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**ESG Investing in the Finnish Market: A Comparative  
Analysis of ESG-Positive and ESG-Negative Stock  
Performance**

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**ABSTRACT:**

This thesis investigates stock performance in the Finnish equity market over the period of January 2010 to December 2023 in relation with Environmental, Social, and Governance (ESG) aspects. Companies listed on the Helsinki Stock Exchange were yearly classified into ESG-positive and ESG-negative portfolios using ESG score data and monthly stock return data from LSEG Workspace. The return and risk-adjusted performance of these portfolios relative to the market and each other is evaluated in this paper using Capital Asset Pricing Model (CAPM) regressions, cumulative return analysis, Sharpe Ratio comparisons, and paired t-tests. Over the whole sample period, the results show that although both ESG-positive and ESG-negative portfolios obtained better average returns and Sharpe Ratios than the benchmark market index, no statistically significant difference in average returns was found between the two ESG groups. The ESG-negative portfolio showed modest outperformance during the crisis period from January 2020 to December 2022, implying that sectoral dynamics and macroeconomic shocks can momentarily affect ESG investment results. This paper adds to the body of knowledge on ESG investing by providing evidence from the Finnish market and stressing the complicated and context-dependent link between ESG traits and financial performance. The results have pragmatic relevance for businesses trying to match ESG activities with long-term value development and for investors trying to balance sustainability issues with financial goals.

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**KEYWORDS:** ESG investing, stock performance, CAPM, Sharpe Ratio, crisis period, Finland, responsible investment

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## 1 Introduction

Environmental, social, and governance (ESG) considerations have become increasingly important in investment decision-making as investors attempt to align their financial objectives with sustainability and ethical principles. ESG investing has evolved from a specialist strategy to a mainstream one in recent years, owing to regulatory advancements, stakeholder pressure, and mounting evidence of a possible correlation between ESG performance and financial outcomes. While global research on the financial performance of ESG investments has increased dramatically, there is still a relative scarcity of localized studies that focus especially on the Finnish equities market.

Finland provides a unique point of view for ESG investing due to its advanced legislative structure, high levels of company openness, and considerable investor interest in sustainability. Nordic countries, particularly Finland, have continuously placed among the top global leaders in ESG practices (Strand, 2024; Antunes et al., 2024), making them an important case study for understanding ESG-related market behavior. However, uncertainties remain over whether ESG-positive stocks, which are defined as those with high ESG ratings, outperform their ESG-negative counterparts in terms of absolute returns, risk-adjusted returns, volatility, and market resilience.

Prior research has yielded conflicting results on the relationship between ESG performance and financial returns. In a meta-analysis of over 2,000 empirical research, Bassen et al. (2015) discovered that the majority of them demonstrated a positive or neutral association between ESG criteria and firm financial success. Similarly, Fatemi et al. (2018) contend that ESG practices can minimize firm-specific risk and result in more consistent long-term returns. Furthermore, Revelli and Viviani (2015) contend that SRI offers no significant cost or advantage in terms of outperforming traditional investing.

Regionally, Vaihekoski and Yahya (2023) conducted a detailed empirical analysis on publicly traded Nordic firms, including Finnish corporations, from 2010 to 2020. Their findings indicate that ESG ratings, particularly those in the environmental and social

dimensions, are favorably related to corporate profitability and valuation. Surprisingly, governance scores were inversely associated with profitability, emphasizing the complexities of assessing ESG performance holistically. The study (Vaihekoski & Yahya, 2023) also found a bidirectional association between ESG performance and financial performance, lending credence to the notion that sustainability is both a cause and an effect of financial success.

Despite these insights, Finland-specific evaluations are still limited, particularly those that distinguish between ESG-positive and ESG-negative enterprises in the stock market. This study seeks to close that gap by systematically analyzing the financial performance of ESG-positive and ESG-negative stocks listed on the Helsinki Stock Exchange. Using ESG scores and stock return data over a specified time period, the study will determine whether organizations with greater ESG credentials provide superior returns.

## **1.1 Purpose**

The purpose of this study is to assess whether companies with strong ESG performance deliver better financial returns than those with weaker ESG profiles in the Finnish stock market. The research results will inform investors, asset managers, and policymakers about the real-world financial implications of ESG investing in Finland.

With ESG integration becoming an increasingly important part of portfolio construction and risk management (Bertolotti, 2020), understanding how ESG scores relate to stock performance in a local context is critical. Though less is known about how this plays out in smaller, well-regulated markets like Finland where sustainability awareness is high but the equity market is quite concentrated, global studies show a favorable link between ESG and long-term value creation (Bistrava & Zumente, 2021).

In this paper I will assess, in terms of returns and risk-adjusted performance, whether ESG-positive companies outperform ESG-negative ones. I will also look at the potential of ESG as a signal for resilience during market downturns or periods of volatility and offer

proof that can let investors make more educated decisions about integrating ESG dimensions into investment analysis. In the Finnish setting, I also hope to help financial professionals grasp the concrete worth of ESG as an investment filter.

## **1.2 Structure**

Each of the nine chapters that make up this thesis logically advances our understanding of the connection between ESG factors and stock performance in the Finnish equity market. The research issue, its significance, the study's goal, and a description of ESG investing in Finland are all covered in the introduction, which logically opens the study as the first chapter. The Theoretical Framework chapter, which follows the introduction, covers important financial theories and concepts that are relevant for the research. Modern Portfolio Theory, the Capital Asset Pricing Model (CAPM), the Efficient Market Hypothesis theories, and the fundamentals of ESG and SRI investing are all included in this.

Following the Theoretical Framework, the Literature Review examines the body of professional and scholarly research on ESG investing and financial performance, with an emphasis on earlier studies that focus on the Nordic region. The Hypothesis Development chapter develops the hypotheses that direct the empirical testing by referencing the literature's insights. The purpose of these hypotheses is to ascertain whether ESG factors influence stock returns, volatility, and risk-adjusted performance in a quantifiable way. The research strategy is then described in the Methodology chapter, which also includes information on the statistical techniques that will be used, the analytical framework, and the portfolio construction approach.

The Data chapter describes the information sources that were used, such as LSEG Workspace's monthly financial data for Finnish listed companies and annual ESG scores. In order to guarantee consistency and comparability, it outlines the variables, sample selection criteria, and data preparation procedures. The empirical results are then presented in the Results chapter, which compares the performance of ESG-positive and ESG-negative portfolios during the whole sample period as well as a specified crisis time.

Using the proper statistical tests, variations in return metrics, risk-adjusted measures, and volatility are examined.

The Discussion chapter examines potential explanations for the observed results and evaluates their significance for investors, asset managers, and businesses by interpreting these findings in light of previous research and theoretical frameworks. The Conclusion chapter concludes by summarizing the main findings of the study, acknowledging its shortcomings, suggesting future research avenues, and considering the practical importance of ESG factors in Finnish market investment decision-making.

## **2 Theoretical Framework**

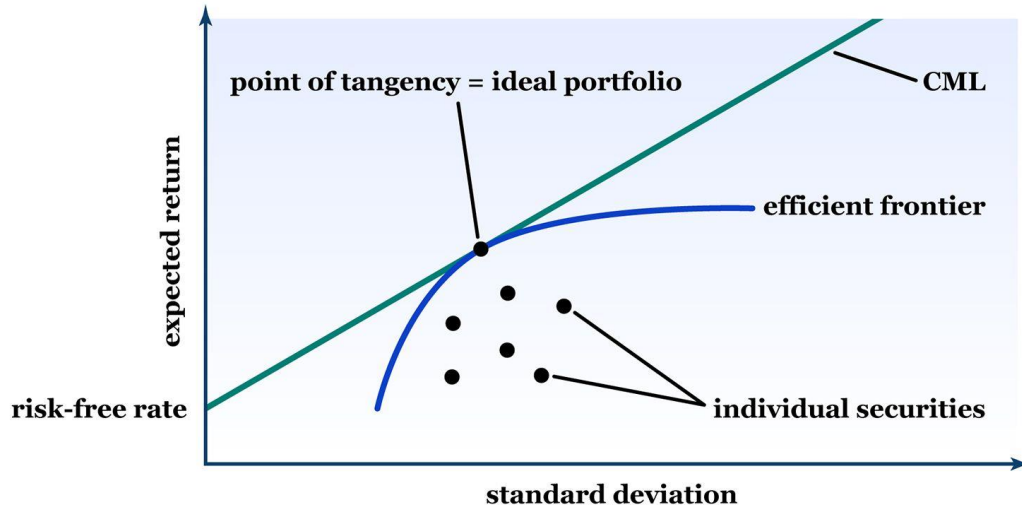
Beginning with Modern Portfolio Theory and the Capital Asset Pricing Model (CAPM), I will create the pertinent theoretical foundation for the research in this chapter, then continuing with a discussion of market efficiency. Examining the basis of Socially Responsible Investing (SRI) and the development toward modern ESG investing techniques closes the chapter.

### **2.1 Modern Portfolio Theory**

Developed in 1952 in his work "Portfolio Selection," Harry Markowitz's Modern Portfolio Theory offers a fundamental method of investment management. The theory (Markowitz, 1952) presents a methodical framework for portfolio building that, by diversification, balances risk and projected returns. Markowitz (1952) claims that investors are naturally risk-averse, thus they search to maximize expected profits for a given level of risk or reduce risk for a given level of expected return.

The efficient frontier—a graphical depiction of the set of optimal portfolios offering the highest predicted return for a given amount of risk, or the other way around, the lowest risk for a given return—introduced by modern Portfolio Theory (Markowitz, 1952). Ideally, investors choose portfolios at this boundary since these ones maximize the trade-off between risk and return.

## Capital market line (CML) and the efficient frontier



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**Figure 1.** Capital market line and the efficient frontier. (Logue, A. 2023. Harry Markowitz and modern portfolio theory. *Encyclopedia Britannica*.)

Modern Portfolio Theory (Markowitz, 1952) is fundamentally based on the idea that diversification of assets whose returns are not exactly linked can help to lower investment risk. The interactions among several securities in a portfolio generate this diversification advantage, hence reducing total portfolio risk without always compromising expected returns.

