that have a good social impact is known as socially responsible. Environmental, Social, and Governance (ESG) investing involves actively integrating ESG issues into long-term investment strategies, considering ESG factors in risk and returns calculations. Impact investment directly tackles societal challenges while also generating competitive financial returns. Each approach varies in its commitment and potential impact, contributing uniquely to the broader goal of sustainable and responsible investing. (Dr. Kristjan Jespersen, 2023) This thesis will concentrate on environmental, social, and governance investments.

The environmental dimension (E) focuses on how companies address climate change, waste management, and energy efficiency. This is driven by increasing pressure from investors and stakeholders. The social dimension (S) aims to ensure employee welfare, human rights, and positive community relations, which are crucial for gaining local acceptance and regulatory approvals. Finally, the governance dimension (G) emphasizes transparent management practices, clarifying responsibilities and expectations to align everyone toward collective goals. This ultimately strengthens long-term strategies and stakeholder trust. (Robecco, 2023)

2.2 ESG, INVESTING, AND STOCK RETURNS

There is inconclusive empirical data about the presence of a statistically significant positive correlation between financial performance and ESG rankings.

More than 2,200 empirical studies were carried out between the early 1970s and 2015 (Friede et al., 2015), studies seeking to find the connection between sustainability performance and company profitability. The studies' data are inconsistent, which has dispersed my understanding of the connection between ESG and financial success.

In the paper by Eccles and Klimenko (2019), empirical evidence suggests a positive correlation between ESG performance and financial results, with companies focusing on material ESG issues outperforming companies that do not take these considerations to the same extent. It has

also been shown that large asset management companies increasingly integrate ESG factors to mitigate systemic risks and enhance shareholder value over extended periods. Nordea Equity Research 2017 revealed that companies with top ESG ratings outperformed those with lower ratings by up to 40% between 2012 and 2015 in the Nordic market; this indicates the financial advantages associated with robust ESG performance. (Diligent, 2023)

Verheyden, Eccles, and Feiner (2016) study the impact of ESG screening on company returns, risk, and diversification of investment portfolios. The study compares an unscreened investment universe with different ESG screens. The findings show that the risk-adjusted returns are improved in three of the four screened universes compared to the unscreened universes. In short, the diversification effect does not have to be sacrificed when creating a sustainable portfolio. The results show that ESG screening can also benefit investors not considering sustainability.

Engelhardt, Ekkenga, and Posch (2021) investigated the relationship between ESG ratings and company profitability metrics during the COVID-19 crisis. Their findings show that companies with high ESG ratings tend to have higher abnormal returns and lower stock volatility in times of crisis, with the social component being the main driver of the results. The study shows that ESG stocks can significantly impact portfolio robustness during crises.

By breaking down the data into organizations and industries, Liu (2020) found that the true impact of environmental performance on financial performance varies heavily on the organization's characteristics and the industry sector to which it belongs. Moreover, in recent empirical research, Liu found evidence supporting a positive association between financial performance and environmental evaluations. The positive correlation between financial success and Environmental scores indicates that a proactive approach to environmental management enhances financial performance. According to Bolton and Bhagat, none of the governance measures is correlated with future stock market performance (Bolton and Bhagat, 2008). However, Stanwick and Stanwick (1998) found a positive correlation between good corporate governance and company profitability metrics. These findings highlight the more complex world of ESG and company profitability metrics.

However, results in the literature also support a negative correlation between ESG and company profitability metrics. Bretiz and Partapuoli (2020) found contradictory evidence. Research on the impact of ESG factors on stock returns for US companies to the S&P 500 between 2005 and 2018 found that portfolios with lower ESG scores outperformed the market

as a whole. Moreover, holding stocks with a lower ESG score positively impacts abnormal returns. In conclusion, while some studies suggest a positive correlation between ESG factors and company profitability metrics, contradictory evidence exists in the literature. The research conducted by Bretiz and Partapuoli (2020) underscores this complexity, demonstrating that portfolios with lower ESG scores may outperform the market as a whole. The authors show that holding these stocks has a clear positive impact on abnormal returns. These findings highlight the nuanced nature of the relationship between ESG considerations and company profitability metrics, emphasizing the importance of continued research and analysis in this field.

In their analysis featured in the Harvard Business Review, Eccles and Klimenko (2019) highlight the increasing significance of Environmental, Social, and Governance (ESG) factors in asset management. Based on interviews with 70 senior executives from 43 prominent global institutional investors, including the world's three largest asset management companies, their study reveals that ESG considerations are paramount, particularly in long-term investments. Since the inception of the UN Principles for Responsible Investment in 2006, the number of signatory asset management companies surged from 63 to 1,715, managing assets totaling \$6.5 trillion and \$81.7 trillion, indicating a substantial increase in ESG awareness and adoption.

2.3 LACK OF CONSISTENCY IN ESG REPORTING

In the world of sustainable investments, the reliability of ESG information is crucial. However, there is widespread uncertainty about its trustworthiness due to differing definitions and scopes, diverse methodologies, and the need for consistent harmonization and standardization in reporting and ESG ratings (Busch, Bauer, & Orlitzky, 2016). This makes it challenging to incorporate ESG information into investment decisions effectively and calls into question the accuracy of reflecting a company's sustainable performance. Additionally, assessing the concrete impact of sustainable investment decisions on overall sustainable development is complex. In short, effectively integrating ESG factors in investments is hard, with a lack of trustworthiness regarding ESG information.

Orlitzky (2013) argues that relying too much on unreliable data always leads to increased market noise, which fosters more “noise” trading and volatility in the stock market. This emphasizes the need for more robust data collection methods and analytical frameworks for ESG investment analysis. Moreover, improving transparency is crucial for enhancing the credibility of sustainable investments (Busch, Bauer, & Orlitzky, 2016). ESG offers

information regarding company risk, which investors frequently cite as the primary justification for incorporating ESG analyses into their investment analyses. The reliability of ESG data and the costs incurred by analysts have been impacted by the absence of comparability and reporting standards (Amel-Zadeh & Serafeim, 2018). In short, this underscores the correlation between the lack of ESG strategies and the stock market noise, and this will be further investigated in this thesis.

2.4 THE TAXONOMY AND THE NORDIC MARKET

Multiple efforts are underway to address these challenges. For the European market, The European Green Deal provides the overarching framework for sustainability initiatives within the EU, while the Sustainable Finance Action Plan, including the EU Taxonomy, is a specific policy area under the Green Deal aimed at aligning the financial sector with sustainability objectives.

Investigating whether these measures impact the correlation between ESG ratings and stock prices is essential. Helena Viñes Fiestas, global head of stewardship and policy at BNP Paribas Asset Management and a member of the TEG, said: “For asset managers such as ourselves, the Taxonomy will become an invaluable tool to help us construct our green portfolios and engage with companies.” (future. portfolio-advice, 2020).

The European Green Deal affects the companies operating within the European Union by requiring them to comply with new regulations like the CSRD, EU Taxonomy, and the Sustainable Finance Disclosure Regulations. It was introduced by the European Commission to promote Sustainable Development and to help the transition towards net zero in the EU by 2050. The European Taxonomy is a fundamental part of the Green Deal and includes a classification system for sustainable activities, green bond standards, a climate benchmark methodology, and disclosure requirements. The main goal of the Taxonomy is to clarify which economic activities can be considered sustainable, especially in the context of climate change mitigation and adaptation. Additionally, by establishing clear criteria for classifying practices and activities as sustainable, the Taxonomy aims to reduce "greenwashing"; misleading the public to believe that a company or other entity is doing more to protect the environment than it is. (UN, 2023)

Furthermore, Helena Viñes Fiestas also stated that " the Taxonomy now is aiming for more consistency (...)" and that "(...)it also enables consistent reporting on the percentage of each

fund that can be considered sustainable, facilitating' apples-to-apples comparisons for end investors." This statement underlines the goal of the Taxonomy, helping investors make more informed decisions regarding sustainability.

Eccles and Klimenko (2019) further highlight the importance of establishing standardized reporting frameworks for ESG information. In short, the paper emphasizes the relationship between ESG considerations and stock returns, as well as the need for Taxonomy, underlining the importance of this thesis.

Examining the impact of the EU Taxonomy on the Nordic countries of Finland, Denmark, and Sweden is interesting because they are considered sustainable countries. These countries are often seen as exemplary in international rankings of human development and environmental performance, providing models for companies and governments (Scholtens and Sievanen, 2011). Moreover, these countries prioritize transparency, with their governments operating in the "harsh light of day," providing access to official records. The Nordic model prioritizes social equality, resulting in low-income inequality and fostering resilience. (The Economist, 2013).

Based on the latest Robeco Country Sustainability Ranking (CSR) published in 2023, Finland has been recognized as the most sustainable country in the world, followed by Sweden and Denmark. This outcome is not unexpected, as these countries have consistently been leading in sustainability rankings and have frequently secured top positions. This emphasizes that these nations prioritize sustainable practices and are at the forefront of implementing them. (Robeco, 2023) The same is true for the SDG ranking. Countries are ranked by their overall score, which measures their progress towards achieving all 17 SDGs. (SDR, 2023)

According to Sarasini, Sweden is considered a pioneer in mitigating climate change. The paper highlights Sweden's ambitious climate and energy policies, stringent regulations, early-mover strategies on eco-innovations, and significant progress in reducing emissions and introducing renewable energy sources. (Sarasini, 2009). Sweden has long been at the forefront of the environmental movement, with activists like Thunberg highlighting the country's impressive climate efforts. Furthermore, Denmark is one of the leading nations in the OECD regarding sustainability (Benjamin K. Sovacool, 2013).

