THE EFFECT OF ESG PERFORMANCE ON FINANCIAL PERFORMANCE IN THE INDUSTRIAL SECTOR

Evidence from Nordic countries

Lappeenranta–Lahti University of Technology LUT

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ABSTRACT

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The effect of ESG performance on financial performance in the industrial sector

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The purpose of this thesis is to study the impact of environmental, social, and governance (ESG) factors on the financial performance of companies in the industrial sector of Nordic countries over a seven-year period from 2016 to 2022. In addition, the aim is to find out how the portfolios with low and high ESG performance compare to each other.

Two portfolios were created for the study based on ESG scoring. The performance of the low and high ESG portfolios was analyzed and compared to each other and to the selected benchmark index. The OMX Nordic 40 Index was used as a benchmark index in the study. The empirical part of the thesis is quantitative in nature and the data was conducted from the Refinitiv database and Yahoo Finance. Total Return, Revenue Growth Rate, Return on Equity, Sharpe Ratio, and Jensen's alpha were used in the comparison of the portfolios.

According to the results, no clear connection between ESG performance and financial performance was found over the time period 2016-2022 in Nordic countries. The results in comparison of low and high ESG portfolios using Total Return, Revenue Growth Rate, and Return on Equity were mixed. However, it was noted that both portfolios outperformed the benchmark index and the low ESG portfolio mostly outperformed the high ESG portfolio.

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Tämän kandidaatintutkielman tarkoituksena on tutkia ympäristö-, sosiaali- ja hallintotekijöiden (ESG) vaikutusta teollisuuden yritysten taloudelliseen tulokseen Pohjoismaissa seitsemän vuoden ajanjaksolla 2016–2022. Lisäksi tavoitteena on saada selville miten alhaisen ja korkean ESG-suorituskyvyn omaavat portfoliot suoriutuvat toisiinsa verrattuna.

Tutkimusta varten luotiin kaksi portfoliota ESG-pisteytysten perusteella. Matalan ja korkean ESG-portfolioiden kehitystä analysoitiin ja verrattiin toisiinsa sekä valittuun vertailuindeksiin. Vertailuindeksinä tutkimuksessa käytettiin OMX Nordic 40 -indeksiä. Tutkielman empiirinen osa suoritetaan kvantitatiivisella tutkimusmenetelmällä ja tutkimuksen aineisto on kerätty Refinitiv-tietokannasta ja Yahoo Financesta. Portfolioiden vertailussa käytettiin kokonaistuottoa, liikevaihdonkasvuprosenttia, oman pääoman tuottoa, Sharpen lukua sekä Jensenin alfaa.

Tulosten mukaan pohjoismaisissa teollisuussektorin yrityksissä ei havaittu selkeää yhteyttä ESG-suorituskyvyn ja taloudellisen tuloksen välillä vuosina 2016–2022. Tulokset matalan ja korkean ESG-portfolioiden vertailussa kokonaistuoton, liikevaihdonkasvuprosentin ja oman pääoman tuoton perusteella vaihtelivat. Tuloksista huomattiin, että molemmat portfoliot tuottivat vertailuindeksiä paremmin ja matala ESG-portfolio menestyi enimmäkseen paremmin kuin korkea ESG-portfolio.

ABBREVIATIONS

Abbreviations

CFP	Corporate financial performance
CSR	Corporate social responsibility
ESG	Environmental, social, governance
GSIA	Global sustainable investment alliance

Table of contents

Appendices

Figures

Tables

1 Introduction

Since the beginning of the 1970s, there has been continuous research done on sustainable investing and later on the relationship between environmental, social, and governance (ESG) criteria and corporate financial performance (CFP), with partially mixed results. However, in 2015, Friede, Busch, and Bassen stated that roughly 90 percent of the studies found a nonnegative relation between the factors and a large majority of the findings were positive. In recent years, the development of sustainability and corporate social responsibility has only intensified, and companies, regardless of their industry and size, have started to consider the issues in their business models and strategies. Companies have noted that success is not only dependent on financial performance but also on how various stakeholders see the company's operations affecting nature and the social environment (Sheehy & Farneti, 2021).

ESG stands for non-financial factors, environmental, social, and governance, which investors have increasingly used to identify opportunities for growth in the market. The ESG framework describes the company's ability to manage risks and opportunities related to sustainable issues. Companies can directly benefit from good ESG performance, for example, by getting a strong positive impact on their brand and reputation, which creates added value for the company. Better success in ESG performance is beneficial not only for companies and shareholders by increased value but also for the entire society in which the company operates. (Hill, 2020)

Although corporate responsibility and sustainability is generally perceived as positive matter, it has always divided the opinions of researchers and investors as part of investing. Sustainable investing as an investment strategy can be seen as a great opportunity to achieve excess returns while supporting companies whose business is in line with the values of responsibility. On the other hand, some investors and researchers see that when implementing a sustainable investing strategy, the investors must give up potential excess profits. (Silvola & Landau, 2021)

Moskowitz (1972) was one of the first researchers to present the idea that investing in responsible stocks can be more profitable than other stock investments. Since then, many studies have supported the idea of the relationship between ESG and corporate financial performance. Kempf and Osthoff (2007) affirmed the idea that responsible investing leads to excess returns by comparing portfolios, and the idea was further supported by Setyahuni and Hnadayani in 2020. However, Renneboog, Ter Horst, and Zhang (2008) stated that the sustainable portfolio performed worse than the market portfolio. This suggests that sustainable investing cannot achieve excess returns, but rather, is a way to support the sustainable development of society.

This thesis focuses on studying the impact of sustainability on the financial performance of Nordic industrial companies in the years 2016-2022. Limiting the research to Nordic-listed companies enables providing a better understanding of the less researched stock exchanges, as previous research has largely focused on the United States. The limitation to the industrial sector also brings a new, less researched perspective to the topic, as much research has not considered sectors.

Although responsible investing as a topic overall has already been studied for many years, new research is still needed due to its relevance and continuous development. Through the findings of future research, companies can better understand their stakeholders, such as investors, and thus develop their business in a more profitable direction, aiming for the best possible success. Mixed results from previous literature on the topic provide motivation to study the relationship between ESG and corporate financial performance further and it underlines the relevance of the study. Hence, the motivation for this study is to provide more information on the relationship between sustainability and corporate financial performance. The aim of the thesis is also to deepen research and knowledge about the importance of sustainable development for the industrial sector.

1.1 Research objectives and limitations

This thesis studies the impact of ESG performance on the financial success and riskiness of industrial companies in Nordic countries. As mentioned earlier, the purpose of this study is to complement previous studies on sustainable investing. Since the results of previous research have been mixed, this thesis is conducted to support the previous findings regarding the quality of the relationship between ESG and corporate financial performance. In addition, the goal is to give industrial companies insights into how sustainability and responsibility have affected their financial performance and success over the research period.

Since a majority of the previous studies on responsible investing have found a positive relationship between ESG and financial success, the initial assumption of this thesis is also that a positive relationship will be found between the factors in the Nordic industrial sector. This assumption is investigated with one main research question and two sub-questions.

The main research question of the study is:

- *How does ESG performance affect the financial performance of industrial companies in Nordic countries?*

To support the main research question, two additional sub-questions are formulated as follows:

- *How did portfolios with high and low ESG scores compare to each other?*
- *Did the high ESG portfolio perform better than the low ESG portfolio in risk-adjusted metrics?*

The research questions of the thesis are studied by forming two portfolios based on ESG scoring. The first portfolio consists of shares of companies with high ESG scores, and the second portfolio consists of low scores. The success of the portfolios is compared using five different metrics. The first three metrics are Total Return, Revenue Growth Rate, and Return on Equity. In addition, the study uses two risk-adjusted metrics, Sharpe Ratio and Jensen's Alpha, to deepen the analysis. Data for financial metrics and ESG values have been collected from the Refinitiv database and Yahoo Finance.

In addition to the research objectives and implementation, its limitations must also be acknowledged. This study is mainly limited by the data availability. There was a limited amount of historical ESG data available, which is why some companies were excluded from the study. Therefore, the main limitation is a fairly limited sample size. Also, ESG scores may vary depending on which database the scores are collected from, as there are various calculation methodologies. The lack of historical ESG data limited the time span of the study to a 7-year period. If the results will be generalized, it should be noted that the used data describes the performance of companies in the time period from 2016 to 2022. In addition, the study is limited to the industrial sector in Nordic countries and selected financial performance metrics, and therefore the results of this study cannot be generalized to all industries and countries.