The Modern Portfolio Theory mostly uses the Sharpe ratio (Sharpe, 1966), which gauges excess return per unit of risk, to evaluate the risk-return trade-off. Named the tangency portfolio, the one with the best Sharpe ratio combines a risk-free asset with a risky asset in the best mix.

Modern Portfolio Theory is extended under the framework of ESG investment to add non-financial elements sometimes known as ESG criteria. An adaption of Markowitz's efficient frontier, the ESG-efficient frontier was first presented by Pedersen, Fitzgibbons, and Pomorski (2021) into portfolio optimization using ESG considerations. Their approach highlights the extra features of sustainability and ethical preferences in portfolio

building by demonstrating how investors could best combine financial performance with ESG considerations.

## 2.2 The CAP-model

Developed separately by William Sharpe (1964), John Lintner (1965), and Jan Mossin (1966), the Capital Asset Pricing Model (CAPM) expands Modern Portfolio Theory by characterizing the link between systematic risk and projected returns on assets, especially equities. It is a pillar financial model that offers a structure for estimating the suitable expected return of an asset considering its risk in relation to the market as whole.

The CAPM holds that three primary factors define the expected return of an asset. First, the baseline return on an investment free of risk—that of government bonds—the Risk-Free Rate. Second, the Beta, which gauges the systematic risk of an asset and shows its sensitivity to market portfolio returns changes in. Third, the Market Risk Premium, which is the excess return expected from holding the market portfolio over the risk-free rate.

Formally, the CAPM is expressed through the equation:

$$E(R_i) = R_f + \beta_i \times [E(R_m) - R_f]$$

Where  $E(R_i)$  = *Expected return on asset i*

$R_f$  = *Risk free rate of return*

$\beta_i$  = *Beta of asset i (the systematic risk measure)*

$E(R_m)$  = *Expected return of the market portfolio*

$[E(R_m) - R_f]$  = *Market risk premium*

The CAPM's fundamental implication is that investors should only expect compensation in terms of higher expected returns for taking systematic risks that cannot be diversified away. Unsystematic risk, specific to individual companies or industries, is theoretically diversifiable and thus should not command additional expected returns.

### **2.3 Market Efficiency**

Fundamental to financial theory, the idea of market efficiency is expressed mostly via the Efficient Market Hypothesis (EMH), developed by Eugene Fama (1970). The EMH (Fama, 1970) holds that stock prices completely represent all the information at any one moment, meaning that stocks often trade at their fair value and therefore help to prevent investors from regularly obtaining above-average returns without considering extra risk.

Weak form efficiency, semi-strong form efficiency, and strong form efficiency are three ways that Fama (1970) divides market efficiency. Weak form efficiency indicates that present asset prices completely reflect all prior market data including past prices and volumes. Technical study or trading based on past price trends cannot so regularly produce extra returns. Semi-strong form efficiency implies that asset prices accurately reflect all publicly accessible information including market events, economic news, and corporate financial statements. As a result, public information analysis or fundamental study cannot often produce unusual returns. Strong form efficiency ensures that asset prices represent all information, public and private. Under this situation, even privileged information insiders cannot regularly produce extra returns.

The conclusion of market efficiency is that, especially in highly efficient markets, attempts to outperform the market consistently by active management or stock-picking tactics are probably ineffective. Therefore, rather than trying to take advantage of informational advantages, investors are advised to use passive investment techniques or concentrate on risk management and portfolio diversification (Ang et al., 2011). Empirical data, however, often points out anomalies or inefficiencies where markets fall short in

swiftly or precisely reflecting some forms of information. Because measuring and analyzing non-financial performance data is difficult, ESG information for example, may first be disregarded or underpriced (Jámbor & Zanócz, 2023). These possible inefficiencies give chances for ESG-aware investors to profit from mispriced assets, especially if ESG considerations eventually influence companies' long-term profitability and risk profiles.

## **2.4 Socially Responsible Investing and ESG Investing**

Cowton (2018) defines Socially Responsible Investing (SRI) as investment techniques that openly include ethical, social, and environmental considerations into the investment decision-making process. Traditionally, SRI was motivated by moral imperatives, with investors avoiding companies or industries deemed detrimental, such as tobacco, weapons manufacture, gambling, or fossil fuels (Kempf & Osthoff, 2008). This early approach relied heavily on negative screening to align portfolios with ethical ideals, challenging standard financial approaches such as Modern Portfolio Theory (Markowitz, 1952) and the Capital Asset Pricing Model (Sharpe, 1964; Lintner, 1965; Mossin 1966), which are only focused on risk and return.

Over time, SRI shifted from exclusionary methods to more aggressive strategies. According to Kurtz (2020), the three modern SRI pillars are alignment, integration, and impact. Alignment is accomplished by removing companies that are considered unethical. Integration is achieved by incorporating environmental, social, and governance (ESG) considerations into investment decision-making. And being an active owner and participating with a company's management allows you to have an impact. Thus, the basic basis for SRI can be framed within utility maximization models that go beyond financial returns and include non-financial, ethical fulfillment (Fitzgibbons et al., 2021).

Empirical data strongly supports the financial sustainability of SRI. Revelli and Viviani (2015) discovered that SRI funds performed similarly to conventional funds when risk was reduced, refuting the concept that ethical investment necessarily compromises returns. Similarly, Helliari, Petracci, and Tantisantiwong (2022) found that SRI fund

performance, as measured by Principal Component Analysis (PCA), is generally equivalent to that of conventional funds, however results vary depending on context and strategy.

The shift from classic SRI to ESG investing implies a more comprehensive and systematic incorporation of sustainability concerns into investment analysis. ESG investing goes beyond ethical considerations to highlight financial materiality, recognizing that environmental stewardship, social responsibility, and sound governance frameworks can have a major impact on a company's risk profile and future profitability (Fatemi, Glaum, and Kaiser, 2018). The Environmental dimension of ESG evaluates a company's impact on natural ecosystems using metrics including carbon emissions, resource conservation, and energy efficiency. The Social component assesses corporations' interactions with employees, communities, and customers, including labor practices, human rights, and diversity while Governance focuses on the effectiveness of internal controls, leadership structures, board diversity, and shareholder rights.

Several theoretical theories support ESG investing. Stakeholder Theory (Freeman, 1984) contends that considering the interests of all stakeholders increases long-term corporate value. Legitimacy Theory (Dowling & Pfeffer, 1975) states that corporations seek society approval to secure their survival and profitability. According to the Resource-Based View (Barney, 1991), excellent ESG practices can provide a sustained competitive advantage. Furthermore, Fitzgibbons, Pedersen, and Pomorski (2019) introduced an ESG-efficient frontier model that incorporates ESG scores directly into portfolio optimization, demonstrating how investors can balance financial performance with ESG preferences.

Generally speaking, the scholarly research indicates either a positive or neutral correlation between ESG performance and financial results. Meta-analysis of more than 2,000 empirical research by Friede, Busch, and Bassen (2015) revealed a generally positive link between ESG elements and financial performance. Cornell and Damodaran (2020) warn, nonetheless, that real financial gains from ESG come from actual sustainability

improvements "doing good" rather than flimsy signaling "sounding good". Furthermore, underlined by Fatemi, Glaum, and Kaiser (2018) are the most noticeable benefits of ESG integration when companies offer open, high-quality ESG disclosures that lower informational asymmetries.

Empirical research carried out in several geographical environments supports the importance of local variables. Although results in underdeveloped nations are more erratic, Kaur and Tripathi (2022) found that ESG investing generally generates more consistent beneficial impacts in developed markets. In the Nordic context, Vaihekoski and Yahya (2023) observed that companies with strong ESG profiles usually show higher profitability and market values whereas governance issues have complicated effects on company performance. More recent theoretical advances help to include ESG into financial models. Pedersen, Fitzgibbons, and Pomorski (2021) set aside ESG-unaware, ESG-aware, and ESG-motivated investors using an ESG-adjusted Capital Asset Pricing Model (CAPM). This model clarifies the way various investor incentives influence trade-offs between asset pricing and risk-return.

In essence, modern ESG investment techniques are varied and sophisticated. They comprise negative screening by excluding underperforming ESG companies, positive screening by selecting ESG leaders, thematic investing by targeting sustainability-linked themes, ESG integration by embedding ESG factors into conventional financial analysis, active ownership and engagement by influencing corporate behavior, and impact investing by seeking quantifiable social and environmental outcomes alongside financial return. From essentially ethical reasons toward a holistic approach that recognizes the financial materiality of sustainability variables, ESG investing marks a development of SRI. It integrates more general society issues into conventional risk-return models, therefore reflecting a basic change in investment philosophy.

### **3 Literature review**

The body of current scholarly and business research on ESG investing and its effect on financial performance is reviewed in this chapter. Studies concentrating on the Nordic region and Finland especially get particular attention in order to place the present research in the larger background.

#### **3.1 ESG Investing and Financial Performance: Global Evidence**

Over the past two decades, a considerable amount of research has gone into the link between ESG performance and financial returns (Evans & Peiris, 2010; Kang et al., 2023). Earlier sentiment expressed that including ESG elements into financial decision-making and investing practices may restrict investing options, hence possibly lowering portfolio diversification and results. But a mounting amount of empirical data (Shi & Yang, 2024; Eliza, 2024) challenges this perspective by showing that ESG integration may either match or even improve financial performance.

Comprising results from more than 2,000 empirical investigations, Bassen, Busch, and Friede's (2015) meta-analysis is among the most thorough studies in this field. With a notable majority finding a positive impact, their study finds that around 90% of the research reviewed find a non-negative association between ESG elements and firm financial performance. Especially over longer investment horizons, this aggregate supports the perspective that ESG factors are not only ethical but also sensible financial wise.

By means of another meta-analysis in the same year, Revelli and Viviani (2015) also concentrate especially on the performance of socially responsible investing (SRI) funds. On a risk-adjusted basis, they find that SRI funds average performance-wise to be somewhat similar to conventional funds. This result emphasizes the fit of ESG integration with conventional investment goals since it implies that ethical investing methods do not always entail a financial trade-off.