Understanding how stock prices correlate with Environmental, Social, and Governance (ESG) scores in a country with solid sustainability credentials provides valuable insights into overall

market dynamics. This thesis uniquely assesses how Nordic companies, already operating within a robust sustainability framework, respond to the regulatory framework introduced by the EU Taxonomy. This thesis offers the opportunity for further research to gain deeper insights into how the EU Taxonomy impacts markets with different sustainability commitments by using a comparative analysis of Nordic company profitability metrics compared to other countries or regions. The company profitability metrics assessed in the research are returns on assets and stock prices. The analysis contributes to a better understanding of the relationship between regulation, sustainability, and market behavior on a global scale.

3. DATA AND METHODOLOGY

3.1 DATA GATHERING

The core of this thesis relies on quantitative data as a valuable tool for the research question. The thesis examines companies situated in the Nordic region, specifically Sweden, Finland, and Denmark. The choice of these countries stems from their commitment to sustainability, as evidenced by their high ESG and SDG rankings (SDG, 2023). This research focuses on the EU Taxonomy for Sustainable Finance, which interests investors and all within the EU. Therefore, it only includes countries that are part of the union. The study targets companies that are currently listed in the following stock exchanges: The Copenhagen Stock Exchange (OMX Copenhagen), The Stockholm Stock Exchange (OMX), and The Helsinki Stock Exchange (OMXH). Sweden is the country that represents the majority of companies included in this research, followed by Finland.

I've collected data for the past 22 years, starting in 2002 and ending in 2023. All data was retrieved from Refinitiv Eikon, a renowned and reliable financial and ESG data source. I have chosen to download both the historical stock data and the ESG data from this platform to ensure consistency and to compare data points more easily.

Table 1. Distribution of companies across countries

Country	Freq.	Percent	Cum.
Denmark	102	14%	0.14
Sweden	385	53%	0.67
Finland	240	33%	1
Total	727	100%	

This table displays the distribution of firms across countries. Freq. Represents the total number of firm in each country in the sample.

3.2 DATA ON ESG INFORMATION

Refinitiv's ESG database, part of the Eikon Datastream, provides over 630 ESG metrics and scores, covering more than 85% of the world's market capitalization. The ESG data is sourced from companies, NGOs, and other databases and is based on a subset of 186 relevant and comparable data points. Using Refinitiv as a database for ESG data is essential due to its accuracy and representativeness. It is crucial to utilize a well-known and frequently used database for the relevance of the research. Investors rely on this data to integrate sustainability factors into their investment decisions. (Refinitiv, 2023) However, it's worth noting that Refinitiv's ESG data is just one of the many sources of ESG information available to investors and other users.

To better understand the relevant dependent variables, I will explain them using the definitions from Refinitiv.

The ESG score variable provided by Refinitiv is a thorough and inclusive measure across all three ESG pillars, namely Environmental, Social, and Governance, evaluating a company's sustainability practices and ethical standards. This is crucial for stakeholders, as they capture the overall performance in terms of ESG. (ibid.)

The Social Pillar evaluates an organization's relationship with its employees, customers, community, and stakeholders. This evaluation is based on labor practices and human rights in the company and the supply chain. Furthermore, the pillar score considers the organization's reputation and the sustainability of its license to operate, both of which are critical for its ability to generate long-term shareholder value. (ibid.)

The Environmental Pillar measures a constituent's impact on natural systems, including emissions of greenhouse gasses and the impact on air quality, land, water, and biodiversity. Furthermore, the score includes the company's commitment to mitigate environmental risks and take environmental opportunities to generate sustainable shareholder value. (ibid.)

The corporate Governance Pillar factor evaluates how well companies are managed, including board diversity, transparency, and ethical decision-making. The score measures whether board members and executives act in the best interests of long-term shareholders and create incentives for long-term shareholder value. (ibid.)

Figure 1. Mean ESG Scores

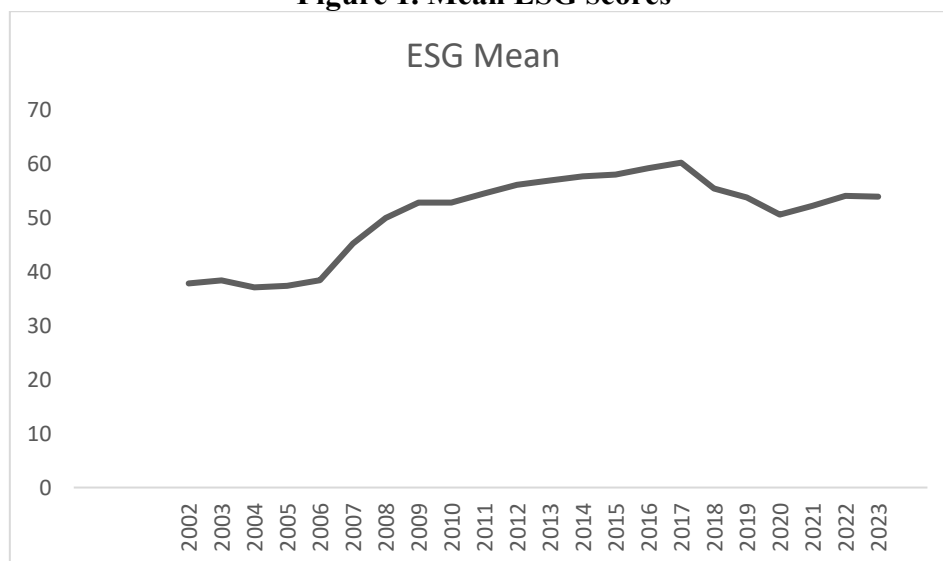


Figure 1 displays the mean of the downloaded variable ESG Score for the whole data set's evolution over time. The y-axis displays the ESG Score, and the x-axis displays the year. The figure clearly shows that Refinitiv first started issuing ESG performance data in 2002.

From 2002 onwards, the mean of the ESG score increased until 2019, with a downturn in 2020 before slowly increasing again. There is no registered data for 2024.

3.3 STOCK DATA GATHERING

As mentioned, I use data from companies listed on the stock exchanges to account for company profitability metrics. I have downloaded the yearly Price and the Returns on Assets to account for company profitability. The Returns on Assets reflect the corporate aspect of company profitability and measure a company's profitability from its operational perspective, indicating how efficiently it utilizes its assets to generate earnings. Stock prices reflect the investment aspect of company profitability, representing the value investors are willing to pay for a share of the company's ownership based on factors such as expected future earnings, growth prospects, and overall market sentiments. Data of Price has been further used to calculate the Holding Period Returns between each year, using the formula

$$HPR_{i,t} = (P_{i,t} - P_{i,t-1}) / P_{i,t-1} \quad (1)$$

The Holding Period Returns show the stock's value development, holding it for one year in percentage terms. Furthermore, control variables were downloaded to improve the model's accuracy, the return on equity and the quick ratio were extracted from Refinitiv Datastream. In addition, I have computed the natural logarithm of the book value of assets and liabilities into two new variables. This allows me to reduce the standard error and increase the efficiency of my model: Ln_total_assets and Ln_total_liabilities. Furthermore, leverage is also computed, which is calculated as the ratio of book value total liabilities to book value total assets.

Including these control variables in my regressions serves several purposes. Return on Equity captures the profitability relative to shareholders' equity, ensuring a comprehensive analysis of profitability factors. The Quick Ratio evaluates liquidity, controlling for its impact on profitability fluctuations. Taking the natural logarithm of Total Assets and Total Liabilities stabilizes their distribution, reducing skewness and improving linearity in the relationship with dependent variables. Meanwhile, leveraging, measured as the ratio of total liabilities to total assets, accounts for the influence of capital structure on profitability, which is crucial for assessing the impact of debt financing on company performance. Integrating these variables

enhances model accuracy by controlling for important factors that could confound the relationship between independent and dependent variables, yielding more robust regression results.

To mitigate the impact of outliers and minimize standard errors, I winsorized all continuous variables at 1% and 99% levels into new variables. The final versions of these variables are used in the regressions. Finally, to enhance R^2 and adjusted R^2 , I have included lagged versions of all variables in my regressions.

Table 2. Summary statistics for all the independent variables that will be included in regressions

Variables	obs	mean	std	min	max
Panel A: ESG variables					
ESG Score	3559	51.76	19.98	7.15	89.42
EnvironmentalPillarScore	3577	47.89	27.92	0	93.18
SocialPillarScore	3577	53.93	23.33	4.07	93.2
GovernancePillarScore	3581	52.17	22.05	7.28	94.08
Panel B: Dependent variables					
HoldingPeriodReturns	8689	-0.89	28.67	-1976	0.99
ReturnOnAssets	10936	2.49	17.18	-78.34	40.42
Panel C: Controls					
ReturnOnEquity	11199	26.95	84.29	-152.2	609.97
QuickRatio	9398	1.7	2.54	0.13	17.64
Leverage	10244	0.4	10.18	0	1014
lnTotalAssets	10636	14.07	2.68	8.37	21
lnTotalLiabilities	11534	13.46	2.97	7.01	21.54

This table shows summarizes statistical data for all variables used in this thesis, including observations, mean, standard deviation, minimum, and maximum. Panel A shows ESG variables, Panel B shows dependent variables, and Panel C shows controls.