1.2 Structure of the thesis

This thesis consists of four more sections as follows: theoretical framework, methodology and data, results, and final conclusions.

The second chapter of this thesis begins to create a theoretical framework around the research topic. The topic is introduced in more detail by presenting descriptions of the key concepts and terminology. To elaborate on the focus of the study, sustainable investing and ESG as a concept are explained further. The main strategies of sustainable investing are described, forming a clear picture of the phenomenon under study. In addition, a literature review of previous studies presents the findings of existing studies aiming to gain an understanding of the existing research, provide an overview of the topic, and possibly identify gaps in current knowledge.

Chapter three continues to form the theoretical framework by presenting the methodology of the study. The financial performance measurements used in the study and the formation of portfolios are presented. In addition, the ESG data used in this study are reviewed.

Finally, chapters four and five present and analyze the results of the study, which have been obtained during the research process. The key research findings are summarized to answer the research questions. In addition to summarizing the key research findings, chapter five provides recommendations for future research.

2 Sustainable investing

To study sustainable investing in more detail, it is essential to define the terms formed around it so that a full understanding of the matter can be gained. Sustainable investing as a concept includes two independent terms. Investing refers to an activity that aims to make a profit by trading and holding assets or financial instruments that contains a certain amount of risk of losing capital partially or completely. (Hyrske, Lönnroth, Savilaakso & Sievänen, 2020)

Sustainability, on the other hand, is a normative notion about how people are responsible for acting towards nature in such a way that it stays sufficient also for future generations (Baumgärtner & Quaas, 2010). It is a megatrend, the development of which many consumers, companies, politicians, and international non-profit organizations have joined in recent years. When investors have also started to commit to responsibility through sustainable investment strategies, questions have arisen as to whether investing in sustainability is profitable or not. (Silvola & Landau, 2021)

A sustainable investing strategy, like other investing strategies, aims for potential excess returns and competitiveness. However, the strategy also has other important goals for many investors. Its goal is often to achieve positive impacts on society through responsible companies. In addition, the strategy aims to help investors manage risks related to climate change and other environmental problems. Also, the risks of financial scandals and corporate misconduct can be reduced using the sustainable investing strategy. Altogether, sustainable investing can generate potential returns while managing risks and aligning investments with social and environmental values. (Silvola & Landau, 2021)

When it comes to sustainable investing, investment decisions are based on information that considers ESG factors, i.e. the company's performance regarding environmental, social, and governance factors (Silvola & Landau, 2021). By taking ESG factors into account, the aim is to seek good long-term returns and low risk, while bearing responsibility for the returns. There are many investment styles that take ESG factors into consideration, with which investors can seek, for example, profits, risk management, social acceptance, better knowledge of the investment targets, and good long-term investment returns. Ethical investing, philanthropic investing, impact investing, socially responsible investing, and transitional investing are examples of such investment styles that consider a company's performance in environmental, social, and governance factors. (Hyrske et al., 2020) For clarity, this thesis mainly uses the term sustainable investing, referring generally to all investment styles where the traditional way of investing has evolved to consider ESG factors when making investment decisions.

2.1 History of sustainable investing

The history of sustainable investing dates back to the 1970s, when the first socially screened investment instruments were established. Shortly after that, in the late 1970s and early 1980s, corporate social responsibility reporting was developed, through which for the first time attention was paid to the company's compliance with environmental management. In this case, however, environmental factors were not connected to corporate performance as the factors were seen as separate and without connection. (Ruggie & Middleton, 2019; Siew, 2015)

The environmental disasters of the 1980s, such as the Chernobyl nuclear power plant accident and the Exxon Valdez oil spill, made shareholders active, and finally, in the early 1990s, social investors began to practice positive screening to set new standards for companies' commitment to social and environmental awareness. (Puaschunder, 2019) During the 1990s, corporate sustainable reporting also developed when the review of occupational safety and communicational-based activities was added to it. Hence, three main pillars of sustainability began to form: economy, social, and environment. The development of reporting and the emergence of social and environmental issues led to the establishment of the first research companies. These companies began to provide the investment community with data on the companies' social and environmental performance, and soon different rating scales began to develop. Although social and environmental issues started to be considered by companies using different tools, the responsibility of companies for human rights issues was still not generally recognized. (Siew, 2015; Ruggie & Middleton, 2019)

In 2010, real-time data providers started providing ESG data for the first time, and by 2016 ESG information and scores were already provided to the investment community by more than 100 rating and ranking providers. Today, ESG data is provided by a large number of public and private companies, for-profit companies, and non-profit institutions. Global companies recognize corporate responsibility in environmental, social, and governance aspects with acceleration, and sustainable investing has developed into an important and popular strategy. (Amel-Zadeh & Serafeim, 2017; Ruggie & Middleton, 2019)

2.2 Strategies of sustainable investing

In addition to numerous terms related to sustainable investing that consider ESG factors, there are also plenty of sustainable investing strategies. The strategies differ from each other in their return-risk profiles, methods, and goals, among other things. Investors choose the most suitable approach according to their own strategy, resources, and principles, and sometimes investors use several strategies at the same time. (Finsif, 2022)

Over the years, numerous strategies have been narrowed down to broader strategy groups based on their similarities. According to the Global Sustainable Investment Alliance (2020), three of the strategies have clearly become the most popular in recent years: ESG integration, negative and exclusionary screening, and corporate engagement and shareholder action. ESG integration especially has grown significantly over the past few years and has overtaken other strategies in their popularity and use (GSIA, 2020). Next, these sustainable investment strategies are introduced in more detail.

2.2.1 Screening

Screening as a sustainable investing strategy is one of the first sustainable investing strategies and can be of two types: negative screening or positive screening. Negative screening is known as one of the most traditional strategies and its main idea is to exclude certain investments due to different reasons such as a sector, country, or company, which are not perceived as investable. Investors make decisions based on their values and norms and the exclusion criteria can be, for example, norm violation, unethical company practices or products. (GSIA, 2020)

In negative screening, the investment process starts with the investor excluding activities that they do not want to finance with investments. After that, the investment targets that have connections to the excluded activity are defined and finally, these investment targets are excluded from the group of potential investments. Thus, the excluded activity is avoided. (Hyrske et al., 2020)

Positive (or best-in-class) screening is when an investor invests in companies that have been selected based on good ESG performance. ESG success can be defined, for example, in relation to other companies in the industry or according to a defined threshold value. (GSIA, 2020) In this investing strategy, the ESG scores of the companies are better than other companies' scores in either a certain area or in all of them. The investor can make their choice based on, for example, indices, analyzes by ESG research organizations, or their own evaluations (Finsif, 2022). As with other sustainable investing strategies, both screening strategies, negative and positive, can be used at the same time even though they are the opposites of each other (Hyrske et al., 2020).

2.2.2 Active ownership

Active ownership is a sustainable investing approach, which refers to the relationship between the owner of the investment and the company's management. In this approach, the investor actively uses their right to influence the management of the company through various tactics and actions, such as dialogue and influencing processes. Thus, the investor tries to communicate the sustainability goals to the company's management and actively follow the development of ESG goals and their accomplishment. Sometimes the dialogue also involves addressing the company's grievances and cooperating with other investors to strengthen effectiveness. (Finsif, 2022; Hyrske et al., 2020)

Hyrske et al. (2020) have divided influencing processes into proactive and reactive operations. Operation is defined as reactive when the actions are triggered by a certain incident, that attracts the investor's attention. Proactive actions, on the other hand, usually originate from the investor's own values and perspectives as well as megatrends. (Hyrske et al., 2020)

Through the influencing processes, the investor aims to get more information about topics related to responsibility and the company's operations, with the main goal of improving them. In addition to promoting more sustainable business operations, the investor's goal is often also to ensure good long-term investment returns and influence industry standards and practices. Active ownership as a sustainable investing strategy is typically popular with large institutional investors because they can gain a lot of influence as the company's largest owners. (Finsif, 2022; Hyrske et al., 2020)

2.2.3 ESG integration

ESG integration is the largest and most common sustainable investing strategy in which investors systematically include environmental, social, and governance factors in the analysis when making an investment decision Along with financial matters, ESG factors are analyzed more and more since ESG factors are expected to influence the return-risk profile of the investment in the long term. (Finsif, 2022; GSIA, 2020) ESG integration can be implemented at the macro level, within the industry, or on a company-by-company basis. The chosen level depends on the level at which the corporate responsibility analysis is to be carried out. The goal of the strategy is to analyze ESG factors to identify companies and investment targets that make a positive impact on society and the environment while creating competitive financial returns. (Hyrske et al., 2020)

When the analysis is done on a macro level, several countries and industries are included based on selected megatrends. The analysis can also be dope per industry, in which case the effect of, for example, legislation is considered, as they affect all companies in the industry in a similar way. In the analysis of a certain company alone, the analysis is usually based on discounted cash flow, and company-specific financial values are analyzed through ESG factors. (Hyrske et al., 2020) In the macro, industry, and company level analysis, the goals are to find opportunities in the market and to improve long-term financial outcomes (Finsif, 2022).