Further evidence comes from developing and emerging markets. Kaur and Tripathi (2022) conducted a comparative analysis of ESG investment outcomes across selected developed and developing economies. Their results indicate that while ESG investing is consistently associated with favorable financial outcomes in developed markets, results are more mixed in developing countries. However, some researchers (Lee & Suh, 2022) warn against generalizations even if ESG elements have a generally good correlation with financial performance. Factors that should be accounted include the particular ESG feature under consideration, the investment horizon, sectoral characteristics, and regional market conditions to determine the type and degree of the association.

### **3.2 ESG Integration and Firm Value**

Apart from the overall correlation between ESG investing and financial performance, a significant body of studies concentrates on how ESG variables affect firm-level value generation. Strong ESG performance is essentially a proxy for better management practices, less exposure to regulatory and reputational concerns, and greater stakeholder relations, all of which can help to raise company value.

By means of a theoretical and empirical analysis for this link, Fatemi, Glaum, and Kaiser (2018) suggest that ESG performance adds to business value via several channels: lower capital costs, better access to finance, and more operational efficiency. Most importantly, their research highlights the part disclosure plays as a moderator. Transparency in ESG reporting helps companies enjoy value benefits, according to the authors (Fatemi et al., 2018), since investors can evaluate the materiality and credibility of their sustainability initiatives more easily. This emphasizes the need of not only ESG performance but also the quality and availability of information connected to ESG.

From a more critical stance, Cornell and Damodaran (2020) wonder if ESG efforts really provide financial benefit or merely “sound good” from a public relations aspect. They contend that ESG programs should not be expected to significantly affect business value in a meaningful sense unless they result in increased future cash flows or lowered risk.

This mistrust calls for careful assumption of a direct causal link between ESG adoption and performance, particularly in situations where companies might adopt ESG language without significant practical changes. By means of the ESG-efficient frontier framework, Fitzgibbons, Pedersen, and Pomorski (2021) offer a formalized model showing how companies with high ESG ratings might draw demand from ESG-oriented investors. The model also suggests that ESG attributes can impact capital market dynamics independently of operational performance, so introducing an additional behavioral and demand-driven mechanism for valuation effects, even if this may lead to higher valuations and reduced expected returns due of increased investor preference. Collectively, these studies suggest that ESG integration has the potential to influence firm value both through intrinsic channels, for example operational efficiency and reduced risks, and extrinsic channels, for example investor preferences and market premiums. However, the magnitude and direction of this influence depend on factors such as disclosure quality, stakeholder alignment, and market expectations.

### **3.3 ESG Investing in Nordic Countries and Finland**

The Nordic countries have long been considered as pioneers in sustainability, transparency, and responsible governance (Strand, 2024; Antunes et al., 2024), making them an ideal location for ESG research. Strong regulatory settings, progressive business cultures, and significant public awareness of environmental and social issues have established the region as a model for ESG integration. Within this context, Finland stands out due to its relatively small but well-regulated capital market, high corporate responsibility norms, and proactive government sustainability measures.

Vaihekoski and Yahya (2023) give one of the only thorough empirical studies that investigate ESG and company performance in the Nordic nations, including Finland. Using data from 2010 to 2020, they discovered a generally positive association between ESG scores and corporate valuation, notably in the environmental and social dimensions. Surprisingly, the governance pillar was shown to be inversely associated with profitability in some circumstances, implying that placing too much focus on governance frameworks

may come at a cost, such as lower managerial freedom or compliance requirements. The study (Vaihekoski & Yahya, 2023) also mentions bi-directional causality, meaning that while strong ESG practices can boost financial performance, more profitable organizations may also be better positioned to invest in ESG activities.

These conclusions are supported by additional research conducted abroad. For example, research (He et al., 2022; Khorilov & Kim, 2024) based on data from China and Korea show that enterprises with strong ESG policies have reduced idiosyncratic risk and greater resilience during market downturns, particularly during the COVID-19 crisis. This suggests that ESG may serve as both a value-enhancing signal and a defensive trait in unpredictable markets, which is especially important for long-term investors. Despite this improvement, the scholarly literature on ESG investing in Finland is still rather limited when compared to larger markets. While asset managers and institutional investors in Finland are increasingly implementing ESG strategies, empirical research at the firm or stock level is lacking. Most previous research have concentrated on ESG fund performance or employed pan-Nordic samples, making it impossible to distinguish country-specific effects.

### **3.4 ESG Factors and Risk Reduction**

Pedersen, Fitzgibbons, and Pomorski (2021) build on traditional portfolio theory by introducing the ESG-efficient frontier, which adds ESG preferences into the classic risk-return optimization paradigm. Their model suggests that portfolios with high ESG scores may benefit from improved downside protection, either through intrinsic firm resilience or through the collective actions of ESG-motivated investors stabilizing stock prices during market stress. Thus, ESG integration has the potential to boost not only projected returns for select investors, but also lower tail risks.

Empirical evidence supports this theoretical viewpoint. Firms with strong ESG scores have been found to have lower idiosyncratic risk and stock price volatility. Fatemi, Glaum, and Kaiser (2018) suggest that ESG practices help organizations reduce risk by improving

stakeholder management, regulatory compliance, and adaptation to external shocks. High-ESG enterprises efficiently reduce their risk profiles by limiting exposure to costly events such as lawsuits, environmental disasters, and social boycotts. Furthermore, ESG can be used as a risk management tool at the portfolio level. Studies (Broadstock et al. 2021; Ouchen, 2021) undertaken during moments of increased market volatility, such as the COVID-19 pandemic, show that portfolios biased toward high-ESG equities exhibit smaller drawdowns and faster recoveries than conventional benchmarks. Although ESG-focused funds are not immune to market-wide shocks, their greater resilience demonstrates the potential for ESG integration to function as portfolio insurance.

However, it is crucial to note that the risk-reduction benefits of ESG investment may not be the same across various sectors and markets. Some industries, such as energy and heavy manufacturing, confront inherently higher ESG risks due to their environmental effect, whereas technology and healthcare companies may naturally align with ESG standards. Furthermore, the success of ESG in risk reduction is dependent on the consistency and uniformity of ESG disclosures, which vary greatly across areas and across time. The research supports the theoretical proposition that ESG considerations can help improve risk management. For investors in reasonably open and regulated markets like Finland, where firms are often subject to strict governance norms and environmental legislation, ESG variables may provide an especially significant signal of corporate resilience and sustainability.

## 4 Hypothesis Development

Extending the theoretical framework and results presented in the previous literature review, I will now develop a set of hypotheses to investigate the correlation between ESG performance and financial results in the Finnish stock market. Previous studies imply that companies with strong ESG policies could have better financial results via several avenues. Better operational efficiency, enhanced risk management, stronger stakeholder relationships, and reputational benefits, all of which can help to improve long-term profitability and lower volatility, have been linked to high ESG performance (Fatemi, Glaum, & Kaiser, 2018; Pedersen, Fitzgibbons, & Pomorski, 2011). Meta-analyses by Bassen, Busch, and Friede (2015) and Revelli and Viviani (2015) show that ESG investing is often linked with positive or neutral financial performance, therefore refuting the idea that sustainability issues imply financial sacrifices.

Moreover, ESG-oriented companies and portfolios have exhibited more resilience than their non-ESG counterparts during times of market turbulence, such the COVID-19 epidemic (Pedersen, Fitzgibbons, & Pomorski, 2021; Broadstock et al. 2021; Ouchen, 2021). The idea that companies dedicated to excellent environmental control, social responsibility, and sound governance are better suited to negotiate economic uncertainty and external shocks grounds this resilience logically. Although these results are well-documented worldwide, very few studies have concentrated especially on Finland. Given Finland's strong institutional frameworks, high degrees of corporate transparency, and sustainability orientation, it is logical to anticipate that ESG issues may greatly influence financial outcomes in this market also. Thus, the following hypotheses for empirical testing are developed:

H1: ESG-positive stocks listed in Finland provide higher risk-adjusted returns than ESG-negative stocks.

H2: ESG-positive stocks listed in Finland have lower volatility than ESG-negative stocks.

H3: ESG-positive stocks listed in Finland are more resilient during moments of market stress than ESG-negative stocks.

The first hypothesis is based on the belief that better operational management, reduced exposure to regulatory and reputational concerns, and more attractiveness to investors, all of which lead to better financial outcomes, are linked with stronger ESG performance. Consequently, the second hypothesis is connected with the idea that strong ESG policies are hypothesised to help increase corporate resilience and stability, which should over time translate into reduced stock price volatility. For the third hypothesis, stronger stakeholder support and operational consistency during economic downturns are expected of ESG-positive companies, which will help to slow down stock price losses and hasten recoveries compared to ESG-negative companies.

These hypotheses directly address the primary study goal: to methodically compare Finnish ESG-positive and ESG-negative stock performance. By means of localized empirical data on the influence of ESG in financial outcomes, testing these hypotheses will contribute to the larger body of ESG research and provide useful information for investors in the Finnish market.

## 5 Methodology

This chapter discusses the research design, including the portfolio development procedure, firm classification into ESG-positive and ESG-negative groups, and the statistical methods used. The analytical framework comprises CAPM regression analysis, Sharpe Ratio evaluation, and paired t-tests.

### 5.1 Overview and Research Design

To address the research issues and test the hypotheses presented in Chapter 4, a quantitative, comparative research strategy is used that is comparable to Borgers et al. (2013) and Kempf & Osthoff (2007). This will allow for the systematic comparison of financial performance disparities between two distinct groups of firms: those defined as ESG-positive and those labeled as ESG-negative based on their ESG ratings. The study relies on secondary data from a respected financial database and ESG rating provider, LSEG Workspace (LSEG, 2025). The research population consists of firms registered on the Helsinki Stock Exchange. ESG scores divide companies into ESG-positive and ESG-negative groups. The financial performance of these two groups is measured using typical investment performance metrics such as average returns, cumulative returns, risk-adjusted returns, volatility, and drawdowns during market crises.

Portfolio-level analysis simulates a practical investment approach by constructing and tracking hypothetical portfolios of ESG-positive and ESG-negative equities over a set time period. Descriptive statistics and inferential statistical tests are used to determine whether observed differences in financial performance are statistically significant. Using this research design, the study intends to generate strong empirical evidence on whether ESG performance correlates with financial advantages or drawbacks in the Finnish equity market. The methodology is designed to be objective, replicable, and relevant to both academic research and practical investment decisions.