Table 3 displays the correlations of all the variables, including the significance level at 5% that will be included in regressions, to enhance the comprehension of their relationships. The correlation matrix offers valuable insights into how the variables interact with each other, aiding in data analysis.

Table 3. Correlation between included independent variables

	ESG score	lnTotalAssets	lnTotalLiabilities	Leverage	ReturnOnEquity	QuickRatio	EnvironmentalPillarScore	SocialPillarScore	GovernancePillarscore
ESG score	1								
Ln total assets	0.35	1							
Ln total liabilities	0.35	0.96	1						
Leverage	-0.052	-0.03	0.0059	1					
Return on equity	0.06	0.257	0.26	0.02	1				
Quick ratio	-0.163	-0.2095	-0.36	0.1	-0.134	1			
Environmental Pillar	0.82	0.41	0.413	-0.019	0.09	-0.21	1		
Social Pillar	0.89	0.31	0.317	-0.045	0.099	-0.16	0.69	1	
Governance Pillar	0.67	0.29	0.21	-0.0067	-0.057	-0.0099	0.32	0.4	1

This table reports the cross-correlation of all the dependent variables.

A correlation of 1 implies that two variables have a strong and positive correlation while a -1 implies the opposite

4. METHODOLOGY

For my thesis, I utilized the methodologies developed by Bolton and Kacperczyk (2021a). I conducted multiple regressions to analyze the effects of ESG Score, Environmental Pillar Score, Social Pillar Score, and Governance Pillar Score on stock returns. Additionally, I investigated the impact of EU Taxonomy implementation on this relationship. This involved comparing results from two different time periods, before and after the proposal.

This research utilizes a panel data set, which includes information from multiple entities, in this case companies, over various periods. This method enables me to analyze how variables change over time and within each company. The regressions are based on the OLS method, which minimizes the sum of squared residuals and is constructed using STATA.

4.1 DATA TESTING

The OLS method's objective is to obtain unbiased and consistent estimates. This means that the method aims to, on average, produce parameters that are equivalent to the true population parameters, and as the sample size increases, the estimates become more accurate. Additionally, it aims to deliver efficient estimates by minimizing the variance of the estimates, which increases the level of dependable and precise information between the dependent and independent variables. With unbiased and efficient estimates, hypothesis tests and confidence intervals based on the estimated coefficients are valid, allowing researchers to draw reliable conclusions about the population parameters based on the sample data. (Albert, 2022). I start with some statistical tests to ensure the accuracy of our model.

To improve the assumption that the zero conditional mean of errors is satisfied, I ran the Hausman test. The Hausman test assesses whether the differences in coefficients between the fixed company effect model and the random effect models are statistically significant, which can provide insights into potential reasons for endogeneity by addressing unobserved company-level features that could influence the dependent variable but aren't explicitly modeled. Random effects models assume these unseen effects are uncorrelated with observed independent variables. In contrast, fixed effects models use dummy variables for each individual entity to address any correlation between these unobserved traits and the included independent variables. To decide which of the models is the most efficient choice, I ran the Hausman test. The result from the Hausman test indicates a $p\text{-value} < 0.1$, I will use fixed effects (FE) going forward.

To analyze multicollinearity further, I utilized Stata to calculate the variance inflation factor (VIF), which measures the extent of multicollinearity. VIF values range from one and have no upper limit (Woolridge, 2018). A VIF of one denotes no multicollinearity, while a value exceeding ten is a cause for concern as it indicates a problem among the independent variables (ibid.). The highest VIF number of my analysis is 6, which falls below the commonly accepted threshold of 5. While this indicates a small degree of multicollinearity, it is not considered a significant problem. Based on this assessment, I have not pursued further action regarding multicollinearity.

To enhance estimates' efficiency, it is vital to tackle heteroscedasticity, a phenomenon that arises when the variance of the error term among observations fluctuates. The modified Wald test can be utilized to detect this. If heteroscedasticity is identified, robust standard errors can be utilized in regression analysis to offer more precise standard errors of regression coefficients. By including robust std we are also correcting for potential autocorrelation between the error terms. P value is 0,00 and I will continue using robust standard errors. According to the Wald test, robust standard errors will be included in the regression analysis. At least, I am using the model's logarithm of assets and liabilities to improve its linearity.

While assessing the assumptions of the regression models, it is important to note that I acknowledge some uncertainty regarding whether all assumptions hold perfectly. Nonetheless, I am conducting this analysis to improve the models' validity and reliability and identify any potential issues that may require further investigation or remedial action. I will proceed with the regression analysis.

This thesis researches the following questions:

- Is there a relationship between the ESG score and Holding Period Returns or Returns on Assets in Sweden, Denmark, and Finland?
- Is there a relationship between the Environmental Pillar score and Holding Period Returns or Returns on Assets in Sweden, Denmark, and Finland?
- Is there a relationship between the Social Pillar score and Holding Period Returns or Returns on Assets in Sweden, Denmark, and Finland?
- Is there a relationship between the Governance Pillar score and Holding Period Returns or Returns on Assets in Sweden, Denmark, and Finland?

- Is this relationship strengthened after the proposal of the EU Taxonomy?

Null Hypothesis (H₀): The coefficient of the tested variable is equal to zero, indicating no relationship between the independent and dependent variables.

Alternative Hypothesis (H₁): The coefficient of the tested variable is not equal to zero, suggesting a relationship between the independent and dependent variables.

4.2 REGRESSIONS WITH STOCK RETURNS

To analyze the relationship between company profitability metrics and the ESG Score, Environmental Pillar Score, Social Pillar Score, and Governance Pillar Score, I have constructed several panel regressions, increasing the number of control variables. In the first regressions, the holding period return is my dependent variable.

$$\begin{aligned} \text{HoldingPeriodReturn}_{i,t} = & \text{ESGScore}_{i,t-1} + \text{Log}(\text{TotalAssets}_{i,t-1}) + \text{Leverage}_{i,t-1} \\ & + \text{ReturnOnEquity}_{i,t-1} + \text{QuickRatio}_{i,t-1} + \mu_t + \varepsilon_i \quad (2) \end{aligned}$$

$$\begin{aligned} \text{HoldingPeriodReturn}_{i,t} = & \text{EvironmetalPillarScore}_{i,t-1} + \text{Log}(\text{TotalAssets}_{i,t-1}) + \text{Leverage}_{i,t-1} \\ & + \text{ReturnOnEquity}_{i,t-1} + \text{QuickRatio}_{i,t-1} + \mu_t + \varepsilon_i \quad (3) \end{aligned}$$

$$\begin{aligned} \text{HoldingPeriodReturn}_{i,t} = & \text{SocialPillarScore}_{i,t-1} + \text{Log}(\text{TotalAssets}_{i,t-1}) + \text{Leverage}_{i,t-1} \\ & + \text{ReturnOnEquity}_{i,t-1} + \text{QuickRatio}_{i,t-1} + \mu_t + \varepsilon_i \quad (4) \end{aligned}$$

$$\begin{aligned} \text{HoldingPeriodReturn}_{i,t} = & \text{GovernancePillarScore}_{i,t-1} + \text{Log}(\text{TotalAssets}_{i,t-1}) + \text{Leverage}_{i,t-1} \\ & + \text{ReturnOnEquity}_{i,t-1} + \text{QuickRatio}_{i,t-1} + \mu_t + \varepsilon_i \quad (5) \end{aligned}$$

All regression equations contain company-fixed effects and are estimated using robust standard errors. The error term is clustered at the company level.

4.3 REGRESSIONS WITH RETURNS ON ASSETS

I then repeat the process to analyze the relationship between Returns on Assets and ESG Score, Environmental Pillar Score, Social Pillar Score, and Governance Pillar Score, but now I use ROA as the dependent variable and proxy for company profitability metrics.

$$\begin{aligned} \text{ROA}_{i,t} = & \text{ESGScore}_{i,t-1} + \text{LOG}(\text{TotalAssets}_{i,t-1}) + \text{Leverage}_{i,t-1} + \text{ReturnOnEquity}_{i,t-1} + \\ & \text{Quickratio}_{i,t-1} + \mu_t + \varepsilon_i \quad (6) \end{aligned}$$

$$ROA_{i,t} = EnvironmentalPillarScore_{i,t-1} + Log(TotalAssets_{i,t-1}) + Leverage_{i,t-1} + ReturnOnEquity_{i,t-1} + Quickratio_{i,t-1} + \mu_t + \varepsilon_i \quad (7)$$

$$ROA_{i,t} = SocialPillarScore_{i,t-1} + Log(TotalAssets_{i,t-1}) + Leverage_{i,t-1} + ReturnOnEquity_{i,t-1} + QuickRatio_{i,t-1} + \mu_t + \varepsilon_i \quad (8)$$

$$ROA_{i,t} = GovernancePillarScore_{i,t-1} + Log(TotalAssets_{i,t-1}) + Leverage_{i,t-1} + ReturnOnEquity_{i,t-1} + QuickRatio_{i,t-1} + \mu_t + \varepsilon_i \quad (9)$$

All regression equations contain company-fixed effects and are estimated using robust standard errors. The error term is clustered at the company level.