2.3 Measuring sustainability and ESG scoring

Since investors are increasingly making their investment decisions based on the sustainability and responsibility of companies, it is essential to know how to get truthful information about the stage of sustainability and how it can be measured. Companies worldwide have developed sustainability reporting and its tools over the past two decades, as various stakeholders more often demand great transparency regarding company's environmental and social issues. (Siew, 2015) However, as corporate sustainability reporting has become more common, new problems such as 'greenwashing' have emerged, making it increasingly difficult for stakeholders to get a true picture of the state of company's sustainability. According to Peterdy (2022), greenwashing refers to making misleading, false and incomplete claims about the sustainability of a business operation. The claims are often given intentionally aiming to get positive marketing efforts. To avoid the perception of greenwashing, companies can use global and well-reputed reporting tools to present frameworks, standards and ratings, in which case the information related to ESG factors presented by the company is as comparable and standardized as possible. (Peterdy, 2022; Siew, 2015)

Siew (2015) divides corporate sustainability reporting into three categories: frameworks, standards and ratings and indices. Frameworks and standards have a similar function in assisting companies in sustainability reporting by providing principles and guidelines that companies can use to provide transparency to their stakeholders. Standards, however, are often in the form of more formal documentation containing more precise requirements and characteristics that companies can use to ensure the systematic pursuit of sustainable goals. The third category, ratings and indices, are evaluation of corporate's sustainability provided by third parties. (Siew, 2015) Such evaluations are, for example, ESG scores, which are used in this thesis as a measure of sustainability.

A company is measured and evaluated according to each ESG factor, to obtain an ESG score. The environmental factor considers, for example, environmental programs, energy efficiency, emissions, waste, and climate change (Silvola & Landau, 2021). Analysis of social responsibility includes human rights, product liability, and labor rights, while the governance factor usually adds managerial components, institutional responsibility, and decision-making components to the analysis (Silvola & Landau, 2021; Ali-Toudert & Ji, 2017). Even though ESG scoring is a popular tool in sustainable investing, it also has its own risks which should be considered when using the scores in the investment analysis. The risks of ESG scoring include its possible decrease from the value on the basis of which the investment decision was made. ESG risk is therefore defined by the average changes in the ESG score over a certain time period, and for this reason it is important to follow the development of the score over a longer period of time when analyzing a potential investment target. (Dorfleitner, Halbritter & Nguyen, 2015)

There are many providers and databases that offer companies' ESG scores, and comparison is made difficult by the fact that there is not only one way to create the score. Therefore, different parties create scores with different criteria and weightings. Even though there is not a unified and standardized method to measure corporate sustainability, investors and companies can use certain industry-standard tools (Montiel & Delgado-Ceballos, 2014). As a method to measure corporate sustainability, this thesis uses ESG scores from the Refinitiv database. The ESG scores from the Refinitiv are based on company-reported data on various themes with different category weights as shown in Table 1. Category weights vary per industry, except for governance factor, whose weights remain the same regardless of industry. (Refinitiv, 2022) Table 1 summarizes the weightings of the diversified industrial good industry, based on which Refinitiv database has created ESG scores for the companies belonging to the group. This division is the closest to the sector of the industrial companies selected for the study of this thesis.

Factor	Category	Weighting in scoring
Environmental	Emission	21
	Resource use	29
	Innovation	50
Social	Workforce	29
	Community	24
	Product Responsibility	5
	Human rights	43
Governance	Management	67
	Shareholders	20
	CSR strategy	13
Total		301

Table 1: Refinitiv ESG scoring weightings for Diversified Industrial Goods industry (Refinitiv, 2022)

This thesis uses Refinitiv's overall ESG scores without separating the scores between their three different dimensions. Refinitiv ranks the ESG scores in four different quartiles. The first quartile includes scores that indicate weak ESG performance and transparency in ESG reporting. The second quartile, in which the low ESG portfolio of this study is ranked, includes scores with satisfactory ESG performance and a moderate level of transparency in ESG reporting. The third quartile indicates a good level of ESG performance and better than average transparency in ESG reporting. The high ESG portfolio of this study is ranked in the fourth quartile, whose score means excellent ESG performance and transparency. (Refinitiv, 2023)

2.4 Review of previous research

Research into sustainable investing goes back many years to when corporate responsibility started to be considered in the investment decision process. Various literature reviews have been conducted related to the topic, where research has focused on the concept and phenomenon of sustainable investing. When a connection between sustainability and corporate financial performance was found, the research expanded strongly on the success of the investment strategy. Although majority of research has found that sustainable investing has a positive effect on corporate financial metrics, the results have been partly mixed (Whelan et al., 2021). In this section, studies on the success of a sustainable investing strategy are presented in more detail.

2.4.1 Positive results

Positive results between sustainable investing and corporate financial performance have been a popular assumption and topic of conversation in the scientific debate for years. Whelan et al. (2021) reported that a positive relationship can be found between ESG and financial performance in 58 percent of corporate studies that focused on operational metrics. Thus, it has been found that over the long term, companies and investment targets with higher ESG rating overcome their peers. A positive effect was also found in the review of 59 studies on the connection of climate change or low carbon to financial performance. (Whelan et al., 2021)

Kempf and Osthoff (2007) studied the effect of sustainable investing on portfolio success focusing for social responsibility. The study was conducted by investing in responsible stocks for 12 years using different sustainable investing strategies such as positive screening. Negative screening was also used when stocks with low sustainability were avoided. The results of the study showed that with positive screening it was possible to achieve the best returns compared to other sustainable investing strategies. Evidence was found that the sustainability of portfolio has a positive effect on returns. (Kempf & Osthoff, 2007)

Later in 2015, Friede et al. noted in their analysis that several different studies found positive results between ESG and financial performance. The analysis focused on more than 2,000 studies that ranged from the 1970s to the 2010s. (Friede et al., 2015) Silvola and Landau (2019) also more recently stated that responsible investing produces better returns in the long term when the risk is also lower. A study by Dai (2021) found evidence that sustainable investing can increase the risk-adjusted returns of the portfolio and thus beat the market in China. This result further supported the idea that Silvola and Landau stated in 2019.

Zhou and Zhou (2021) studied the effect of ESG performance on the stock price and its volatility during the COVID-19 pandemic. According to the results of the study, companies with good ESG performance are better able to recover from shocks faced by the market, such as the COVID-19 pandemic. Corporate responsibility therefore reduces stock price volatility. The stock prices of companies with good ESG performance were found to stabilize sooner after the shock. (Zhou & Zhou, 2021)

Sun and Small (2022) also studied whether the sustainable investing had an impact on returns and risks during COVID-19 pandemic. The research focused on 244 Australian exchange traded funds. The results showed that the portfolios with a low environmental risk tend to outperform their peers. On the other hand, portfolios with high carbon, governance, and environmental risk were found to have higher volatility and can be seen as riskier investment targets for investors. (Sun & Small, 2022) Therefore, it can be said based on this research, that sustainable investing can lead to a better return-risk profile.