## 5.2 Sample Selection and Data Sources

This study's sample includes publicly traded companies listed on the Helsinki Stock Exchange (Nasdaq, 2025). Firms are chosen based on the availability of comprehensive ESG scores and consistent financial performance data for the whole analysis period (January 2010–December 2023). To ensure comparability and reduce survivor bias, only firms with continuous ESG rating coverage and adequate financial data across the entire sample period are included. Companies with missing ESG scores, insufficient trading history, or delisting during the period are eliminated, as is usual procedure in ESG investment research (Vaihekoski & Yahya, 2023; Kempf & Osthoff, 2008).

LSEG Workspace (LSEG,2025) provides ESG and financial market data, including monthly stock prices, total returns, and firm-specific characteristics like market capitalization and beta. LSEG offers standardized ESG ratings across the environmental, social, and governance pillars, as well as aggregated overall ESG scores based on a proprietary system that assesses organizations using a variety of quantitative and qualitative variables. These ESG scores are frequently utilized in academic research and serve as the foundation for categorizing companies into ESG-positive and ESG-negative portfolios.

Historical financial data obtained from LSEG Workspace is adjusted for dividends and business activities to ensure accurate monthly return calculations. The generated dataset allows for portfolio-level examination of performance, volatility, and risk-adjusted returns. The study attempts to improve internal validity by focusing solely on Finnish enterprises and employing a single, high-quality data provider while ensuring consistency in measurement and reporting standards across firms.

## 5.3 ESG Classification Approach

To investigate the link between ESG performance and stock-level financial outcomes, firms in the sample are divided into two portfolios: ESG-positive and ESG-negative. This classification is based on the total aggregated ESG scores supplied by LSEG Workspace,

which are standardized percentile rankings that assess a company's relative sustainability performance within its industry across Environmental, Social, and Governance aspects. For this thesis, the categorization procedure uses a relative, percentile-based approach.

1. Companies having ESG scores in the top 50% in a given year are sorted to the ESG-positive portfolio.
2. Firms in the bottom 50% are sorted to the ESG-negative portfolio.

This relative categorization system assures a consistent separation of high and low ESG performance, avoids artificial absolute limits, and accounts for annual variations in score distributions. The portfolio composition is changed annually to reflect changing ESG profiles, allowing for dynamic grouping that better reflects how ESG-aware investors might rebalance in response to evolving ESG disclosures. To protect data integrity, firms having incomplete or missing ESG data for specific years are omitted from portfolio development for relevant periods. This treatment adheres to protocols typically used in ESG-related financial performance studies (Kempf & Osthoff, 2008; Vaihekoski & Yahya, 2023), which require consistent data availability to assure comparability and avoid survivorship or selection bias.

The percentile-based classification is especially relevant for the Finnish market, where the spread of absolute ESG ratings may be narrower than in bigger and more diversified markets. By focusing on relative ESG status within the domestic listed universe, the method captures significant disparities in sustainability performance while staying robust to score compression and industry effects (Fatemi, Glaum, & Kaiser, 2018).

#### **5.4 Portfolio Construction**

Two hypothetical investment portfolios based on the ESG categorization system are developed to assess the financial performance of companies with ESG-positive and ESG-negative influence. Based on ESG ratings, companies annually ranked in the top 50%

make up the ESG-positive portfolio while those ranked below 50% make up the ESG-negative portfolio. Every constituent company included in a portfolio is under an equal-weighting structure. Whether a company has a high market capitalization, every company opens each calendar year with the same portfolio weight. This approach helps to avoid too strong impact by big-cap firms and allows for a more fair comparison between companies of various sizes (Kempf & Osthoff, 2008; Kaur & Tripathi, 2022).

Every year, portfolios are rebalanced to reflect updated ESG classifications. Based on their most recent ESG score, companies are moved at the start of every year into the ESG-positive or ESG-negative portfolio. Companies no longer qualifying are deleted while newly qualifying companies are included. Reflecting the operational practices of many ESG-themed investment products, this rebalancing timetable lets the portfolios catch dynamic changes in company ESG performance across time similar to Vaihekoski & Yahya (2023). Monthly portfolio returns are calculated as the average of monthly total returns of individual companies adjusted for dividends and corporate actions. These monthly results are the basis for further analysis which includes cumulative return calculations and risk-adjusted performance assessments.

Compounding monthly returns calculates cumulative returns over the whole sample period of 2010–2023 while volatility is assessed as the standard deviation of monthly returns. Risk-adjusted performance is evaluated using Sharpe Ratios, which align with earlier studies analyzing the effects of ESG (Revelli & Viviani, 2015; Helliar, Petracci, & Tantiantiwong, 2022). Companies delisted, merged, or bought during a calendar year stay in the portfolio until the end of the year. After that, they are taken off at the next annual rebalance. Companies with missing return data for specific months are excluded from the monthly return computation for that period, therefore maintaining data integrity without significantly biasing the results.

## 5.5 Performance Metrics

A variety of performance criteria are used to assess and compare the financial performance of ESG-positive and ESG-negative portfolios. These measurements aim to represent many aspects of investment performance, such as raw returns, volatility, and risk-adjusted returns (Revelli & Viviani, 2015; Helliar et al., 2022). The primary comparison is based on average monthly and cumulative returns. Monthly returns are computed by taking an equal weighted average of each portfolio's constituent equities. Cumulative returns are calculated by geometrically compounding monthly returns for the whole sample period of 2010-2023. But because return metrics alone do not account for investment risk, a few risk-adjusted performance measures are calculated:

Sharpe Ratio:

$$\text{Sharpe Ratio} = \frac{E(R_p) - R_f}{\sigma_p}$$

where:

$E(R_p)$  = *expected monthly portfolio return*

$R_f$  = *risk free rate*

$\sigma_p$  = *standard deviation*

Jensen's Alpha:

$$\text{Alpha} = R_p - R_f + \beta(R_m - R_f)$$

where:

$R_p$  = *portfolio return*

$R_f$  = *risk free rate*

$\beta$  = *beta*

$R_m$  = *market return*

This method closely follows Fatemi et al. (2018) and Vaihekoski & Yahya (2023), where alpha is used to test for persistent performance after adjusting for systematic risk. To test for performance under market stress with Hypothesis H3, portfolio returns are also analyzed for a defined crisis period from January 2020 to December 2022, covering the COVID-19 crash and the 2022 energy crisis. This sub-sample analysis mirrors similar approaches in ESG resilience literature (Broadstock et al., 2021; Ouchen, 2021), where ESG portfolios were tested for stability and downside protection during turbulent markets.

## 5.6 Statistical Methods

To evaluate the hypotheses proposed in Chapter 4 and assess if the performance differences between ESG-positive and ESG-negative portfolios are statistically significant, a combination of descriptive and inferential statistical methods are used similar to Kampf & Osthoff (2008) and Fatemi et al. (2018). Basic descriptive statistics are computed for each portfolio to characterize performance characteristics. This includes:

1. Mean monthly returns
2. Standard deviation of return (volatility)
3. Sharpe ratios
4. Max drawdowns

These indicators give an overview of the average performance, risk levels, and downside exposure. Cumulative returns are also visually graphed to show long-term return trajectories.

Inferential statistical methods are used to explicitly examine whether ESG-positive and ESG-negative portfolios perform significantly differently. An independent sample t-test is used to compare the mean returns and volatility of the ESG-positive and ESG-negative portfolios. This test determines whether the means of two independent groups are significantly different. This method is extensively used for comparing ESG performance and

is similar to Revelli & Viviani (2015) and Eliza (2024). The following assumptions are examined.

1. The two samples are independent
2. Estimate the normality of return distributions
3. Homogeneity of variances

To account for firm-specific variables, a cross-sectional Ordinary Least Squares (OLS) regression model is used to quantify the influence of ESG classification on stock returns while controlling for firm size and systematic market risk. The model is defined as follows:

$$R_{i,t} = \alpha + \beta_1 \times ESG_{Groupi,t} + \beta_2 \times Size_{i,t} + \beta_3 \times Beta_{i,t} + \varepsilon_{i,t}$$

Where:

$R_{i,t}$  = monthly return for firm  $i$  at time  $t$

$\alpha$  = alpha

$ESG_{Groupi,t}$  = dummy variable, 1 if ESG positive, 0 if ESG negative

$Size_{i,t}$  = firm size, logarithm of market capitalization

$Beta_{i,t}$  = firm's market beta

$\varepsilon_{i,t}$  = error term

Holding size and risk exposure constant, this regression model allows one to isolate the return effects resulting from ESG portfolio classification. It reflects models found in similar ESG literature (Fatemi et al., 2018; Kang, Moon, & Shin, 2023). The analysis is reproduced for a defined crisis subperiod January 2020 to December 2022, covering the COVID-19 crash and the 2022 energy crisis, therefore testing Hypothesis H3 regarding performance under market stress. The same performance measures are computed during this period. In keeping with past crisis-oriented ESG research, differences between

ESG portfolios are once more examined using independent samples t-tests (Broadstock et al., 2021; Ouchen, 2021).

## 5.7 Limitations and Assumptions

While this analysis aims to give rigorous and relevant insights on ESG-related stock performance in Finland, it is important to note key methodological limitations and assumptions in order to frame the breadth and generalizability of the findings. The research is based on ESG scores and financial data gathered from LSEG Workspace, a well-known and reliable data provider. However, ESG scores are naturally vulnerable to methodological heterogeneity and subjectivity due to differences in evaluation criteria, indicator selection, weighting systems, and disclosure quality amongst organizations (Fatemi, Glaum, & Kaiser, 2018; Cornell & Damodaran, 2020). These variations may impair the comparability of ESG ratings between organizations and over time. Furthermore, only enterprises with continuous ESG data from 2010 to 2023 are included, potentially introducing survivorship bias by favoring larger, more established firms with consistent reporting methods (Vaihekoski & Yahya, 2023).

The findings apply specifically to the Finnish equities market, which is small, established, and relatively transparent, with strong regulatory frameworks and ESG adoption. As a result, the findings may not be immediately applicable to larger, emerging, or less-regulated markets with significantly different ESG norms, investor behavior, and market dynamics (Kaur & Tripathi, 2022). This study follows an equal-weighted portfolio construction and annual rebalancing technique based on ESG categories. While this approach allows for a clear comparison of ESG-positive and ESG-negative portfolios, it may not fully reflect real-world investment behavior, since issues such as transaction costs, liquidity restrictions, and dynamic weighting methods come into play. Using fixed percentile cutoffs to construct ESG groups simplifies ESG variance and may mask more nuanced distinctions, particularly when ESG scores cluster within small ranges.