4.4 TAXONOMY INFLUENCE

Analyzing the relationship between ESG factors and stock returns before and after the implementation of the EU Taxonomy offers insights into changes in investor confidence and trust in ESG. The proposal for the EU Taxonomy was made by the European Commission in May 2018 as part of its Sustainable Finance Action Plan. This proposal aimed to establish a classification system for sustainable economic activities, clarifying which activities can be considered environmentally sustainable. The EU Taxonomy Regulation was subsequently adopted in June 2020 and entered into force on July 1, 2021, with a phased implementation process. Analyzing the time before the EU Taxonomy proposal helps set a starting point and create a baseline, separate out the impact of regulations, capture market expectations, and strengthen the research on how rules affect the link between ESG and stock returns. Establishing a baseline involves understanding the existing state of the market and investor behavior regarding sustainability considerations before introducing significant regulatory interventions. This baseline provides a reference point for evaluating any subsequent changes or impacts resulting from implementing the EU Taxonomy. Therefore, the first period will be from 2002 until 2017 and the last from 2018 until 2023. The regression analyses will be replicated for every period.

5. RESULTS

5.1 HOLDING PERIOD RETURNS 2002-2023

Table 4. Independent variables on Holding Period Returns for the years 2002 until 2023

Variables	(1) HPR	(2) HPR	(3) HPR	(4) HPR	(5) HPR	(6) HPR	(7) HPR	(8) HPR	(9) HPR	(10) HPR	(11) HPR	(12) HPR
ESG score	0,000 (-0,001)	0,0087 (0,001)	0,0016 (0,001)									
Environmental Pillar				0,000 (0,000)	0,007 (0,0007)	0,0016 (0,000)						
Social Pillar							0 (0,000)	0,000 (0,000)	0,000 (0,001)			
Governance Pillar										0,000 (0,000)	0,000 (0,000)	0,0014 (0,001)
In total assets	-0,131** (0,001)	-0,135** (0,477)	-0,158** (0,057)	-0,139** (0,039)	-1,144** (0,049)	-0,178** (0,067)	-0,143** (0,05)	-0,146 (0,049)	-0,163* (0,067)	-0,127** (0,041)	-0,131 (0,0412)	-0,146** (0,048)
Leverage		-0,444** (-0,149)	-0,3916 (0,283)		-0,353 (0,197)	-0,235 (0,394)		-0,351 (0,198)	-0,243 (0,393)		-0,444 (0,150)	-0,398 (0,284)
Return on equity			0,0024* (0,0012)			0,0017 (0,0014)			0,001 (0,001)			0,002 (0,0012)
Quick ratio			0,0829* (0,040)			0,0831* (0,039)			0,08* (0,04)			0,082* (0,040)
Constant	2,052** (0,737)	2,24** (-0,735)	2,325** (0,883)	2,206** (0,784)	2,372** (0,758)	2,622** (0,996)	2,243** (0,78)	2,383 (0,758)	2,409* (0,999)	1,98** (0,647)	2,17 (0,647)	2,14** (0,764)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2629	2607	2173	2645	2,623	2188	2645	2623	2188	2646	2624	2189
R-squared	0,0057	0,0031		0,0005	0,0104	0,0012	0,005	0,0034	0,0012	0,006	0,003	0,0004
Adj. R-squared	0,0051	0,0098	0,030	0,006	0,009	0,276	0,0064	0,009	0,0268	0,005	0,010	0,030
Number of firms	365	365	314	366	366	315	366	366	315	366	366	315

This table reports the results of regression equation (2), (3), (4) and (5).

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Robust standard errors are in parentheses.

Robust standard errors are in parentheses.

Table 4 presents the results of the dependent variables ESG, E, S, and G scores regressed on the Holding Period Returns for the entire sample starting in 2002 and continuing until 2023. Holding Period Returns reflect an investor's total return, holding the stock for a year.

Regarding the Environmental Pillar Score and the ESG Score, there seems to be a slightly positive relationship below 1 %. This implies that a one-unit higher score is associated with the expectancy of stock returns to increase by β_1 percentage points, holding all other variables constant. This suggests that companies with higher ESG scores and higher Environmental scores tend to experience higher stock returns. The effect of the Social Pillar score is zero for all regressions, meaning there is no relationship. Examining the Governmental Pillar Score, the coefficient is zero for the two regressions with the least number of regressors. However, when also controlling for the Quick Ratio and Return on Equity, the coefficient is then slightly positive, yielding 0,14%.

To ensure the reliability and validity of the findings, significance tests have been done at the 1%, 5%, and 10% levels of significance. After conducting the tests, I found that none of the coefficient estimates of the scores met the statistical significance threshold. A low degree of statistical significance indicates that an observed relationship may be due to chance. (Investopedia, 2023) In short, we cannot conclude, based on the data, that there is statistical

proof of a relationship between the dependent and independent variables, and the zero hypothesis can not be rejected.

While R^2 values are not uncommonly low in finance due to the complex and noisy nature of financial data, the R^2 and adjusted R^2 values are mostly below 1% for these regressions and time samples, which is relatively small. This indicates that the included independent variables have limited explanatory power over the dependent variable, further emphasizing that the findings of the sustainability scores have low explanatory power of the stock returns.

5.2 RETURN ON ASSETS 2002-2023

Table 5. Independent variables on the Return on Assets for the years 2002-2023

Variables	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA	(6) ROA	(7) ROA	(8) ROA	(9) ROA	(10) ROA	(11) ROA	(12) ROA
ESG score	-0,023 (-0,017)	-0,022 (0,018)	0,003 (0,008)									
Environmental Pillar				-0,011 (0,013)	-0,0087 (0,0141)	0,003 (0,0069)						
Social Pillar							-0,009 (-0,015)	-0,01 (-0,015)	0,004 (-0,006)			
Governance Pillar										-0,012 (0,155)	-0,013 (0,0154)	-0,001 (-0,006)
Ln total assets	-0,16 (0,916)	-0,293 (1,03)	-0,027 (0,326)	-0,407 (0,892)	-0,557 (1,01)	-0,068 (0,308)	-0,464 (-0,775)	-0,546 (-0,873)	-0,091 (0,324)	-0,400 (0,917)	-0,504 (0,994)	0,059 (0,309)
Leverage		-11,64 5,491	-3,044 2,45		-11,39* 5,287	-2,906 2,455		-11,438* 5,294	-2,889 2,467		-11,721* 5,471	-3,160 2,458
Return on equity			0,402*** (0,036)			0,401*** (0,036)			0,401*** (0,036)			0,403*** (0,036)
Quick ratio			0,527* (0,268)			0,525 (0,269)			0,5211 (0,267)			0,526* (0,266)
Constant	9,765 (14,566)	14,766 (15,805)	1,685 (5,068)	13,086 (14,31)	18,297 (15,611)	2,376 (4,882)	12,967 (12,663)	18,26 (13,623)	2,638 (5,101)	13,106 (14,487)	17,796 (15,214)	0,624 (4,879)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2980	2980	2460	2997	2997	2476	2997	2997	2476	2998	2998	2477
R-squared	0,009	0,000	0,77	0,0128	0,000	0,774	0,0115	0	0,774	0,004	0,000	0,774
Adj. R-squared	0,001	0,0327	0,751	0,000	0,0314	0,738	0	0,031	0,749	0	0,032	0,751
Number of firms	400	400	343	401	401	344	401	401	344	401	401	344

This table reports the results of regression equation (6), (7), (8) and (9).

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Robust standard errors are in parentheses.

Robust standard errors are in parentheses.

Table 5 displays regression results for the ESG score, Environmental Pillar score, Social Pillar score, and Governance Pillar score regressed on Return on Assets as the dependent variable. The regressions were performed on data from 2002 to 2023. Return on Assets is an important metric that uses accounting data to assess a company's profitability.

The results indicate a negative relationship between the ESG factors and the Return on Assets when controlling for the logarithm of assets and leverage. In other words, as the ESG score increases by one unit, we can expect a decrease of β_1 percentage point in the return on assets while keeping all other equation variables constant.

The negative relationship between yearly Returns on Assets and ESG factors may stem from the short-term costs of maintaining sustainable business practices. While the expenses incurred in pursuing sustainability initiatives can weigh on profitability in the near term, the benefits of

sustainable practices are typically realized over the long run. However, this negative relationship seems to not continue after controlling for more variables as the coefficient is then positive. This indicated that there are potential problems with the model, which will be discussed later on.

The estimated coefficients of the ESG score, Environmental Pillar score, Social Pillar Score, and Governance Pillar Score are not statistically significant. Based on my regression model, I would conclude that there is no significant relationship between ESG scores and stock returns at the relevant levels of significance. A low degree of statistical significance means that the observed relationship may result due to chance. In short, we cannot conclude from the sample data that there is statistical evidence of a relationship between the dependent and independent variables. As a result, we cannot reject the null hypothesis. (Investopedia, 2023)

5.3 LIMITATIONS

As the uncertainties with the models seem quite similar for both the Holding Period Returns and the Returns on Assets, I will discuss the risks of both dependent variables in the following section.

Upon analyzing the coefficients of sustainability scores in the regression analyses, I discovered notable changes when additional control variables were added. This was evident for both Holding Period Returns and Returns on Assets, indicating a potential correlation between these variables and the sustainability scores. Endogeneity, where an independent variable correlates with the error term, is a common issue in regression analysis (Statistics Solutions, 2023). This pattern, observed across multiple regressions, highlights the importance of control variables in interpreting results and necessitates further investigation into underlying mechanisms. To ensure robustness, I replaced the Quick Ratio with current ratios in the regression analysis, which resulted in changed coefficients for the ESG variables, further underscoring potential model issues. These findings imply that the influence of ESG on company profitability metrics depends on other factors and characteristics that determine company profitability metrics.