2.4.2 Negative or mixed results

Although, Friede et al. (2015) state that a large majority of the studies report that the findings about the relationship between ESG performance and corporate financial performance are positive, mixed and negative results have also been obtained. Bauer, Koedijk and Otten (2005), for example, were unable to prove the success of ethical investment strategy as they studied the performance of 103 ethical funds gathered in the United States, Germany, and the United Kingdom over an 11-year period from 1990 to 2001. No evidence was found for the excess returns of ethical funds when compared to alternative funds. (Bauer et al., 2005)

Seven years later, Fulton, Kahn and Sharples (2012) studied the long-term performance of a responsible investment strategy. The study was conducted for Deutsche Bank, and it examined the results of ten academic studies comparing the performance of responsible and non-responsible funds. Again, in this study, no clear answer was obtained about the success of responsible investments, as half of the data received a neutral result, and the rest of the results were either positive or negative. (Fulton et al., 2012)

A more recent study examined whether socially responsible stock selections strengthen or weaken the performance of portfolios. In the research, Auer (2016) studied the European market for an 8-year period from 2004 to 2012. The study also included all ESG factors in the formation of portfolios, and thus it was found that by emphasizing governance factor, it is possible to achieve excess returns. In general, the study had mixed results since it was found that a positive screening strategy had negative effects, meaning that the use of this strategy weakened the efficiency of the portfolio. Negative screening had no effect at all. (Auer, 2016)

Bodhanwala and Bodhanwala (2020) conducted a global study on the success of sustainable and responsible investing compared to the benchmark index. Again, the results of the study were contradictory. According to the study, in some developed countries, such as the United States, sustainable portfolios performed significantly better than the benchmark index. However, sustainable portfolios underperformed significantly compared to their benchmark index in developing countries. The performance of the UK and Australia sustainable portfolios was neutral in relation to the benchmark index. (Bodhanwala & Bodhanwala, 2020)

Pavlova & De Boyrie (2022) conducted a study of five factor models and post-expense returns from before and after the market crash due to the COVID-19 pandemic. The aim of the study was to determine whether higher ESG ratings have a connection to better performance during a market crash. The study analyzed the risk-adjusted returns of 62 ESG ETFs and found mixed results. According to the results of the study, lower-rated ESG ETFs outperformed the market and the higher-rated ESG ETFs. Therefore, a positive connection between ESG and financial performance was not found. However, the ETFs with higher sustainability did not perform worse than the market during the pandemic. (Pavlova & De Boyrie, 2022)

Later in 2023, Bodhanwala and Bodhanwala published another study on ESG performance and its effect on market value during COVID-19 pandemic. The study consisted of 70 Indian companies. The results strongly indicated that ESG did not have an explanatory effect on stock market performance during the crisis. Furthermore, no significant difference was found between the performance of high and low ESG companies. (Bodhanwala & Bodhanwala, 2023)

Since the research results over the years have been contradictory, the investment community has not received clear information about whether sustainable investing can achieve excess returns compared to the market. Despite this, interest in corporate responsibility and sustainability is increasingly popular and it is essential for companies to publish their sustainability reports and information clearly, quickly, and transparently in order to gain the most appreciation among different stakeholders. (Shaikh, 2022)

3 Methodology and data

This study is quantitative in nature and the data of research is collected from the companies of the industrial sector of Nordic countries: Denmark, Finland, Iceland, and Sweden. Portfolios are created from the shares of the 20 selected companies according to the company's ESG score. From the companies from which enough data was available, the 10 companies with the highest ESG score and the 10 companies with the lowest ESG score were selected for the study. The portfolios formed from these companies are examined in more detail and compared to each other and to the OMX Nordic 40 Index. The OMX Nordic 40 Index was chosen to describe the Nordic market in general, with which the returns of the portfolios are compared in this study.

ESG scores and the data for financial performance metrics was collected from the Refinitiv database and Yahoo Finance. The data was collected from 2016 to 2022. In this study, ESG values and data were aligned so that the previous year's ESG performance explained the following year's financial success. This alignment was done because investors make the current decisions about investment targets based on the previous year's ESG performance. This chapter presents the data used in the empirical section of the study and the research methods.

3.1 Forming the portfolios

In total, 20 companies were selected for the research from the Nordic countries including Sweden, Denmark, Finland, and Iceland. The companies were selected firstly according to their sector and then their ESG score. The research was limited to the industrial sector, so that sector specific differences do not distort the results and can be eliminated from the research. Companies from the industrial sector were excluded from the study if enough data of them was not available from the selected 7-year period in the Refinitiv database. A total of two portfolios were created from shares of the selected companies based on the companies' ESG scores. An annual ESG score was collected from the Refinitiv database for each company over the 7-year period, after which the ESG average for the entire research period was calculated for each company separately. Portfolios were formed based on these ESG averages by comparing them and dividing them into the highest 10 and the lowest 10. Since each portfolio consisted of 10 company shares, the weighting of one share is 10 percent. The correlations of the stocks in the portfolios are presented in Appendix 1 and 2, since considering the correlations is important, for example, in terms of portfolio risk.

Table 2 describes the first portfolio which was created from the share of 10 companies using the best-in-class method. The shares of 10 companies with the highest ESG average were selected. The highest ESG average among the companies was achieved by ABB Ltd, whose score of 91.53 corresponds to the grade A in the Refinitiv database. As shown in Table 2, ISS A/S has the lowest average of 76.75, which corresponds to almost an excellent grade of A-. The ESG average of the entire portfolio is 81.99, which is also rated A- in the Refinitiv database. Grade A- is almost an excellent grade and includes all scores ranging between 75 and 83.33 (Refinitiv, 2022). Although the review included companies from all stock exchanges in the Nordic countries, only companies from Nasdaq Helsinki, Nasdaq Stockholm, and Nasdaq Copenhagen were selected to the high ESG portfolio.

Company	ESG score average
ABB Ltd	91.53
Stora Enso Oyj A	86.47
UPM-Kymmene Oyj	85.29
Volvo A	85.14
Alfa Laval	81.20
Atlas Copco Ab	78.97
Wärtsilä Oyj Abp	78.89
Outokumpu Oyj	78.68
Sandvik	76.95
ISS	76.75
Portfolio's average	81.99

Table 2: High ESG portfolio.

The low ESG portfolio described in Table 3, also consist of 10 shares of companies from Nasdaq Helsinki, Nasdaq Stockholm, and Nasdaq Copenhagen, but they were selected based on the lowest ESG average. CCT Systems has the lowest ESG average of the study with a score only of 13.92 and YIT Oyj the highest of the low ESG portfolio with a score of 59.39. The average of the low ESG portfolio is 45.54, which is rated C+ as all scores ranging from 41.67 to 50 in the Refinitiv database (Refinitiv, 2022). It can be noticed that the ESG scores of the companies vary quite a lot within the low ESG portfolio. Overall, seven out of ten companies scored over 50. This may be due, for example, to the fact that Nordic countries are generally sustainably developed, which is why very low ESG scores may not be seen that often. On the other hand, it may be that the Refinitiv database cannot provide ESG scores to the worst companies implementing sustainability, for example due to insufficient ESG reporting.

Company	ESG score average
CCT Systems	13.92
Beijer Ref B	25.55
Bergman & Beving B	31.84
Nederman Holding	50.24
NKT	50.60
TORM A	54.37
Securitas B	55.96
Nolato B	56.46
Uponor Oyj	57.11
YIT Oyj	59.39
Portfolio's average	45.54

Table 3: Low ESG portfolio.

3.2 Financial performance metrics

The empirical section of this thesis is based on performance metrics, which are used to measure and compare the performance of the portfolios formed based on ESG scoring over a seven-year period. The metrics for this research were chosen so that they represent different types of metrics such as profitability and growth metrics. In addition, two risk-adjusted key figures were chosen, so that the riskiness of the investment target can be considered beyond its return. The performance measurements used are presented in this section in more detail.

3.2.1 Revenue Growth Rate

Revenue growth rate is a metric that measures the annual percentage change in revenue. It is a common key performance indicator that provides information of the company's growth and success. The revenue growth rate can be positive or negative. A positive rate indicates an increase in the revenue while a negative rate indicates that the revenue has decreased over time. From the revenue growth rate, investors get an indication of how financially healthy a company is, and a company with a constantly growing rate can reveal itself as a potential investment target. The growth rate is calculated according to the formula (1) below, by subtracting the initial value from the final value and dividing the result again by the initial value. (Chen, 2023)

$$Growth\ Rate = \frac{Final\ Value - Initial\ Value}{Initial\ Value}$$

(1)

Revenue growth rate was chosen for the research as a metric to describe the growth. As it is commonly used key performance indicator, it brings added value to the research. Revenue growth rate will be used to describe how successful the companies behind the portfolios have been. Insights, for example, into business expansion trends can be obtained with the rate, which can indicate about potential and successful investment targets.