Inferential statistical tests, such as t-tests, make the assumption that return distributions are normal and variances between groups are homogeneous. Although established diagnostic procedures are used, financial return data frequently deviates from optimal expectations, especially during times of market volatility. Furthermore, while the regression models account for firm size and market beta, they do not explicitly include other potentially significant characteristics like as sector exposure, leverage, or firm-specific news, which may lead to omitted variable bias.

## 6 Data

This chapter describes the data sources and variables used in the study. It describes the sample selection process, data cleaning techniques, and variable preparation for analysis using ESG ratings and financial data from Finnish listed firms.

### 6.1 Dataset Description

This study makes use of a comprehensive dataset that combines ESG scores and financial performance data for publicly traded firms on the Helsinki Stock Exchange (Nasdaq, 2025) between January 2010 and December 2023. The sample includes all firms for which ESG scores and monthly financial return data are available throughout the entire study period. Companies with inadequate ESG ratings or significant gaps in financial data were eliminated to maintain uniformity and comparability across the portfolios. The final dataset includes 37 distinct organizations per year, representing a wide range of industries such as industrials, finance, technology, consumer products, and energy.

ESG data is obtained from LSEG Workspace, formerly Refinitiv Eikon, which offers standardized ESG ratings based on business filings and independent third-party assessments (LSEG, 2025). Each company is evaluated on the Environmental, Social, and Governance dimensions and granted an ESG score. LSEG Workspace (LSEG, 2025) also provides monthly stock price data, adjusted for dividends and corporate actions, which is used to calculate portfolio-level returns. Portfolio returns are computed using total return data, and excess returns are calculated by deducting the monthly risk-free rate, which is based on an annualized rate of 1.34%. The risk-free rate is calculated using the long-term average yield on Finnish 10-year government bonds for the sample period (Suomen Pankki, 2025). The OMX Helsinki Index serves as a proxy for market returns. It should be noted that this index shows price returns and excludes reinvested dividends, which introduces a modest limitation to return comparability.

Sharpe Ratios are used to assess risk-adjusted performance of both ESG-positive and

ESG-negative portfolios in comparison to market benchmarks. In addition to the full-sample analysis, the study conducts a focused examination of the portfolios from January 2020 to December 2022, capturing the effects of the COVID-19 pandemic and the 2022 energy crisis linked to geopolitical tensions, primarily the Russia-Ukraine conflict.

## 6.2 Summary statistics

Table 1 displays the descriptive statistics for the monthly returns of the ESG-positive portfolio, ESG-negative portfolio, and the OMX Helsinki market index for the entire sample period from January 2010 to December 2023. The statistics encompass the mean return, standard deviation, lowest and maximum returns, and the count of monthly observations for each series.

**Table 1.** Descriptive statistics for the study period

Statistic	ESG-Positive Return	ESG-Negative Return	Market Return
Mean	0.0086925	0.0085445	0.0035008
Standard Deviation	0.049273	0.0544144	0.0456866
Minimum	-0.1926378	-0.2007914	-0.1680508
Maximum	0.1342779	0.1723644	0.1191669
Observations (N)	167	167	167

The ESG-positive portfolio demonstrates a marginally superior average monthly return of 0.87% compared to the ESG-negative portfolio's 0.85%, with reduced volatility. This indicates a possible return advantage for enterprises with higher ESG ratings on a risk-adjusted basis. Moreover, both ESG portfolios exhibit increased return variability relative to the market benchmark, which has a lower average return of about 0.35% but also a reduced standard deviation.

Regarding extreme outcomes, the ESG-negative portfolio recorded the largest monthly gain of 17.24% and the most significant monthly loss of -20.08% over the study period.

The ESG-positive portfolio demonstrated significant return dispersion, with monthly returns fluctuating between -19.26% and 13.43%. The market index exhibited reduced volatility, with returns ranging from -16.81% to 11.92%. Though with more volatility, the statistics show that both ESG portfolios produced better returns than the market. The closeness of the ESG-positive and ESG-negative portfolios emphasizes the need of extra statistical testing and risk-adjusted performance evaluation, which will be covered in the next parts.

### **6.3 Data cleaning and preparation**

The preliminary dataset was subjected to a number of cleansing and preparation procedures to guarantee the consistency, completeness, and comparability of observations across companies and time periods. Companies lacking ESG scores or exhibiting significant deficiencies in monthly return data were omitted from the final sample. Only corporations having comprehensive yearly ESG ratings and accessible monthly total return data for the period from 2010 to 2023 were included. This method alleviates biases linked to incomplete reporting and guarantees that all organizations incorporated in the research possess dependable and uninterrupted data coverage.

Monthly total returns were computed using stock prices obtained from LSEG Workspace. Companies were subsequently categorized into ESG-positive and ESG-negative portfolios annually, based on their cumulative ESG scores, with portfolios being rebalanced at the commencement of each calendar year. An equal-weighting methodology was employed to mitigate return distortion attributable to firm size, in accordance with established practices in ESG portfolio research (Kempf & Osthoff, 2008).

Excess returns for both ESG portfolios and the market index were computed by subtracting a constant risk-free rate. The rate utilized reflects an annualized figure of 1.34%, derived from the long-term average yield of 10-year Finnish government bonds for the sample period (Suomen Pankki, 2025), and was adjusted to a monthly equivalent to align with the return frequency. This modification conforms to the Capital Asset Pricing Model

(CAPM) framework, facilitating accurate computation of risk-adjusted returns.

Cumulative returns were computed for each portfolio and the market benchmark via continuous compounding of monthly returns. All data were synchronized to a monthly frequency, and date variables were standardized to enable precise time-series alignment across datasets. The OMX Helsinki index, utilized as the market benchmark, solely reflects price returns and excludes dividend reinvestment considerations. Consequently, comparisons of market returns may exhibit a minor downward bias in relation to firm-level total returns, which account for dividend effects.

A crisis-period dummy variable was established to encapsulate the cumulative effects of the COVID-19 epidemic and the 2022 energy crisis for sub-sample analysis. This dummy delineates the timeframe from January 2020 to December 2022 and is employed in both descriptive and regression research to isolate portfolio behavior amid increased volatility and systemic uncertainty. The data preparation techniques guarantee the analytical integrity of the study by delivering a comprehensive, clean dataset suitable for statistical testing, regression modeling, and visual performance analysis of ESG-positive and ESG-negative portfolios within the Finnish equity market.

## 7 Results

This chapter specifies the empirical results of the study, contrasting the performance of ESG-positive and ESG-negative portfolios across the entire sample and during the crisis period. Results from CAPM regressions, Sharpe Ratios, cumulative return assessments, and t-tests are analyzed. All of the data and calculations were carried out in StataIC 16 (Stata, 2025).

### 7.1 Descriptive Statistics

Table 1 determines the monthly return attributes of the ESG-positive and ESG-negative portfolios, alongside the OMX Helsinki market index, across the entire sample period from January 2010 to December 2023, thereby offering context for the ensuing analysis. The ESG-positive portfolio demonstrated a slightly superior average monthly return of around 0.87%, in contrast to 0.85% for the ESG-negative portfolio. Conversely, the market index yielded a decreased average return of 0.35%. The ESG-positive and ESG-negative portfolios exhibited standard deviations of 4.93% and 5.44%, respectively, surpassing the market index volatility of 4.57%.

The spectrum of returns further demonstrates the increased volatility of the ESG portfolios in comparison to the market. The ESG-negative portfolio achieved the best monthly return of 17.24% and the most significant loss of -20.08% within the sample period. The ESG-positive portfolio exhibited marginally reduced extremes, with a maximum return of 13.43% and a minimum of -19.26%. The market index demonstrated a more steady return profile, varying between -16.81% and 11.92%. The summary statistics indicate that although ESG portfolios exhibited greater volatility than the market, they also provided superior average returns, necessitating further analysis via risk-adjusted and regression-based performance metrics.

## 7.2 CAPM Regression Results

Table 2 presents the results of the CAPM regressions for the ESG-positive and ESG-negative portfolios over the full sample period. Both portfolios demonstrate beta values close to one, 0.958 for the ESG-positive and 0.962 for the ESG-negative portfolio, indicating that they move closely in line with overall market returns. These beta coefficients are statistically significant at the 1% level.

**Table 2.** Regressions for both portfolios

	(1)	(2)
Portfolio	ESG-Positive	ESG-Negative
Beta	0.958*** (0.0386)	0.962*** (0.0546)
Alpha (monthly)	0.00529*** (0.00176)	0.00513** (0.00249)
Alpha (annualized)	0.0654	0.0634
Observations	167	167
R-squared	0.789	0.653

**Note:** Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

For both portfolios, the alpha estimates, which reflect risk-adjusted excess returns outside what is explained by market movements, are positive and statistically significant. With a monthly alpha of over 0.529%, the ESG-positive portfolio shows a 1% level significance. The comparable monthly alpha of 0.513% produced by the ESG-negative portfolio is notable at the 5% level. Annualizing them yields approximately 6.54% and 6.34% respectively.

Particularly for the ESG-positive portfolio with  $R^2 = 0.789$ , compared to  $R^2 = 0.653$  for the ESG-negative portfolio, the R-squared values show that market volatility account for a significant share of return variance. For ESG-positive companies, this implies tighter market connection and improved model fit. Although the ESG-positive portfolio showed somewhat greater risk-adjusted consistency, overall both ESG portfolios produced statistically significant positive abnormal returns during the study period.

### 7.2.1 Sharpe Ratios

As Table 3 shows, Sharpe Ratios for the ESG portfolios and the market index were computed to evaluate risk-adjusted performance. The Sharpe Ratio records the extra return obtained per unit of risk.