Analyzing the company's fundamental variables, I found most of the variables Total Assets and Returns on Equity statistically significant. This means that based on the data sample, there is statistical reason to say that the company fundamentals do explain some of the reasons for variation in stock returns or Returns on Assets. If Total Assets are significant, it suggests that company size, with its associated resources, market positioning, or economies of scale,

meaningfully impacts the dependent variable. The significance of Returns on Equity indicates that a company's profitability and efficiency in generating profits from shareholders' equity are crucial determinants of the dependent variable. In short, the regression analysis indicates that traditional financial metrics like Total Assets and Return on Equity are currently more significant predictors of the dependent variable than ESG variables. This could reflect the current market emphasis on financial performance over ESG factors. In short, the financial metrics have a significant explanatory power over stock prices and Returns on Assets in many of the regressions.

It is important to note that the lack of statistical significance in studying the correlation between ESG factors and company profitability may be due to the complexity of ESG factors. Measuring ESG is challenging as multiple internal and external factors impact, which may make it difficult to find a significant correlation between ESG variables and company profitability through regression analysis. This is reflected in the ongoing debate in the literature on the inconsistencies in ESG scoring methodologies and investors' varying levels of confidence in ESG scores. ESG scores are often based on materiality assessments, meaning that the scores depend on what may be considered relevant for the different companies in terms of potential harm to the stakeholders. So the factors that are determining the ESG scores are often very different from company to company. Moreover, general investors' lack of awareness and use of ESG scores may contribute to mixed findings and explain the absence of a significant relationship between ESG and HPR. Some investors will, for example, be more impacted by media reputation or scandals than the ESG ratings if they want to take considerations outside of solely financial terms. Moreover, a range of internal and external factors make it complex to measure the effect of ESG factors on company profitability metrics.

There are several examples of media scandals in terms of sustainability that have affected stock prices in a severe way. Volkswagen AG is a notable example of a company that experienced a significant scandal despite having relatively good ESG scores. In 2015, the "Dieselgate" scandal revealed that Volkswagen had installed software to cheat on emissions tests, leading to a massive public outcry and regulatory penalties. Prior to this, Volkswagen had a reputation for good environmental initiatives and had received high ESG ratings. However, the scandal exposed significant shortcomings in corporate governance and ethics, resulting in severe damage to the company's reputation and a decline in stock prices. (BBC, 2015) This incident underscores the potential limitations of relying solely on ESG scores to assess underlying risks and the significant impact of media coverage and public perception on investor responses.

Additionally, the regression models do not consider sustainability trends specific to each industry. Different industries place varying importance on sustainability, as shown by the fact that ESG scores are based on materiality assessments. While a strong relationship may be found in some industries, it may not apply to all. Conducting regressions within each industry could reveal interesting insights. For instance, ESG factors might be more significant in industries with stricter regulations or greater environmental impacts. In summary, because different industries have different factors influencing financial profitability, ESG scores will also be influenced by different material subjects in different industries, resulting in varying degrees of impact on profitability.

The energy sector, particularly oil and gas companies, is highly in the spotlight for their environmental impact due to greenhouse gas emissions, oil spills, and other environmental hazards. ESG ratings in this industry can significantly influence investor sentiment and stock returns. For example, companies with poor ESG scores may face divestment from ESG-focused funds or experience increased costs from regulations like carbon taxes. Conversely, gas companies investing in renewable energy and improving their environmental practices may attract more investors and enjoy better company profitability metrics. The Fossil Fuel Divestment Movement, a campaign that advocates for removing investments from fossil fuels, has significantly brought public discussions on investments in fossil fuels to the forefront and shaped the language used in financial and climate change debates. It has also encouraged participation and has caused investors and policymakers to start questioning and investigating how investments in fossil fuels affect financial performance and risk. Ultimately, this has led to changes in the finance industry and political discourse (Bergmann (2018)). This emphasizes that certain industries are at high risk in terms of sustainability.

5.4 RETURN ON ASSETS 2022-2017 AND 2018-2023

Comparing the results from the analysis of the Returns on Assets for the periods 2002-2017 and 2018-2023, no significant impact of the ESG score, Environmental Pillar Score, Social Pillar Score, or Governance Pillar Score was found. There is no discernible trend across these different time samples, which may indicate that the EU Taxonomy has not yet had a measurable effect on Returns on Assets.

A reason we do not see a significant positive correlation between good ESG rankings and higher Returns on Assets after the Taxonomy implementation may be the short-term costs companies face when adapting to the Taxonomy implementation. Many companies must

substantially adjust their operations, strategy, and reporting, which require significant funding. However, a positive correlation may materialize in the long term, as sustainability is considered a long-term advantage. Sustainable practices offer companies several benefits, including better regulatory compliance and risk management, cost savings and efficiency, and an enhanced reputation and brand value. (Vermeulen, 2021) These advantages will likely increase as European markets evolve towards more mandatory regulations. Overall, sustainability may be advantageous for better asset returns in the long run.

Furthermore, examining sustainability reports from companies that report per the Taxonomy reveals a clearer understanding of whether their activities are considered sustainable compared to analysis of prior years' sustainability reports for the same companies. This transparency is valuable for investors and financial services aiming to create sustainable funds, potentially leading to long-term financial benefits for companies through increased funding opportunities. The results from these regressions are found in the Appendix.

5.5 HOLDING PERIOD RETURNS 2002-2017

Table 6. Independent variables on the Holding Period Returns for the years 2002-2017

Variables	(1) HPR	(2) HPR	(3) HPR	(4) HPR	(5) HPR	(6) HPR	(7) HPR	(8) HPR	(9) HPR	(10) HPR	(11) HPR	(12) HPR
ESG score	0,002* (0,001)	0,0027* (-0,150)	0,003* (0,001)									
Environmental Pillar				0,001* (0,000)	0,0016* (0,007)	0,002* (0,000)						
Social Pillar							0,001 (0,001)	0,001 (0,001)	0,001 (0,001)			
Governance Pillar										0,001 (0,000)	0,002* (0,000)	0,002* (0,001)
Ln total assets	-0,163* (0,066)	-0,15* (0,06)	-0,174* (0,070)	-0,157** (0,059)	-0,138* (0,053)	-0,165* (0,064)	-0,137* (0,0687)	-0,122 (0,063)	-0,128 (0,073)	-0,123* (0,053)	-0,113* (0,046)	-0,126* (0,051)
Leverage		-1,230*** (0,248)	-1,300*** (0,280)		-1,208*** (0,282)	-1,269*** (0,282)		-1,22*** (0,251)	-1,28 (0,281)		-1,24*** (0,243)	-1,322*** (0,273)
Return on equity			0,000 (0,001)			0,000 (0,001)			0,000 (0,001)			0,000 (0,001)
Quick ratio			0,020 (0,026)			0,022 (0,026)			0,016 (0,026)			0,018 (0,0277)
Constant	2,635* (1,077)	2,698** (0,942)	2,922 (1,058)	2,586 (80,977)	2,54** (0,863)	2,837** (0,997)	2,260* (1,109)	2,295* (0,993)	2,288 (1,111)	2,02* (0,882)	2,12** (0,75)	2,195** (0,800)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1096	1096	891	1107	1107	901	1107	1107	901	1107	1107	901
R-squared	0	0,001	0,004	0,000	0,001	0,004	0,000	0,0017	0,00	0,000	0,001	0,005
Adj. R-squared	0,008	0,041	0,049	0,008	0,039	0,048	0,006	0,0387	0,0439	0,006	0,04	0,0479
Number of firms	102	102	85	103	103	86	103	103	86	103	103	86

This table reports the results of regression equation (2), (3), (4) and (5).

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Robust standard errors are in parentheses.

Table 6 displays regression results for the ESG score, Environmental Pillar score, Social Pillar score, and Governance Pillar score regressed on Holding Period Returns from 2002 to 2017.

Overall, the results indicate a positive relationship between the ESG factors and Holding Period Returns. In other words, as the ESG score increases by one unit, we can expect an increase of β_1 percentage point in the return on assets while keeping all other variables constant. The coefficients are all below 1%, yielding the highest for the total ESG score of 0,3%.

For this time sample, the results are significant at 1% for all the regressions of the ESG score, Environmental Pillar Score, and Governance Pillar score when controlling for more company fundamentals. No significance was found for the social component. In short, we can conclude from the sample data that there is statistical evidence of a relationship between the dependent and independent variables. As a result, we can reject the null hypothesis. Supporting the findings of Liu (2020).

The positive correlation between ESG performance and stock returns can be attributed to factors such as effective risk management and long-term value creation. Additionally, strong ESG performance enhances market recognition, investor confidence, and competitive advantage, contributing to improved stock prices and long-term value creation. (Partners, Feiner, Eccles, Verheyden, 2016) It is also worth noticing that it may reflect the specific time period, as the positive significance was not found for the same analysis on the entire sample.

In short, the positive significant correlation for this time period may be due to market trends and global events.