3.2.2 Return on Equity

Return on equity (ROE) is a financial performance measure that calculates the company's return generated with its shareholders' equity. It has become an important indicator for investors as it can be used to analyze the profitability of the possible investment target. ROE can be used to assess for example a company's ability to finance its growth and generate returns. Because ROE shows how effectively a company uses its equity financing to generate income, a company with a higher ROE is more tempting to investors. It is an indicator that investors are interested in, as it helps to understand whether the gained return is good. (Fernando, 2023a) ROE represents the profitability metric of this study because it clearly indicates how efficiently the company creates profit.

$$ROE = \frac{Net\ Income}{Shareholders'Equity}$$

(3)

3.2.3 Total Return

Total return is a financial performance metric, which indicates the total amount earned by the investor from an investment in a certain period of time. It is usually presented as a percentage and the calculation is based on the stock price and dividends according to the formula (3) below. Total return represents a convenient key figure that allows an investor to examine the long-term value of an investment target for individual investors. (Ganti, 2021)

Toal return was chosen for this study to describe the value creation of the company as a neutral, market-based measure. It is a definitive metric for gauging performance, and it strongly describes the investment's true growth over time. (Banton, 2021) Thus, total return describes the performance and growth of different portfolios in this thesis, simply creating a clear picture of the total amount earned.

$$Total\ Stock\ Return = \frac{(P_1 - P_0) + D}{P_0} \tag{3}$$

P_0 = Initial Stock Price

P_1 = Ending Stock Price

D = Dividends

3.2.4 Sharpe Ratio

The Sharpe ratio is a risk-adjusted performance metric of an investment. It is calculated by comparing an investment's return to the return of a risk-free asset. The part of the return that exceeds the risk-free return is proportioned to the total risk. The higher the Sharpe ratio, the better the risk-adjusted return is. (Fernando, 2023; Kallunki, Martikainen & Niemelä, 2019) A Sharpe ratio greater than one is generally considered acceptable risk-adjusted performance. If the result is between two and three, it indicates a really good performance compared to a risk-free investment. A ratio of more than three is excellent. (Maverick, 2022)

The Sharpe ratio was chosen for this thesis to consider the risk of the investment target in addition to the return. It is a common and well-reputed measure in previous research on sustainable investing (Maverick, 2022). In this thesis, the German 10-year bond was used in the calculation as a risk-free asset. The Sharpe ratio was calculated according to the formula (4) below.

$$Sharpe\ Ratio = \frac{R_p - R_f}{\sigma_p} \tag{4}$$

R_p= Return of portfolio

R_f= Risk-free rate

σ_p = Standard deviation of the portfolio's excess return

3.2.5 Jensen's Alpha

Jensen's alpha is a risk-adjusted performance metric. In addition to Sharpe ratio, it is one of the most commonly used risk-adjusted metrics. It measures portfolio's risk-free rate of return. Jensen's alpha indicates if the investment has generated more return than it should have generated at its risk level. If the portfolio gets a positive value, it has generated more return than its risk level requires. On the other hand, if the investment gets a negative value, it indicates that it has generated less return than its risk level would require. Jensen's alpha is calculated according to the formula (5) below. (Chen, 2020; Kallunki et al., 2019)

Jensen's alpha was also chosen for the study to describe risk-adjusted returns, as it fives a broader picture of the portfolio's success. It compares the portfolio's return to the expected market return and therefore the benchmark index could be included in the analysis. The benchmark index used in this study is the OMX Nordic 40 Index.

$$Jensen's\ Alpha = (R_p - (R_f + B_p * (R_m - R_f))) \tag{5}$$

R_p= Expected portfolio return

R_f= Risk-free rate

B_p= Beta of the portfolio

R_m= Expected market return

4 Analysis and results

This chapter presents and analyses the results and key findings of the empirical part of the study aiming to answer the research questions. The research questions are answered using the results of Total Return, Revenue Growth Rate, ROE, Sharpe Ratio and Jensen's alpha.

Table 4 presents the portfolios' averages of the key figures for the entire research period. The table shows that the averages of portfolios with higher ESG scores were partly against expectations, as the lower ESG portfolio performed better in terms of total return and revenue growth rate. On the other hand, the portfolio with higher ESG performed better in ROE, but the difference is small, only 0.76 percentage points. In order to better understand the results of this Table 4, the data should be further analysed.

	ESG	Revenue Growth Rate	ROE	Total Return
High ESG portfolio	81.99	3.56%	19.07%	15.48%
Low ESG portfolio	45.54	9.13%	18.31%	18.02%

Table 4: The averages of ESG and financial metrics by portfolio.

The highest and best result in average revenue growth rate was achieved by the low ESG portfolio (9.13%), the difference to the high ESG portfolio being 5.57 percentage points. Also, in terms of total return, the low ESG portfolio outperformed the high ESG portfolio with 2.54 percentage points. Thus, low ESG portfolio made an average annual return of 18.02%, while the corresponding value of high ESG portfolio was 15.48%. While the low ESG portfolio performed better in terms of revenue growth rate and total return, the high ESG portfolio scored a better average of 19.07% in ROE. However, the higher ROE average was only 0.76 percentage points higher than the corresponding average for low ESG portfolio, which was 18.31%

Although the averages of the entire research period generally indicate the performance of the portfolios, it is essential to analyze the financial metrics in more detail to get an idea of what the averages in question consist of and how a possible connection between ESG performance and financial performance can be seen. The analysis is also deepened by comparing the returns of the portfolios to the benchmark index, which is the OMX Nordic 40 index in this research. In addition, the results of risk-adjusted returns are presented. The results for the key figures are presented next in more detail.

4.1 Revenue Growth Rate

As stated earlier, the low ESG portfolio has the highest average revenue growth rate in the study, and the result is contrary to a prior expectation. Figure 1 describes the annual development of the revenue growth rate by portfolio.

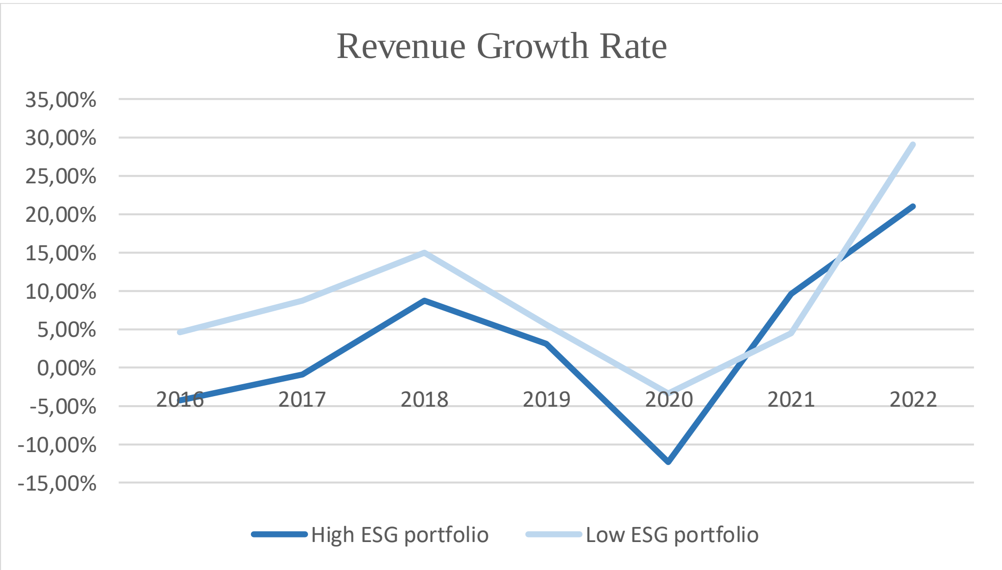

Figure 1: Development of Revenue Growth Rates by portfolio.