**Table 3.** Sharpe Ratios for both portfolios

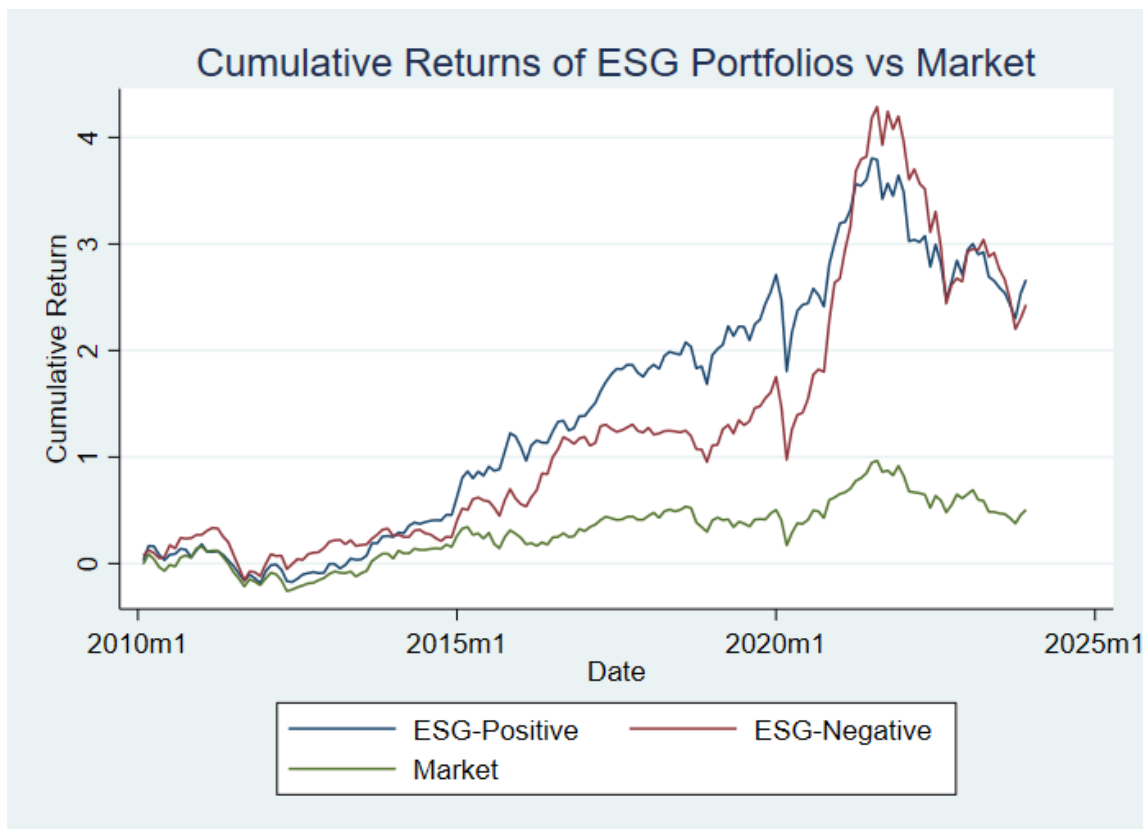
Portfolio	Sharpe Ratio
ESG-Positive	0.154
ESG-Negative	0.136
Market	0.052

With a Sharpe Ratio of 0.154, the ESG-positive portfolio attained somewhat better risk-adjusted performance than both the ESG-negative portfolio of 0.136 and the market index of 0.052. These results line up with past CAPM data and offer more data to support Hypothesis 1, that ESG-positive companies might produce better risk-adjusted returns.

### 7.3 Cumulative Return Analysis

Together with the market index, Figure 2 shows the cumulative return graphs of the ESG-positive and ESG-negative portfolios during the whole sample period from January 2010 to December 2023. Over the study period, ESG portfolios clearly outperform the market

benchmark, suggesting that companies included in the sample generated better long-term returns than the more general Finnish equity market.



**Figure 2.** Cumulative returns of ESG portfolios and market index (2010-2023)

For the larger part of the period, the ESG-positive portfolio routinely outperformed the ESG-negative portfolio in terms of cumulative returns; with a particularly noteworthy difference developing around 2015-2020. This growing performance difference implies that companies with better ESG profiles would have provided better long-term investment success in line with Hypothesis 1 assumptions. Notwithstanding both portfolios experiencing significant drawdowns, the ESG-negative portfolio momentarily outperformed the ESG-positive portfolio during the COVID-19 epidemic and after market volatility between 2020 and 2022. This change emphasizes the possibility of conditional or cyclical variation in ESG-related returns and shows how brief crises could generate deviations from long-run trends in ESG performance.

While the ESG portfolio returns are total returns including dividends and reinvestments, the market index shows price returns solely and excludes dividends. Together with the absence of a large amount of listed companies missing complete ESG or return data, this methodological disparity could help to explain the significant return difference shown between the built portfolios and the market benchmark.

Apart from the variations in the return strategies, the data selection process could be another possible factor for the market index's underperformance in relation to ESG portfolios. Firms with incomplete or missing ESG data were excluded which made the sample to be comprised of only organizations with consistent ESG reporting across the whole period. Companies with inconsistent or no ESG disclosure—many of which nonetheless show up in the market index—may outperform their more transparent counterparts, either because of poorer sustainability performance or less investor trust. Although this theory cannot be explicitly examined within the parameters of the present dataset, earlier studies have indicated a favorable link between ESG disclosure quality and firm valuation (Fatemi, Glaum, & Kaiser, 2018). Consequently, the absence of lower-disclosure companies could have indirectly helped the ESG portfolios to show better performance than the market benchmark.

#### **7.4 T-Test Results**

Table 4 presents the mean monthly returns of the ESG-positive and ESG-negative portfolios under both the defined crisis period 2020–2022 and the whole sample period 2010–2023.

**Table 4.** Paired t-test results

	Full Sample	Crisis Period
Mean Return (ESG-Positive)	0.00869	0.00321
Mean Return (ESG-Negative)	0.00854	0.01237
Mean Difference	0.000148	-0.00916
t-Statistic	0.0555	-1.7226
p-Value	0.9558	0.0938
95% Confidence Interval	(-0.00512, 0.00541)	(-0.01995, 0.00163)

The ESG-positive portfolio shown a somewhat higher average monthly return of 0.87% than the ESG-negative portfolio of 0.85% during the whole sample period. With a p-value of  $p = 0.9558$ , the difference of 0.015 percentage points was statistically insignificantly and economically minimal, nonetheless. The confidence interval for the mean difference spans 0, therefore confirming the conclusion that over the long run there is no statistically meaningful return differential.

By means of an average monthly return of 1.24% compared to 0.32% for the ESG-positive portfolio, the ESG-negative portfolio outperformed in the crisis period between January 2020 and December 2022. With a p-value of 0.0938 the mean difference of -0.916 percentage points was negative and somewhat significant at the 10% level. Although it still contains zero but narrowly, the 95% confidence interval points to a possible variation in portfolio performance during more volatile times. These findings provide only little evidence for Hypothesis 3. Unlike the initial expectation that ESG-positive companies would show better resilience, the data reveal a small short-term benefit for ESG-negative companies throughout the crisis.

## 7.5 Crisis Period Analysis (2020-2022)

The performance of ESG-positive and ESG-negative portfolios over the crisis period spanning January 2020 to December 2022 is investigated in this part. This window catches

the geopolitical and energy-related market volatility following the Russia–Ukraine conflict as well as the economic disturbance linked with the COVID-19 epidemic.

**Table 5.** Descriptive statistics for the crisis period

Statistic	ESG-Positive	ESG-Negative	Market Return
Mean	0.003208	0.0123672	0.0041177
Standard Deviation	0.0626606	0.0779018	0.056848
Minimum	-0.1926378	-0.2007914	-0.1680508
Maximum	0.1309648	0.1723644	0.1191669
Observations (N)	36	36	36

With an average monthly return of 1.24% the ESG-negative portfolio showed a much higher average than the ESG-positive portfolio of 0.32% and the market index of 0.41%. Relative to the market, both ESG portfolios showed increasing volatility; the ESG-negative portfolio had the largest standard deviation at 7.79%. The ESG portfolios also showed more clear return extremes, which reflected significant drawdowns in the early months of 2020. These findings clearly deviate from full-sample tendencies, in which the ESG-positive portfolio performed just marginally better. Examined further in the subsections below, the results challenge the differential susceptibility of ESG strategies to crisis dynamics.

### 7.5.1 CAPM Regression Results: Crisis Period

Table 6 presents the findings of CAPM regressions conducted throughout the crisis era. Both ESG portfolios exhibited heightened vulnerability to market fluctuations, with beta values surpassing 1.0.

**Table 6.** Regression results for both portfolios during crisis period

	(1)	(2)
Portfolio	ESG-Positive	ESG-Negative
Beta	1.060*** (0.0519)	1.232*** (0.103)
Alpha (monthly)	-0.00109 (0.00291)	0.00755 (0.00578)
Alpha (annualized)	-0.0129	0.0945
Observations	36	36
R-squared	0.925	0.808

**Note:** Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The ESG-positive portfolio displayed a marginally negative albeit statistically insignificant monthly alpha of -0.109%. Conversely, the ESG-negative portfolio realized a positive alpha of 0.755% monthly, equating to roughly 9.45% on an annualized basis. The statistical significance of this alpha is constrained by sample size and variation. Both regressions exhibit elevated R-squared values, notably for the ESG-positive portfolio with  $R^2 = 0.925$ , indicating that market returns accounted for the majority of return variation during the crisis. The elevated beta of 1.232 for the ESG-negative portfolio indicates greater market exposure, potentially accounting for its superior performance during the post-crisis recovery.