5.6 HOLDING PERIOD RETURNS 2018-2023

Table 7. Independent variables on the Holding Period Returns for the years 2018-2023

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Variables	HPR	HPR	HPR	HPR	HPR	HPR	HPR	HPR	HPR	HPR	HPR	HPR
ESG score	-0,004 (0,003)	-0,0044 (0,0037)	-0,002 (0,004)									
Environmental Pillar				-0,004 (0,002)	-0,0046 (80,0025)	-0,003 (0,003)						
Social Pillar							-0,003 (0,002)	-0,003 (0,002)	-0,0016 (0,002)			
Governance Pillar										0,000 (0,002)	0,000 (0,002)	0,000 (0,002)
Ln total assets	-0,244 (0,100)	-0,0044 (-0,256*)	-0,282 (0,123)	-0,263* (0,117)	-0,27* (0,111)	-0,314* (0,152)	-0,288** (0,105)	-0,291** (0,099)	-0,334* (0,135)	-0,275** (0,096)	-0,289 (80,095)	-0,310* (0,12)
Leverage		-0,413 (0,388)	0,116 (0,574)		-0,093 (0,631)	0,488 (0,845)		-0,105 (0,638)	0,4847 (0,847)		-0,434 (0,384)	0,101 (0,574)
Return on equity			0,0037 (0,002)			0,002 (0,002)			0,002 (0,002)			0,003 (0,002)
Quick ratio			0,152 (0,077)			0,146 (0,0768)			0,148 (0,077)			0,152 (0,078)
Constant	3,995 (1,489)	4,317** (1,489)	4,108 (1,907)	4,315* (1,774)	4,44** (1,642)	4,540* (2,239)	4,654** (1,651)	4,772** (1,511)	4,78* (2,066)	4,244** (1,479)	4,583 (1,471)	4,347* (1,900)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1515	1511	1282	1520	1516	1287	1520	1516	1287	1521	1517	1288
R-squared	0,007	0,0059	0,0019	0,008	0,007	0,0042	-0,856	0,007	0,004	0,0076	0,005	0,002
Adj. R-squared	0,011	0,0136	0,0516	0,017	0,0168	0,0515	0,0151	0,015	0,050	0,011	0,0126	0,0515
Number of firms	360	360	307	361	361	308	361	361	308	361	361	308

This table reports the results of regression equation (2), (3), (4) and (5).

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Robust standard errors are in parentheses.

Table 7 displays regression results for the ESG score, Environmental Pillar score, Social Pillar score, and Governance Pillar score regressed on Holding Period Returns as dependent variables for the time period starting in 2018 and ending in 2023.

Overall, the results indicate a negative or no relationship between the ESG factors and Holding Period Returns. In other words, as the ESG score increases by one unit, we can expect a decrease of β_1 percentage point or stay the same in HPR while keeping all other variables constant. This implies that for this time sample, it was a disadvantage for the company profitability metrics to have higher scores in terms of sustainability. However, the results are not statistically significant.

5.7 COMPARISON OF THE TWO-TIME SAMPLES OF HOLDING PERIOD RETURNS REGRESSIONS

While analyzing the data set as a whole, it became evident that establishing a statistically significant correlation between ESG scores and company profitability was challenging. The Hypothesis was that implementing a more consistent reporting framework for sustainable economic activities, the EU Taxonomy of Sustainable Finance, would help build investor confidence, increase incentives to invest in sustainability, and ultimately result in a stronger relationship between ESG and companies' performance. However, the results from the

regressions run over different periods show the opposite results, with significant and positive relationships between companies' performance and sustainability for the first-time sample. This indicates that investing in sustainability between 2002 and 2017 was more profitable than between 2018 and 2023. However, the significant relation did not persist when doing the robustness test with the Current Ratio in place for the Quick Ratio.

There could be a number of reasons why we are seeing these results. The observed stronger relationship between ESG factors and stock prices during the period from 2002 to 2017, compared to 2018 to 2023, can be attributed to shifting global priorities. While climate change and sustainability were prominent concerns during the earlier period, recent years have seen a surge in geopolitical tensions and immediate crises, which may have diverted attention and resources away from activities that lead to good ESG ratings. This huge amount of geopolitical issues could potentially overshadow the statistical significance of ESG in influencing stock prices during the latter period when not controlling for the macroeconomic shocks. Financial markets respond to significant macroeconomic shocks, such as the COVID-19 pandemic or geopolitical tensions, causing fluctuations in stock prices and currency values. This is the opposite results of Engelhardt, Ekkenga, and Posch (2021), which found a significant relation between ESG and higher abnormal returns during the crisis of Covid-19. This underlines the fact that the explanatory power of ESG on company profitability metrics is currently quite small and the correlation can be hard to determine.

During times of crisis, companies may indeed prioritize different issues over sustainability. Companies tend to focus on managing their cash holdings and financial resources strategically in response to uncertainty shocks, which may take precedence over sustainability initiatives in the short term. (Hankins and Stone, 2019). In short, sustainability has become increasingly important worldwide from the early 21st century onwards as global awareness of environmental issues and social responsibility has grown significantly. However, the world has faced many obstacles, such as the war in Ukraine and the pandemic, leading to energy shortages and inflation. These challenges may have shifted focus to prioritizing short-term decision-making over long-term sustainable goals, which may influence the significance of the correlation between ESG and stock prices. Looking at figure 1 of the mean ESG rating, I noticed that the ESG ratings were lower during the pandemic. This suggests that companies may have prioritized other issues during this time. Additionally, I observed strong significance with respect to the financial variables, highlighting their impact on company profitability metrics. To conclude, the last time sample included more extreme and closely spaced

macroeconomic shocks than the first sample, which could explain the not statistically significant correlation between ESG and stock prices. In short, the correlation between ESG and stock prices depends on systematic risks.

The analysis does not support the hypothesis that the EU Taxonomy enhances the correlation between ESG factors and stock prices. The expected changes in the relationship between ESG scores and stock prices have not materialized significantly for the second period. This may be due to several factors, including the relatively short time considered in the analysis, the varying relevance of the Taxonomy to different sections, and the market's prior adaptation to long-term risk after other international agreements like the Paris Agreement. The full effects of the EU Taxonomy Regulation may take some time to materialize as stakeholders adapt to the new framework and integrate sustainability considerations into their investment strategies and decision-making processes.

To conclude, this thesis's findings suggest a mixed relationship between ESG factors and company profitability metrics, indicating difficulty in establishing a clear correlation. Moreover, the results imply that other factors beyond ESG considerations may substantially influence the relationship between ESG and company profitability metrics and that these other factors are correlated with the relationship effect of ESG on company profitability metrics. This highlights the complexity of the relationship between sustainability metrics and financial outcomes. Supporting the existing literature of mixed findings regarding ESG and company profitability metrics. (Friede et al., 2015)

6. FURTHER RESEARCH

The European Commission's Sustainable Finance Action Plan aims to redirect capital flows towards sustainable investments, mitigate financial risks associated with climate change and social issues, and promote transparency and long-term thinking in financial activities. (Systainalytics, 2023). Three key regulatory initiatives have been put in place to work towards these objectives. These include the Taxonomy, a classification system that sets criteria for economic activities aligned with a net-zero trajectory by 2050 (European Commission, 2023); the Sustainable Finance Disclosure Regulation, which will provide more information on how investment funds integrate sustainability risks and consider the main negative impacts of sustainability factors in their investments (Nordea, 2023); and the implementation of the Corporate Sustainable Reporting Directive, this directive strengthens rules governing the social and environmental information that companies must report, enhancing corporate transparency

and accountability. (European Commission, 2023). The timeline for achieving the goals outlined in the European Commission Sustainable Finance Action Plan can vary depending on the external circumstances. However, significant progress may be expected within the next decade as regulatory frameworks become more established, investor preferences shift towards sustainability, and new regulations are more integrated among stakeholders. Full realization of these goals may extend beyond a decade, depending on the pace of stakeholders adapting the Sustainable Action Plan. It would be relevant to reevaluate this thesis's research in 10 years once markets have adjusted to new regulations.

Furthermore, conducting research where a more sophisticated model is implemented would be interesting. As discussed in the thesis, regressions, including macroeconomic variables, that account for systematic risk could be interesting. Furthermore, dealing with the problems of endogeneity using instrument variables and the TSLS could improve the model.

An analysis of each industry would be relevant as the Taxonomy's relevance distinguishes between the different industries in terms of relevance due to the different activities that are considered to be a threat to the stakeholder. Industries with activities that pose a higher risk to stakeholders in terms of environmental or social impacts will likely face more significant effects from implementing the Taxonomy. They may need to adapt their activities more substantially to comply with the Taxonomy's criteria for sustainability. This could involve changes in processes, investments in cleaner technologies, or adjustments to business models to align with the Taxonomy's standards for sustainable economic activities. While some industries may experience more pronounced effects due to their inherently harmful activities, others may be less impacted by the Taxonomy's criteria, reflecting their relatively lower environmental or social risk profiles. (KPMG, 2023)

Sassen, Hinze, and Hardeck (2016) found a negative link between ESG scores and company risk in the European stock market, particularly in social and environmental aspects. On the other hand, some of the existing literature claims that introducing ESG screening will reduce the diversification possibilities of investors. However, literature also shows that ESG screening may not reduce diversification as companies with higher ESG scores tend to have significantly lower specific risks. (Hoepner, 2010). Further research would be interesting to see if the implementation of The European Commission's Action Plan on Sustainable Finance will be more apparent in the risk analysis than in this thesis analysis of company profitability metrics. By focusing on risk analysis, researchers could explore how integrating sustainability factors

influences risk assessment methodologies, risk management practices, and investment decision-making. Comparing the effects of risk analysis on company profitability metrics analysis could provide valuable insights into how sustainability considerations are incorporated into different dimensions of financial analysis and decision-making processes. It could also shed light on whether sustainability measures primarily influence risk perceptions or have broader implications for company profitability metrics.