Apart from the year 2021, the revenue growth rate of the low ESG portfolio is higher than the value of the high ESG portfolio throughout the whole research period. In the long term, the trend of the revenue growth rates' development is in the same direction for both portfolios, although the magnitude of the increase or decrease between the years and portfolios varies. The portfolios of high and low ESG values differ greatly in terms of revenue growth rate at the beginning of the study period, as the low ESG portfolio gets a positive rate of 4.54% and the high ESG portfolio's revenue growth rate is negative, -4.28%. The high ESG portfolio got the lowest revenue growth rate (-12.34%) in 2020 and the low ESG portfolio go the highest, 29.07% in 2022. (Appendix 3)

There is a sharp decrease in revenue growth rate for both portfolios in 2020 due to the crash in economy caused by the Covid-19 pandemic. However, the revenue growth rate of the portfolios has started to increase since then. The companies with a higher ESG score have been able to recover better from the crisis caused by the pandemic, and this is evidenced by the fact, that the high ESG portfolio outperformed the low ESG portfolio in 2021. However, at the end of the study in 2022, the revenue growth rate of the low ESG portfolio is seen to be the highest again.

The rapid recovery of the high ESG portfolio from the crisis may be due to the fact that while a company investing in ESG factors might be sensitive to market fluctuations, such companies have nevertheless been better prepared to recover from downturns. This is supported by Zhou and Zhou (2021) who found that the companies with good ESG performance are better to recover from shocks. During and after the pandemic, issues related to corporate sustainability and responsibility have also increasingly come to people's attention and sustainability has started to be valued increasingly more. This may have contributed to the fact that the financial performance metrics of a high ESG portfolio have developed after the pandemic to be closer to the corresponding values of the low ESG portfolio.

The high revenue growth rate (29.07%) of the low ESG portfolio in 2022 is partly explained by the fact that the revenue of TORM PLC has grown by 132.97% from previous year. (Appendix 3) Such exceptionally and single high (or low) results of a company may distort the results of this study. To deepen the analysis further and finding out whether there is a statistically significant relationship between the revenue growth rate and ESG performance, a correlation test and a linear regression analysis were performed on the variable. (Appendix 4; Appendix 5

According to the correlation test, revenue growth rate and ESG are negatively correlated with each other. A negative correlation indicates that as one variable increases, the other decreases. Nevertheless, only -0.18 correlation is generally considered to be negligible. (Appendix, 4) The regression analysis of the revenue growth rate and ESG performance suggests that as the revenue growth rate increases by one, ESG score decreases by 0.0006. This is a rather small negative change. The explanation rate of the model is only 0.5%, according to which ESG performance does not explain the changes in revenue growth rate much. According to the P-value (0.045) of the analysis, the test is statistically significant. (Appendix 5) The results indicates that there is a very small negative relationship between revenue growth rate and ESG performance. However, ESG performance does not explain the changes in revenue growth rate.

4.2 Return on Equity

Among the averages of the financial performance metrics, the average of ROE has the smallest variation between high and low ESG portfolios. The difference is only 1.70 percentage points. Therefore, no significant differences are discovered in the ROE averages between the portfolios.

Figure 2 presents the development of ROE by each portfolio. Although fluctuations are seen in the figure of revenue growth rate between almost every year, the ROEs are more even until year 2020. It can be noted that the pandemic has strongly affected this metric and again the stronger impact is on the high ESG portfolio as its ROE decreases to only 5.79% (Appendix 3). As in the previous metrics, the ROE of the high ESG portfolio has grown more rapidly in the short term after the start of the Covid-19 pandemic. This indicates that the ability of the companies with higher ESG score to recover from the crashes seems fairly good.

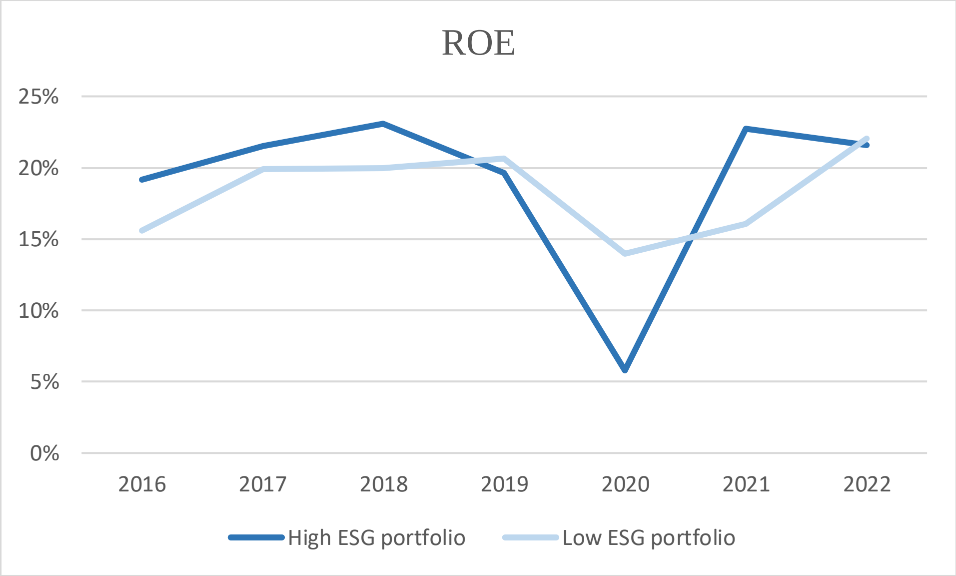

Figure 2: Development of ROEs by portfolio.

The long-term trend in the figure is slightly different between the portfolios. The more noticeable differences are in the steepness of the declines and rises in ROE between the portfolios in 2020 and 2021. For the most part, the high ESG portfolio gets the higher ROEs over time and an average of 19.07%, which is generally classified as a good value. ROEs over 15% are considered good, however, the final estimate of ROE is based on the level of industry. A higher ROE refers to a company's ability to generate a better return on its invested capital. Because of this, based on these results of ROE alone, the high ESG portfolio would be perceived as a more attractive investment target from an investor's point of view.

The relationship between a company's ROE and ESG performance was also tested with a correlation test and regression analysis. A positive correlation of 0.27 was found between ESG and ROE, but this correlation is considered to be negligible. (Appendix 4) According to the regression analysis coefficient, when the company's ROE increases by one, the ESG score decreases by about 0.0005. The explanation rate of the model is also 0.5% so ESG performance does not explain the changes in ROE. P-value of the analysis (0.401) indicates that the results are not statistically significant. (Appendix 6)

4.3 Total Return

This study compared the total returns between the high and low ESG portfolios and the OMX Nordic 40 index, which describes the market. Table 5 presents the average annual returns for the entire research period. The low ESG portfolio had the highest average annual return, which was up to 12.14 percentage points better than the corresponding result of the market. The high ESG portfolio also outperformed the market with 15.48& annual return. The OMX Nordic 40 Index had clearly the weakest annual return, only 5.88%. The fact that the portfolios got better returns on average than the OMX Nordic 40 Index may be due to the sector differences. The portfolios consisted only of industrial companies, while the market index includes companies from many sectors.

	High ESG portfolio	Low ESG portfolio	OMX Nordic 40 Index
Annual return	15.48%	18.02%	5.88%
Volatility	6.28%	4.15%	6.23%

Table 5: Annual returns and volatilities.

The low ESG portfolio had the lowest volatility (4.15%) of the portfolios, which was 2.08 percentage points lower than the volatility of the benchmark index (6.23%). The volatility of the high ESG portfolio (6.28%) was only 0.05 percentage points higher than corresponding value of the market index. Based on the results, it can be noted that the average variation of the returns of the low ESG portfolio is smaller compared to the high ESG portfolio and the market index. By investing in sustainable Nordic industrial companies higher-than-market returns can be achieved in the long term, but the slightly higher volatility should be considered. However, the high ESG portfolio did not outperform the low ESG portfolio, so it can be though that the sector explains the portfolios' higher returns more than sustainability.

Figure 3 shows the development of monthly returns by portfolio and market index. In the long term, the development of the total return of both ESG extreme portfolios has been quite similar. A clear decrease in the returns is experienced in 2018 and again in 2020 (Figure 3, Appendix 3). These trends can be seen for both portfolios and the market index in this study. The trough in 2018 was a global market trend and it was a generally challenging year for investors. Also, the decrease in returns at the beginning of 2020 was affecting the entire market and was due to the COVID-19 pandemic. Although these events affected the entire market, it can be seen from the figure that the returns of the portfolios temporarily fell more strongly. This is partly due to the lack of sector diversification in the portfolios.