#### 7.5.1.1 Sharpe Ratios: Crisis Period

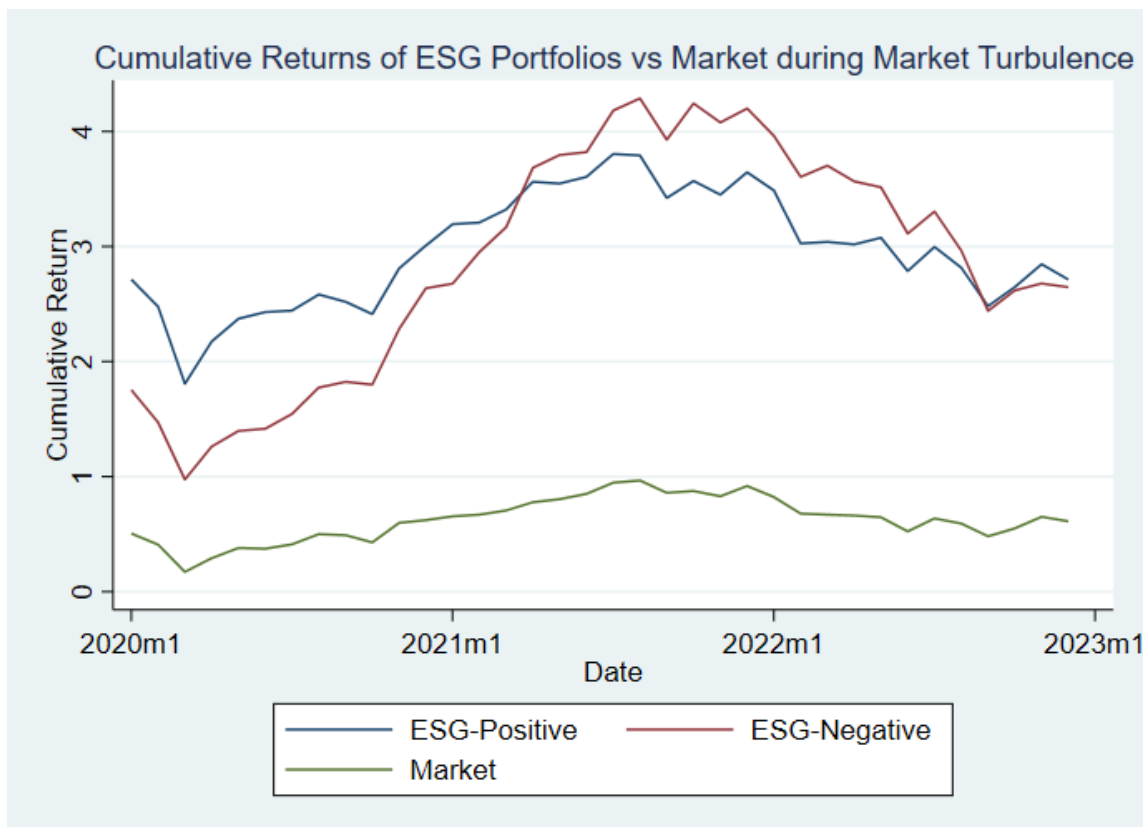
Table 7 displays the Sharpe Ratios for the ESG portfolios and the market index throughout the crisis era to evaluate risk-adjusted performance. The ESG-negative portfolio achieved the highest Sharpe Ratio of 0.144, indicating a superior risk-adjusted return. By contrast, the ESG-positive portfolio's ratio was considerably lower with 0.033, suggesting a much less favorable risk-adjusted performance during the crisis period.

**Table 7.** Sharpe Ratios for the crisis period

Portfolio	Sharpe Ratio
ESG-Positive	0.033
ESG-Negative	0.144
Market	0.053

### 7.5.2 Cumulative Return Analysis: Crisis Period

Figure 3 depicts cumulative return developments from January 2020 to December 2022 for the ESG portfolios as well as the market index. ESG portfolios beat the market index, which stayed very flat during the period. Particularly in the second half of 2020 and into early 2021, corresponding with the post-COVID recovery in world markets, the ESG-negative portfolio showed consistently higher cumulative growth. The ESG-negative portfolio kept a performance edge over its ESG-positive counterpart even with some draw-downs in 2022.



**Figure 3.** Cumulative returns for both ESG portfolios and the market benchmark during the crisis period

Reflecting solely price returns, the market index lagged much behind both portfolios, highlighting the possible benefit of dividend-inclusive portfolio strategies during times of market turbulence. This performance difference also shows the exclusion of companies with incomplete ESG data, which can have underperformed and yet find inclusion in the larger market benchmark.

### 7.5.3 T-Test Results: Crisis Period

Previously mentioned in section 7.4, Table 4 shows the paired t-test findings also for the crisis era. Comparatively to 0.32% for the ESG-positive portfolio, the ESG-negative portfolio returned 1.24% on average over this period. With a p-value of 0.0938 the mean difference of -0.00916 is negative and somewhat significant at the 10% level. Under crisis, the confidence interval for the mean difference of -0.01995 to 0.00 163 tightly spans

zero, suggesting caution in interpretation but implying a possible short-term performance advantage for ESG-negative companies.

Although these results fall short of accepted statistical standards, they complement the CAPM and Sharpe Ratio results and offer some preliminary evidence for Hypothesis 3. Against expectations of stronger ESG resilience, the evidence points to ESG-negative companies perhaps profiting more from the fast rebound and risk appetite changes that defined the post-shock climate.

## **7.6 Summary of Key Findings**

This chapter examined the financial performance of ESG-positive and ESG-negative portfolios in the Finnish equity market for the entire sample period, January 2010 to December 2023, as well as during the designated crisis period, January 2020 to December 2022. Both ESG portfolios outperformed the market index on average and cumulative returns across the whole sample. The CAPM regression results revealed statistically significant positive alphas for both portfolios, with the ESG-positive portfolio having a slightly better model fit, as seen by a higher R-squared. Despite these findings, a paired t-test comparing mean returns between the ESG-positive and ESG-negative portfolios found no statistically significant difference, implying that ESG classification did not systematically cause long-term return differentials. Sharpe ratios validated these findings, with both portfolios outperforming the market on a risk-adjusted basis. Over the entire sample period, the ESG-positive portfolio outperformed the benchmark in terms of Sharpe Ratio.

In contrast, the crisis-period research indicated some discrepancies in portfolio performance. During this period, the ESG-negative portfolio had greater average monthly returns, a higher Sharpe Ratio, and stronger cumulative return growth. The CAPM results revealed an enhanced and statistically significant beta for the ESG-negative portfolio, as well as a positive alpha, though with low statistical significance. The paired t-test revealed a negative mean return difference favoring the ESG-negative portfolio, which was marginally significant at 10%. These findings imply that the ESG-negative portfolio may

have been more responsive to post-crisis recovery and changes in investor risk appetite.

Overall, data suggests that ESG-oriented portfolios outperformed the Finnish market over time. However, the returns differed between ESG-positive and ESG-negative portfolios were small and not consistently significant. Only during instances of severe market stress did performance dynamics appear to diverge, with minimal evidence suggesting that ESG-negative firms had a short-term benefit. These findings emphasize the complexities of ESG-performance linkages and the importance of contextual factors such as market cycles and investor sentiment in shaping ESG-related return outcomes.

## 8 Discussion

The empirical results of this chapter are analyzed in view of the theoretical framework and body of current research. The results have ramifications for companies and investors both and are examined. The limits of the study are also noted together with recommendations for next studies.

### 8.1 Interpretation of Main Results

The empirical results of this study provide a complex view of the relationship between ESG traits and stock performance among publicly listed businesses in the Finnish equity market over the period from January 2010 to December 2023. In terms of average and cumulative returns, ESG-positive and ESG-negative portfolios both notably beat the market index during the whole sample period. The presence of positive and statistically significant alphas for both portfolios was confirmed by CAPM regression results, therefore demonstrating risk-adjusted outperformance relative to the market benchmark. With a somewhat higher R-squared value, the ESG-positive portfolio suggested a rather better model fit and tighter alignment with market fluctuations. The paired t-test, however, showed no statistically significant variation in average returns between the two ESG groups, suggesting that ESG score by itself was not a systemic cause of performance variations over the long run.

Risk-adjusted measurements strengthened this view even more. Both portfolios had Sharpe ratios higher than the market index, therefore proving that, independent of classification, ESG-integrated strategies provided better returns per unit of risk. Though linked with good portfolio formation, the slight variation in Sharpe Ratios between the ESG-positive and ESG-negative portfolio implies that ESG scoring might not be in itself a sufficient differentiator of outperformance.

During the crisis period 2020–2022, a more distinct pattern developed encompassing the COVID-19 epidemic and the energy shock connected to the Russia–Ukraine conflict.

Over many performance criteria, the ESG-negative portfolio beat its ESG-positive equivalent over this period. For the ESG-negative portfolio, average monthly returns and Sharpe ratios were especially higher. The paired t-test produced marginal statistical evidence of the outperformance of ESG-negative companies, whereas CAPM regression results revealed a positive, though marginally significant, alpha for these firms. These findings imply that, during turbulent times, ESG-negative companies would have been more sensitive to investor risk preferences or cyclical rebounds.

Collectively, the findings show that, in the Finnish market, ESG traits, as proxied by aggregated ESG scores, were not consistently correlated with better financial performance. Although overall ESG-oriented portfolios performed better than the market, over the long run the difference between ESG-positive and ESG-negative portfolios was not very clear and became clear only under market stress. These results highlight how dynamically ESG-performance is shaped by contextual elements including macroeconomic uncertainty, investor attitude, and recovery phases. Therefore, instead of assuming a homogeneous performance premium connected with ESG classification, investors and legislators should take care when considering the cyclical and situational character of ESG value drivers.

## **8.2 Comparison to Prior Literature**

The results of this study add to the larger academic debate on the relationship between financial returns and ESG performance. Consistent with most of the body of current research, the findings show that, especially in small, developed markets like Finland, ESG traits do not regularly produce superior absolute returns. The results of Vaihekoski and Yahya (2023), who found limited evidence of ESG-driven outperformance in the Nordic region, are reflected in the lack of a statistically significant difference in returns between ESG-positive and ESG-negative portfolios across the whole study period. The meta-analysis Bassen, Busch, and Friede (2015) conducted, which compiled over 2,000 empirical investigations and produced mixed results, with outcomes mostly based on regional, chronological, and methodological settings, supports this even more. These results

support the belief that ESG investing is not always connected with better financial returns even if it may provide some diversification or non-financial advantages.

Consistent with the theory put forth by Fitzgibbons, Pedersen, and Pomorski (2019), who first established the ESG-efficient frontier, the positive Sharpe Ratios noted in both ESG portfolios relative to the market align with each other. Their approach implies that investors may maximize the trade-off between ESG preferences and projected returns to generate risk-adjusted returns. The current analysis offers empirical evidence for this perspective since ESG-integrated strategies can produce better risk-adjusted performance even in cases when absolute return differences between ESG-positive and ESG-negative companies are small.