The thesis has revealed some of the factors that influence the correlation between ESG and company profitability metrics. The key finding is that this relationship is intricate and is influenced by various internal and external factors. Further research should delve deeper into these mechanisms and track the correlation as the markets evolve over time.

7. CONCLUSION

The research focuses on the relationship between ESG, Environmental, Social, and Governance Scores and company profitability metrics. Furthermore, the thesis delves into the impact of the EU Taxonomy implementation on this relationship. The research sheds light on the evolving landscape of sustainable finance and the introduction of the EU Taxonomy by analyzing data from companies in the Nordic region over two different periods.

The results show a significant correlation between higher ESG scores and stock prices, higher Environmental Pillar scores and stock prices, and higher Governmental pillar scores and stock prices for companies in the Nordic region from 2002 until 2017, before the introduction of the Taxonomy. Implementing the EU Taxonomy did not significantly enhance this correlation in the second period analyzed. The findings indicate a complex and varied relationship between ESG factors and company profitability metrics. When evaluating the macroeconomic environment for two different periods, the findings show that external events can affect the ability to establish a significant correlation between ESG factors and company profitability metrics. During times of crisis, sustainable initiatives are often given lower priority. This highlights the need for further research to fully understand how ESG integration and financial markets interact. The research suggests that companies may prioritize short-term financial concerns over sustainability during crises, potentially affecting the correlation between ESG factors and company profitability metrics. In summary, the correlation between ESG factors and company profitability metrics may be influenced by systematic risks.

The thesis underscores the need for continued research and analysis to understand the full impact of sustainability initiatives on different industries and markets. ESG scores are often based on materiality assessments, meaning that the scores depend on what is considered relevant for different companies in terms of potential harm to stakeholders. Therefore, the factors determining the ESG scores vary significantly from company to company. Based on the regression analysis, the connection between ESG scores and company profitability metrics is affected by other factors. Moreover, the importance of doing well in ESG performance may vary depending on the industry, highlighting the necessity of taking a broader view when evaluating ESG's influence on company financial metrics. This indicates that the relationship may be more complex, and further research is needed to determine which aspects of ESG are most closely linked to company profitability metrics.

The lack of a significant increase in the correlation between ESG factors and company profitability following the implementation of the EU Taxonomy in the Nordic market can be attributed to several factors. Firstly, the short timeframe considered in the analysis may have limited the full effects of the Taxonomy from materializing. Secondly, the varying relevance of the framework across different sectors could have led to mixed results. Furthermore, as outlined in international agreements like the Paris Agreement, the market's prior adaptation to long-term sustainability risks may have already influenced the relationship between ESG factors and financial performance. Lastly, stakeholders are likely still in the process of adapting to the new regulatory framework, which may delay the integration of sustainability considerations into investment strategies and decision-making processes.

In conclusion, the thesis provides valuable insights into the ongoing dialogue on sustainable finance and the integration of ESG considerations into investment practices. It explores the implications of the EU Taxonomy. It contributes to the literature by researching the European Commission's Action Plan on Sustainable Finance, a new framework, and how the financial market has reacted to these regulations in the early stages.

7. APPENDIX

7.1 ROBUSTNESS TESTS. CURRENT RATIO IN PLACE FOR QUICK RATIO

Table 8. Independent variables on the Return on Assets for the years 2002-2023

Entire time sample				
Variables	(1) ROA	(2) ROA	(3) ROA	(4) ROA
ESG score	0,057 0,058			
Environmental Pillar		-0,0038 0,061		
Social Pillar			0,080 0,054	
Governance Pillar				0,015 0,024
Ln total assets	-1,346 1,346	-0,916 1,215	-1,485 1,357	-1,044 1,415
Leverage	-32,794***	-32,884***	-32,755***	-32,838
Return on equity	5,310 -0,0122 0,027	5,357 -0,011 0,026	5,280 -0,069 0,350	5,315 -0,011 0,027
Current ratio	-0,08 0,350	-0,105 0,350	-0,069 0,35	-0,099 0,347
Constant	29,957 21,674	26,464 20,052	30,791 21,815	27,35 22,395
Firm fixed effects	Yes	Yes	Yes	Yes
Observations	1065	1069	1069	1070
R-squared	0,012	0,0114	0,008	0,013
Adj. R-squared	0,085	0,082	0,087	0,083
Number of firms	274	275	275	275

This table reports the results of regression equation (2), (3), (4) and (5).
*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.
Robust standard errors are in parentheses.

Table 9. Independent variables on the Return on Assets for the years 2002-2017

Variables	(1) ROA	(2) ROA	(3) ROA	(4) ROA
ESG score	0,050 0,027			
Environmental Pillar		0,028 0,027		
Social Pillar			0,0144 1,359	
Governance Pillar				-0,019 0,024
Ln total assets	-6,07*** 1,598	-4,44** 1,66	-4,067** 1,35	-3,691** 1,166
Leverage	-27,937*** 3,723	-28,02*** 3,73	-28,455*** 3,771	-28,187*** 3,712
Return on equity	0,1 0,041	0,101* 0,04	0,102* 0,040	0,101* 0,04
Current ratio	0,539 0,984	0,578 0,99	0,501 0,982	0,511 0,98
Constant	112,752 27,084	86,128** 27,789	80,46*** 23,23	75,58*** 20,410
Firm fixed effects	Yes	Yes	Yes	Yes
Observations	692	704	704	707
R-squared	0,064	0,08	0,0852	0,067
Adj. R-squared	0,227	0,22	0,217	0,2177
Number of firms	74	75	75	78

This table reports the results of regression equation (2), (3), (4) and (5).
*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.
Robust standard errors are in parentheses.

Table 10. Independent variables on the Return on Assets for the years 2018-2023

Variables	(1) ROA	(2) ROA	(3) ROA	(4) ROA
ESG score	-0,004 0,003			
Environmental Pillar		-0,005 0,003		
Social Pillar			-0,0018 0,003	
Governance Pillar				-0,000 0,003
Ln total assets	-0,244 0,100	-0,29	-0,328 0,177 0,154	-0,283 0,139
Leverage		0,951 0,971	0,904 0,972	0,452 0,641
Return on equity		0,003 0,002	0,003 0,002	0,004 0,002
Current ratio		0,117 0,069		0,12 0,123 0,07 0,070
Constant	3,995 1,489	4,201 2,69		4,67 3,994 2,427 2,26
Firm fixed effects	Yes	Yes	Yes	Yes
Observations	1515	984	984	985
R-squared	0,0076	0,006	0,0068	0,002
Adj. R-squared	0,011	0,046	0,044	0,042
Number of firms	360	237	237	237

This table reports the results of regression equation (2), (3), (4) and (5).

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels .

Robust standard errors are in parentheses.

Table 11. Independent variables on the Holding Period Returns for the years 2002-2023

Variables	(1) HPR	(2) HRP	(3) HPR	(4) HPR
ESG score	0,002 0,001			
Environmental Pillar		0,002 0,001		
Social Pillar			0,001 0,001	
Governance Pillar				0,001 0,001
Ln total assets	-0,146* 0,073	-0,170* 0,084	-0,161 0,087	-0,124* 0,058
Leverage	-0,25 0,345	-0,031 0,500	-0,051 0,495	-0,268 0,353
Return on equity	0,003* 0,001	0,002 0,001	0,002 0,001	0,003* 0,001
Current ratio	0,069 0,036	0,070 0,036	0,067 0,036	0,068 0,037
Constant	2,091 1,141	2,457 1,128	2,31 1,31	1,792 0,945
Firm fixed effects	Yes	Yes	Yes	Yes
Observations	1564	1579	1579	1580
R-squared	0,009		0,003 0,003	0,000
Adj. R-squared	0,025	0,022	0,022	0,024
Number of firms	243	244	244	244

This table reports the results of regression equation (2), (3), (4) and (5).

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels .

Robust standard errors are in parentheses.

Table 12. Independent variables on the Holding Period Returns for the years 2002-2017

Variables	(1) HPR	(2) HRP	(3) HPR	(4) HPR
ESG score	0,003 0,002			
Environmental Pillar		0,002 0,001		
Social Pillar			0,001 0,001	
Governance Pillar				0,003* 0,001
Ln total assets	-0,144 0,095	-0,132 0,086	-0,088 0,101	-0,09 0,06
Leverage		-1,283** 0,378	-1,334*** 0,384	-1,43 0,362
Return on equity		0,001 0,001	0,001 0,001	0,001 0,001
Current ratio		0,027 0,028	0,021 0,028	0,02 +,028
Constant	2,508 1,487	2,34 1,36	1,679 1,582	1,756 0,971
Firm fixed effects	Yes	Yes	Yes	Yes
Observations	585	595	595	595
R-squared	0,003	0,003	0,005	0,003
Adj. R-squared	0,056	0,053	0,49	0,056
Number of firms	61	62	62	62

This table reports the results of regression equation (2), (3), (4) and (5).
*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.
Robust standard errors are in parentheses.