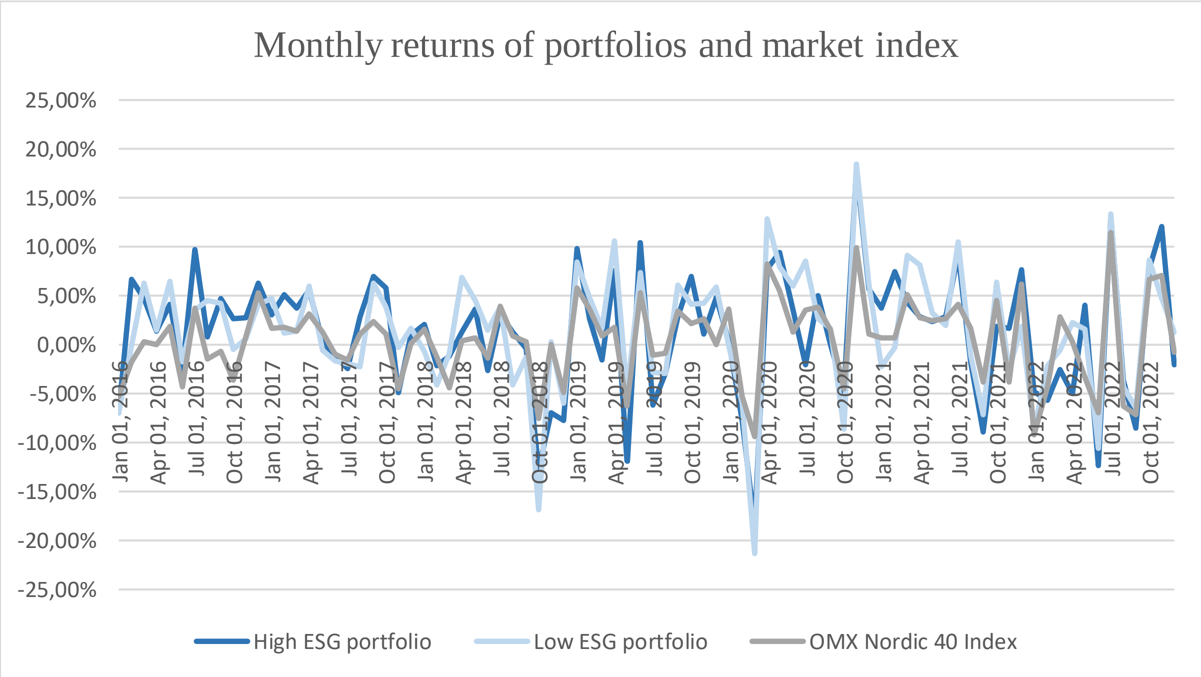

Figure 3: Development of monthly returns of portfolios and market index.

Although the development of the total returns among the portfolios has a fairly similar trend, it can be noted (Appendix 3) that both at peaks and troughs, the high ESG portfolio gets the highest and lowest values, excluding the peak of 2019. Therefore, it can be concluded that companies investing in ESG factors are potentially more vulnerable to market fluctuations. This is also supported by the fact that in 2020, at the time of the Covid-19 pandemic, the total return of the high ESG portfolio was clearly lower than the total return of the low ESG portfolio, but as the market gradually recovered in 2021, the total return of the high ESG portfolio had increased and was 7.28 percentage points higher than value of the low ESG portfolio (Appendix 3). Overall, the lowest total return of the entire time period was for the high ESG portfolio (-21.40%) in 2018 and the highest for the low ESG portfolio (50.22%) in 2019 (Appendix 3).

4.4 Risk-adjusted returns

In addition to revenue growth, ROE and total returns, the portfolios were analyzed using risk-adjusted metrics, because it is important to consider the risk of the investment target when measuring success. Next, the results of Sharpe ratio and Jensen's alpha will be reviewed and analyzed.

4.4.1 Sharpe Ratio

Table 6 shows the Sharpe ratios and their components. The highest risk-adjusted return was achieved by the low ESG portfolio (4.29). This was as expected based on previously analysed returns and volatilities. The reason behind the result is therefore the high return of a low ESG portfolio and low volatility, which indicates risk. The volatility (4.15%) was the lowest of this study.

	High ESG portfolio	Low ESG portfolio	OMX Nordic 40 Index
Risk Free Rate	0.21%	0.21%	0.21%
Annual Return	15.48%	18.02%	5.88%
Volatility	6.28%	4.15%	6.23%
Sharpe Ratio	**2.43**	**4.29**	**0.91**

Table 6: Sharpe Ratios and their components.

The high ESG portfolio had the second-best Sharpe ratio (2.43). This Sharpe ratio indicates a good performance compared to the risk-free rate and a good risk-adjusted return. Although the high ESG portfolio had the highest volatility (6.28%), which lowers risk-adjusted returns, it still outperformed the market. The reason behind this is that the average annual return of the high ESG portfolio was almost 10 percentage points higher than the return of the OMX Nordic 40 Index. Due to the poor annual return, the Sharpe ratio of the market index remained very low, and it is considered unacceptable (Maverick, 2022). Since both of the portfolios are from industrial sector and got better results than the market, it is likely that the sector affects the risk-adjusted return more than sustainability. Thus, it cannot be stated that the market could be completely outperformed using sustainable investing strategy.

4.4.2 Jensen's Alpha

Table 4 presents the Jensen's alphas of the portfolios and the P-values and betas obtained from the regression analyses. Jensen's alphas were calculated using a regressions analysis of portfolio and market returns. The results of the regression analysis are presented in Appendices 7 and 8. The results show that the high ESG portfolio achieved excess return. Therefore, the high ESG portfolio gained more return than its risk level required. Since the low ESG portfolio had Jensen's alpha of -0.32%, it means that it did not gain enough return compared to its risk level.

	High ESG portfolio	Low ESG portfolio
P-value	0.97	0.22
Beta	0.8446	0.5568
Jensen's Alpha	0.02%	-0.32%

Table 7: Jensen's Alphas, Betas and P-values by portfolio.

The portfolios got beta values from the regression analysis. The high ESG portfolio had a beta of 0.8446 and the low ESG portfolio had a corresponding value of 0.5568. The results of beta and Jensen's alpha show that both values were higher for high ESG portfolio. The results of the regression analysis gave explanation rates of 70.1% for the high ESG portfolio and 69.8% for the low ESG portfolio. Thus, the explanation rates are quite high (Appendix 7, Appendix 8) The P-values of the models indicates, however, that the results are not statistically significant.

5 Conclusions

The purpose of this thesis was to examine the financial performance of the high and low ESG portfolios created for the study. The data covered a 7-year period from 2016 to 2022. The aim of the study was to find out whether company's sustainability is connected to good financial performance in the industrial sector of Nordic countries. Two portfolios were formed based on the companies' ESG scores. The low and high ESG portfolios each consisted of 10 shares. The OMX Nordic 40 Index was used in the comparison as a benchmark index. The study was quantitative in nature and the data was collected from the Refinitiv database and Yahoo Finance. Revenue growth rate, ROE, total return, Sharpe ratio and Jensen's alpha were used to measure the financial performance of the portfolios.

The aim of the thesis was to answer the following main question and two sub-questions:

- *How does ESG performance affect the financial performance of industrial companies in Nordic countries?*

- *How did portfolios with high and low ESG scores compare to each other?*
- *Did the high ESG portfolio perform better than the low ESG portfolio in risk-adjusted metrics*?

This thesis got mixed results on whether ESG performance affects the financial performance of industrial companies positively or negatively in the Nordic countries. The high ESG portfolio performed better than the low ESG portfolio in Jensen's alpha and ROE. These results indicate that sustainable companies can better and more efficiently generate excess returns. However, based on the revenue growth rate, total return, volatility and Sharpe ratio, the low ESG portfolio can be seen as more attractive investment target. Compared to the market, the sustainability of the company had a positive effect on its risk-adjusted return. Within the industrial sector, there was no benefit from sustainability in terms of risk-adjusted return, as the low ESG portfolio performed better than the high ESG portfolio. To conclude, the high ESG portfolio outperformed the low ESG portfolio in Jensen's alpha, which is one of the risk-adjusted metrics used in the analysis. However, the low ESG portfolio had a better Sharpe ration indicating a more attractive risk-adjusted return compared to the high ESG portfolio's result.