Still, the results of the crisis-period complicate the story. Unlike expectations that ESG-positive companies could provide for downside protection in volatile markets, as advised by Fatemi, Glaum, and Kaiser (2018), the ESG-negative portfolio attained superior returns and Sharpe Ratios during the 2020–2022 crisis. Sectoral variations could be responsible for this discrepancy, which would imply that companies with lower ESG scores might have concentrated in the industrial or energy sectors that benefited from the global energy shock and post-pandemic recovery.

Particularly in stressing the context-specific and conditional character of ESG-related financial performance, the results of this study are generally rather consistent with the body of current knowledge. Although ESG elements might help to lower risk and improve risk-adjusted returns, they do not always or everywhere result into excess market out-performance. These outcomes emphasize how macroeconomic conditions, sectoral exposures, and investor goals shape the financial consequences of ESG integration.

### **8.3 Implications for Investors and Companies**

The results of this study have numerous significant implications for corporate decision-makers, portfolio managers, and investors who are implementing ESG investing

strategies. The results indicate that ESG scores, while potentially beneficial for risk management and value alignment, do not ensure superior absolute returns for investors. Throughout the entire sample period, no statistically significant difference was observed between the performance of ESG-positive and ESG-negative portfolios. This suggests that ESG classification may not be a reliable indicator of financial outperformance in a relatively mature and efficient market such as Finland.

Nevertheless, the Sharpe Ratios of both ESG portfolios were substantially higher than those of the market index, suggesting that they generated more robust risk-adjusted returns. This implies that ESG-integrated investment strategies may offer improved return efficiency, a feature that is particularly appealing to investors who are concerned with portfolio stability, long-term sustainability objectives, or ESG-aligned mandates. The results also provide significant support for the idea that ESG strategies can improve diversification without sacrificing performance, even if they do not consistently generate excess returns.

The significance of contextual awareness in ESG investing is further emphasized by the crisis-period analysis. The 2022 energy crisis and the COVID-19 pandemic caused the ESG-negative portfolio to outperform, indicating that short-term macroeconomic conditions and sectoral dynamics may prevail over ESG-based expectations. During the crisis, sectors that are frequently associated with lower ESG ratings, including energy, industrials, and utilities, reaped the benefits of increasing commodity prices and defensive characteristics. These findings underscore the necessity for asset managers to integrate sector allocation strategies and macroeconomic analysis with ESG scoring, particularly in volatile environments.

The results from a corporate perspective indicate that, although strong ESG credentials may enhance stakeholder perceptions and facilitate long-term risk mitigation, they do not necessarily result in short-term financial outperformance. This underscores the significance of incorporating ESG practices into a more comprehensive strategic framework

for companies, which should encompass not only sustainability disclosures but also operational resilience, innovation, governance quality, and stakeholder engagement. Companies should consider ESG adoption as a means to develop long-term value, enhance reputational capital, and align with the evolving expectations of investors, regulators, and consumers, rather than viewing ESG investments as a direct lever for short-term stock price appreciation. Even if immediate financial benefits are not always apparent, this may position firms more favorably for future market shifts.

#### **8.4 Limitations of the Study**

Although this study provides insightful analysis on the relationship between ESG characteristics and stock performance in the Finnish equity market, it is crucial to acknowledge numerous constraints in order to place the results in perspective and guide next studies. Originally based on a fixed, annualized risk-free rate of 1.34%, the computation of excess returns was translated into a monthly equivalent to guarantee consistency during the sample period. This approach assured scientific homogeneity, but it neglected variations in risk-free rates, especially at times of rising economic uncertainty as the COVID-19 epidemic or the 2022 energy crisis. Using market-based, monthly risk-free rates that change with time can help one to prove the accuracy of return and regression predictions for further studies.

Second, the benchmark for market performance, the OMX Helsinki Index, is based on price returns instead of total returns including dividends. By contrast, the ESG portfolios were created by modifying the total returns to consider dividends. Particularly in comparisons of cumulative returns, this methodological inconsistency may somewhat affect the relative performance of the portfolios. Future studies could either change the benchmark returns or include a total return form of the benchmark index. Third, the study covers companies listed on the Helsinki Stock Exchange alone. This limited emphasis limits the generalizability of the results to other nations or more general regional indexes even if it enables a context-specific and thorough study of the Finnish market. Regulatory

regimes, investor preferences, and ESG reporting criteria might vary greatly between markets, therefore influencing the ESG–performance dynamics elsewhere.

Fourth, the crisis-period study covers just 36 monthly observations, therefore lowering the statistical power of the tests carried out over this subperiod. Therefore, one should approach the observed marginal significance levels in the crisis-period t-tests and regression results with great care. Increasing the time horizon or include several crisis periods could help to improve the validity of such studies. At last, the ESG ratings applied in this research were revised annually. Although this is the reporting frequency of most ESG data sources, it might not fairly depict significant intra-year developments in company sustainability performance or scandals. Portfolio reclassifications based on annual performance may thus lag behind real-time changes in company behavior or market impression. Higher frequency ESG indicators or event-based ESG data might help future studies to increase responsiveness in portfolio sorting.

## **8.5 Suggestions for Future Research**

Building on the findings and methodological limitations of this study, several avenues for future research can be identified to further explore the relationship between ESG performance and financial returns. First and foremost, future studies could benefit from incorporating time-varying, monthly risk-free rates when calculating excess returns. The use of a constant annualized rate, while methodologically consistent, may understate or overstate risk-adjusted performance, particularly during periods of interest rate volatility such as those observed during the COVID-19 pandemic or the 2022 energy crisis. More granular risk-free rate data would allow for greater precision in performance attribution and regression estimates.

Second, researchers should consider benchmarking portfolio returns against total return indices that include reinvested dividends. In this study, the market benchmark, the OMX Helsinki Index, was based on price returns, whereas the ESG portfolios included dividend-adjusted total returns. Aligning both metrics would minimize potential biases in

return comparisons and improve methodological consistency. Third, expanding the geographical scope beyond the Finnish equity market could enhance the generalizability of ESG-related findings. Comparative studies across Nordic or broader European markets would enable researchers to assess how variations in investor behavior, ESG reporting standards, and regulatory environments influence the performance implications of ESG integration.

Fourth, future research could explore ESG effects at the sectoral level. The crisis-period outperformance of ESG-negative firms observed in this study may reflect sector-specific dynamics, particularly in industries such as energy or materials. Segmenting analysis by industry or including sector-fixed effects in regression models could help disentangle ESG-specific effects from broader sector trends. Finally, the application of multi-factor asset pricing models, such as the Fama-French five-factor model or the Carhart four-factor model, could offer deeper insight into the underlying drivers of return variation. These models can account for factors such as size, value, momentum, and profitability, which may confound or interact with ESG characteristics. By integrating ESG factors within a more comprehensive pricing framework, future studies could clarify whether ESG represents a distinct return driver or reflects exposure to existing financial risk factors.

## 9 Conclusion

This study examined the relationship between ESG characteristics and stock performance in the Finnish equity market over the study period from January 2010 to December 2023. The primary objective was to assess whether firms with higher ESG scores, which were ranked into the ESG-positive portfolio outperform those with lower scores, which were ranked into the ESG-negative portfolio, in terms of raw returns, risk-adjusted returns, and resilience during periods of market stress. Using ESG and financial data from LSEG Workspace, portfolios were formed annually based on ESG scores, and their monthly total returns were calculated. The analysis employed CAPM regressions, Sharpe Ratios, paired t-tests, and cumulative return comparisons to evaluate performance over the full sample period and a defined crisis period of January 2020 to December 2022.

The findings indicate that both ESG-positive and ESG-negative portfolios outperformed the market index over the full sample in terms of average and risk-adjusted returns. CAPM results showed statistically significant positive alphas for both portfolios, and Sharpe Ratios confirmed improved return efficiency relative to the market. However, no statistically significant difference in average returns was observed between the two ESG groups during this period, suggesting that ESG scores alone were not a consistent driver of long-term outperformance in the Finnish market. During the crisis period, a modest divergence emerged. The ESG-negative portfolio achieved higher average returns and superior Sharpe Ratios, while also displaying a positive alpha in CAPM analysis. Although statistical evidence was marginal, the paired t-tests provided weak support for the outperformance of ESG-negative firms during the crisis. These results may reflect sectoral effects, as industries typically associated with lower ESG scores—such as energy and industrials—benefited from macroeconomic tailwinds during the COVID-19 pandemic and the energy crisis.

This study contributes to the ESG investing literature by providing focused, market-specific evidence from Finland, which is an underexplored but transparent and institutionally mature environment. The results are broadly consistent with prior Nordic evidence

(Vaihekoski & Yahya, 2023) and global meta-analyses (Bassen, Busch & Friede, 2015; Revelli & Viviani, 2015), which find that ESG investing can improve risk-adjusted performance but does not necessarily ensure higher absolute returns. It also supports the theoretical view that ESG integration may enhance portfolio efficiency rather than alpha generation per se (Fitzgibbons, Pedersen & Pomorski, 2019). For investors, these findings suggest that ESG integration may enhance return efficiency and risk mitigation, even in the absence of consistent outperformance over conventional strategies. For companies, the results imply that ESG adoption may contribute to long-term value creation and stakeholder alignment but should not be expected to yield automatic short-term financial gains.

The study has several limitations. A constant risk-free rate was used for excess return calculations, and the market benchmark was based on price-only returns, possibly inflating relative portfolio performance. The relatively small number of observations in the crisis subperiod limited statistical power, and annual ESG data may have missed intra-year developments in firms' sustainability performance. Future research can address these limitations by incorporating time-varying risk-free rates, using total return indices, and expanding the analysis to include other Nordic or European markets. Employing multi-factor asset pricing models and conducting sector-specific or firm-level ESG analyses could also provide deeper insights into the mechanisms linking ESG characteristics and financial outcomes.

In conclusion, this study reinforces the growing importance of ESG considerations in investment decision-making while highlighting the conditional and context-dependent nature of their financial effects. As ESG integration continues to evolve, rigorous, data-driven, and market-specific research will remain essential for informing both academic inquiry and practical investment strategies.

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