Table 13. Independent variables on the Holding Period Returns for the years 2018-2023

Variables	(1) HPR	(2) HRP	(3) HPR	(4) HPR
ESG score	-0,497 0,599			
Environmental Pillar		-2,528 2,196		
Social Pillar			-1,636 1,48	
Governance Pillar				1,082 0,965
Ln total assets	-124,64 111,13	-103,567 90,067	-117,713 103,854	-134,49 118,68
Leverage	-9,46 40,52	5,064 5,064	-0,860 39,413	-12,27 44,44
Return on equity	-0,122 0,162	-0,0496 0,144	-0,151 0,180	-0,098 0,152
Current ratio	1,841 2,701	0,370 2,295	1,304 2,562	2,195 2,957
Constant	1978,53 1766,07	1729 1504	1933 1707,47	2047 1811,235
Firm fixed effects		Yes	Yes	Yes
Observations		932	932	933
R-squared		0,0016	0,001	0,0016
Adj. R-squared		0,145	0,128	0,126
Number of firms		244	244	244

This table reports the results of regression equation (2), (3), (4) and (5).
*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.
Robust standard errors are in parentheses.

7.2 RETURN ON ASSETS 2002-2017

Table 14. Independent variables on the Return on Assets for the years 2002-2017

Variables	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA	(6) ROA	(7) ROA	(8) ROA	(9) ROA	(10) ROA	(11) ROA	(12) ROA
ESG score	-0,029 0,018	-0,022 0,018	-0,0065 0,0187									
Environmental Pillar				-0,0125 0,013	-0,009 0,013	0,004 0,015						
Social Pillar							-0,022 0,017	-0,022 0,017	-0,009 0,015			
Governance Pillar										-0,023 0,018	-0,018 0,017	-0,113 0,017
Ln total assets	-0,029** 0,018	-2,321** 0,692	-2,22** 0,751	-2,25** 0,673	-2,362*** 0,613	-2,389 0,797	-2,17*** 0,640	-2,227*** 0,557	-2,170** 0,687	-1,955***	-2,022** 0,65	-2,225** 0,718
Leverage		-16,975** 5,59	-28,11*** 3,84		-17,052** 5,646	-28,287 3,852		-17,112** 5,568	-28,150*** 3,867		-16,99** 5,56	-28,052*** 3,7794
Return on equity			0,103** 0,035						0,102** 0,035			0,103** 0,035
Quick ratio			0,486 0,939						0,500 0,934			0,487 0,932
Constant	45,196*** 12,744	51,78 11,595	48,554*** 12,382	45,777*** 11,255	51,72*** 10,313	50,629 13,089	44,857 10,798	50,156** 9,573	47,737*** 11,610	41,176*** 11,590	46,39*** 10,77	48,692*** 12,110
Firm fixed effects	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1323	1312	1048		1326	1060	1337	1326	1060	1340	1329	1060
R-squared	0,0177	0,027	0,0772		0,027	0,072	0,016	0,0258	0,076	0,014	0,023	0,078
Adj. R-squared	0,028	0,090	0,1905		0,090	0,191	0,03	0,092	0,191	0,023	0,084	0,191
Number of firms	150	145	122		147	124	152	147	124	154	149	124

This table reports the results of regression equation (6), (7), (8) and (9).

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Robust standard errors are in parentheses.

7.3 RETURN ON ASSETS 2018-2023

Table 15. Independent variables on the Return on Assets for the years 2018-2023

Variables	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA	(6) ROA	(7) ROA	(8) ROA	(9) ROA	(10) ROA	(11) ROA	(12) ROA
ESG score	0,037 0,042	0,04 0,0410	0,044 0,047									
Environmental Pillar				-0,027 0,043	-0,244 0,043	-0,003 0,052						
Social Pillar							0,070 0,037	0,072 0,037	0,0718 0,043			
Governance Pillar										0,018 0,019	0,021 0,01	0,005 0,022
Ln total assets	-2,802* 1,153	-2,877** 1,103	-1,999 1,385	-2,340* 1,082	-2,401* 1,043	-1,643 1,275	-2,901** 1,09	-2,955*** 1,047	-2,10 1,32	-2,694* 1,171	-2,75* 1,13	-1,708 1,42
Leverage		-4,267 3,143	2,602 5,038		-3,8215 3,107	2,77 5,072		-4,195 3,167	2,77 5,013		-4,204 3,147	2,66 5,076
Return on equity			0,009 0,028		0,009 0,278	0,009 0,222		0,008 0,262	0,008 0,262		0,009 0,232	0,009 0,232
Quick ratio			0,367		0,367	0,367		0,370	0,370		0,365	0,365
Constant	46,820** 17,906	48,862** 3,148	31,77 21,052	42,77* 17,115	44,58** 16,680	28,908 19,944	46,49** 17,556	48,29** 16,992	31,72 20,69	46,099* 18,189	48,02** 17,760	29,37 21,64
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1696	1696	1430	1701	1701	1435	1701	1701	1435	1702	1702	1436
R-squared	0,022	0,022	0,0347	0,028	0,029	0,0377	0,0145	0,015	0,0103	0,0268	0,0276	0,038
Adj. R-squared	0,0113	0,0129	0,0038	0,0113	0,0125	0,002	0,0144	0,016	0,006	0,011	0,012	0,002
Number of firms	396	396	336	397	397	337	397	397	337	397	397	337

This table reports the results of regression equation (6), (7), (8) and (9).

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Robust standard errors are in parentheses.

7.4 VARIABLE DESCRIPTIONS AND SOURCE.

<i>Dependent and Independent Variables downloaded from Refinitiv Datastream</i>			
TRESGS	ESG Score	Refinitiv's ESG Score is an overall company score based on the self-reported information in the environmental, social and corporate governance pillar.	Datastream
CGVSDP041	ESG Reporting Scope	The natural logarithm of scope 2 emissions	Datastream
ENSCORE	Environmental Controversies	Is the company under the spotlight of the media because of a controversy linked to the Environmental impact of its operations on natural resources or local communities	Datastream
SOSCORE	Social Pillar Score	Weighted average relative rating of a company based on the reported social information and the resulting four social categories.	Datastream
CGSCORE	Governance Pillar Score	Weighted Average relative rating of a company based on a company on the reported governance information and the resulting three governance category scores.	Datastream
WC03351	Total Liabilities	Represents all short and long term obligations expected to be satisfied by the company.	Datastream
WC03101	Current Liabilities Total	Represents debt or other obligations that the company expects to satisfy within one year	Datastream
WC03255	Total Debt	Represents all interest bearing and capitalized lease obligations. It is the sum of long and short term obligations.	Datastream
WC07250	Net Income (U.S\$)		
WC03999	Total Liabilities & Shareholders Equity	Represents the sum of Preferred Stock and Common Shareholders' Equity	Datastream
WC03995	Total Shareholders Equity	Represents the sum of total liabilities, minority interests, non – equity reserves, preferred stock and common equity.	Datastream
WC08326	Return on assets	Profitability Ratio, Annual and Intern Item	Datastream

WC15567	Return on earning assets	Profitability Ratio, Annual Item Banks: Net Income – Bottom Line / Avrage of Last Year’s and Current Years (Investments – Total + Last Year’s Loans-Net) * 100	Datastream
WC08301	Return on Equity %	Profitability Ratio, Annual & Interim Item All Industries: (Net Income – Bottom Line – Preffered Dividend Requierment) / Avrage of Last Year’s and Current Year’s Common Equity * 100	Datastream
WC08376	Return On Invested Capital	Profitability Ratio, Annual Item All Industreis: (Net Income – Bottom Line + ((Interest Expense on Debt – Interest Capitalized) * (1-Tax rate))) / Average of Last Year’s and Current Years (Total Capital + Shot Term Debt & Current Portion of Long Term Debt) * 100	Datastream
WC08231	Total Debt % Common Equity	Levrage Ratio, Annual & Interim Item All Industries: (Long Term Debt + Short Term Debt & Current Portion of Long Term Debt) / Common Equity * 100	Datastream
WC08221	Total Debt % Total Capital	Levrage Ratio, Annual Item All Industries: (Long Term Debt + Short Term Debt & Current Portion of Long Term Debt) / Total Capital + Short Term Debt & Current Portion of Long Term Debt) * 100	Datastream
WC08106	Current ratio	Liquidity Ratio, Annual & Interim Item Idustrials: Current Assets- Total / Current Liabilities-Total	Datastream
WC08101	Quick Ratio	Liquidity Ratio, Annual Item Industrials, Other Financial Companies: (Cash & Equivalent + Receivables (Net)) / Current Liabilites-Total	Datastream
	Total Assets	Represents the sum of total current assets Avrage traded Price for bonds	

WC02999				Datastream
	Price – Trade		A return index (RI) is available for individual equities and unit trusts.	
P			Theoretical growth in value of share holding over a specific period, assuming that dividends are reinvested to purchase additional units of an equity or unit trust at the closing price applicable on the ex – dividend date.	Datastream
	Total Return Index			
RI				Datastream
			Descriptive Data. Represents the company's general industry classification. It is defined as follows:	
	General Industry Classification		01 Industrial 02 Utility 03 Transportation 04 Bank/ Savings & Loan 05 Insurance 06 Other Financial	
WC06010				Datastream

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- 32.) The analysis presented in this thesis was partially assisted by OpenAI's GPT-4, which provided initial data synthesis and interpretation. All final analyses and conclusions were performed by the author.