The relationships of the selected variables were further analyzed by performing two regression analyses. The first regression analysis aimed to find out whether there is a relationship between revenue growth rate and ESG performance. The model was statistically significant, but the results showed that ESG performance explains only 0.5% of the revenue growth rate in the Nordic industrial sector. The second regression model explained similarly the relationship between ESG and ROE. According to the results, ESG performance explain ROE also by 0.5%. The model was statistically significant. Therefore, ESG performance was not found to explain the key figures and thus the financial performance of industrial companies much.

This study did not provide a clear answer to the main question. However, many researchers in history have found similar results such as Fulton et al. (2012) and Pavlova and De Boyrie (2022). Their results also indicated that it is not possible to unequivocally declare how sustainability affects financial success, since the data was divided into neutral, positive and negative results. Regarding excess returns and risk, the results of this study are in line with the results of Kempf and Osthoff (2008). According to the results, a better return can be generated, and the risk can be reduced compared to the market by utilizing sustainable investing. The results are also in line with Bodhanwala and Bodhanwala's (2020) study, which found that sustainability reduces risk compared to the benchmark index.

Based on the results of the figures describing the development of the financial metrics, it was found that the high ESG portfolio has steeper rises and falls than the other portfolios. The conclusion was that a sustainable company may be more vulnerable to market fluctuations, but also the ability to recover quickly and stabilize from declines is at a better level than a company's whose ESG performance is poor. This finding is in line with Zhou and Zhou's research (2021), which found that the sustainable companies are better to recover from shocks.

Although this study was started from the assumption that sustainability and financial performance would have a positive relationship, the findings do not completely differ from the results of the previous research. This is because previous research has found a lot of mixed results and there is still no clear answer about the relation between sustainability and financial performance. Since sustainability is an ever-growing megatrend, the demand for new research will most likely continue. As data availability improves, the research could be expanded to cover more sectors, or it could be carried out by comparing different countries with the aim of finding out how sustainability is valued in different countries.

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Appendices

Appendix 1. High ESG portfolio correlations

	ABB Ltd	Stora Enso Oyj A	UPM-Kymmene Oyj	Volvo Ab	Alfa Laval Ab	Wärtsilä Oyj Abp	Atlas Copco Ab	Outokumpu Oyj	Sandvik Ab	ISS A/S
ABB Ltd	1									
Stora Enso Oyj A	0.85628744	1								
UPM-Kymmene Oyj	0.83231203	0.912336413	1							
Volvo Ab	0.926411807	0.890970537	0.912559835	1						
Alfa Laval Ab	0.902668321	0.862439662	0.913414537	0.917042457	1					
Wärtsilä Oyj Abp	-0.20856493	-0.131349018	-0.284173024	-0.243595091	-0.177777764	1				
Atlas Copco Ab	0.928397423	0.830166412	0.896665115	0.952103949	0.915730165	-0.446816939	1			
Outokumpu Oyj	0.259507954	0.148865124	0.03166369	0.085729686	0.096041515	0.550890447	-0.010506417	1		
Sandvik Ab	0.871055148	0.880335537	0.89546952	0.96080694	0.903775593	-0.242930149	0.926013898	0.018174266	1	
ISS A/S	-0.544933039	-0.574068871	-0.622967961	-0.652767756	-0.564049559	0.728691564	-0.750825543	0.490100749	-0.688697238	1

Appendix 2. Low ESG portfolio correlations

	CTT Systems Ab	Beijer Ref Ab	Bergman & Beving	Nederman Holding Ab	NKT A/S	TORM PLC	Securitas Ab	Nolato Ab	Uponor Oyj	YIT Oyj
CTT Systems Ab	1									
Beijer Ref Ab	0.787812164	1								
Bergman & Beving	0.441423843	0.56936944	1							
Nederman Holding Ab	0.822331423	0.961504428	0.559689607	1						
NKT A/S	0.469308932	0.533430115	0.584231715	0.456220096	1					
TORM PLC	0.231196117	0.308790597	0.036522844	0.215719941	0.575278813	1				
Securitas Ab	0.068738813	-0.053053923	0.162404611	0.049877913	-0.439686536	-0.663633661	1			
Nolato Ab	0.713019663	0.881169467	0.543860473	0.869228329	0.405249278	-0.048735921	0.169873536	1		
Uponor Oyj	0.507446888	0.693903624	0.795860077	0.652494734	0.685063209	0.05912161	0.063730321	0.761654978	1	
YIT Oyj	-0.35276866	-0.570365888	-0.023755161	-0.528436034	-0.284613145	-0.595760444	0.492107432	-0.345087797	-0.103360628	1

Appendix 3. Annual portfolio-specific results.

Revenue Growth Rate	2016	2017	2018	2019	2020	2021	2022
High ESG portfolio	-4.28%	-0.91%	8.72%	3.12%	-12.34%	9.63%	21.00%
Low ESG portfolio	4.54%	8.66%	14.91%	5.63%	-3.39%	4.47%	29.07%

ROE	2016	2017	2018	2019	2020	2021	2022
High ESG portfolio	19.13%	21.54%	23.08%	19.66%	5.79%	22.72%	21.58%
Low ESG portfolio	15.58%	19.93%	19.95%	20.62%	13.97%	16.07%	22.04%

Total Return	2016	2017	2018	2019	2020	2021	2022
High ESG portfolio	38.91%	28.35%	-21.40%	23.36%	12.53%	37.11%	-10.48%
Low ESG portfolio	23.48%	19.41%	-17.55%	50.22%	24.37%	29.83%	-3.63%
OMX Nordic 40 Index	-5.57%	6.86%	-11.34%	18.37%	19.00%	25.12%	-11.29%

Appendix 4. Correlations of measurements

	ESG Score	Revenue Growth Rate	ROE	Total Return
ESG Score	1			
Revenue Growth Rate	-0.182323991	1		
ROE	0.272983642	0.64629975	1	
Total Return	-0.083535498	-0.519405556	-0.218114575	1

Appendix 5. Regression analysis of Revenue Growth Rate and ESG

SUMMARY OUTPUT

Is there a relationship between Revenue Growth Rate and ESG performance?

Regression Statistics	
Multiple R	0,069877028
R Square	0,004882799
Adjusted R Square	-0,00238083
Standard Error	0,194502908
Observations	139

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0,025431231	0,025431231	0,672225808	0,413700819
Residual	137	5,182899202	0,037831381		
Total	138	5,208330432			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	0,101552303	0,050281848	2,019661308	0,045368741	0,002123407	0,2009812	0,002123407	0,2009812
ESG Score	-0,000610232	0,000744282	-0,819893778	0,413700819	-0,002081999	0,000861535	-0,002081999	0,000861535

Appendix 6. Regression analysis of ROE and ESG

SUMMARY OUTPUT

Is there a relationship between ROE and ESG performance?

Regression Statistics	
Multiple R	0,071804323
R Square	0,005155861
Adjusted R Square	-0,00210578
Standard Error	0,141430673
Observations	139

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0,014202144	0,014202144	0,71001367	0,400907921
Residual	137	2,740361012	0,020002635		
Total	138	2,754563156			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	0,21516145	0,036561899	5,884854369	0,000	0,14286281	0,28746009	0,14286281	0,28746009
ESG Score	-0,00045602	0,000541197	-0,84262309	0,40090792	-0,001526204	0,00061415	-0,0015262	0,00061415

Appendic 7. Regression analysis of the high ESG portfolio and the market index.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.83740311
R Square	0.701243969
Adjusted R Square	0.697600603
Standard Error	0.034561117
Observations	84

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.229901529	0.229901529	192.4714467	3.21057E-23
Residual	82	0.097946608	0.001194471		
Total	83	0.327848138			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	0.0002	0.003872435	0.042905924	0.965880832	-0.007537356	0.007869657	-0.00753736	0.007869657
X Variable 1	0.844679334	0.060884776	13.8734079	0.0000	0.723560119	0.965798549	0.723560119	0.965798549

Appendix 8. Regression analysis of the low ESG portfolio and the market index.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.835648117
R Square	0.698307776
Adjusted R Square	0.694628603
Standard Error	0.022942819
Observations	84

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.099905678	0.099905678	189.8001774	4.80406E-23
Residual	82	0.043162582	0.000526373		
Total	83	0.14306826			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	-0.0032	0.002570651	-1.244706184	0.216785495	-0.008313549	0.001914139	-0.008313549	0.001914139
X Variable 1	0.556821538	0.040417339	13.77679852	0.0000	0.476418575	0.6372245	0.476418575	0.6372245