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The Performance of ESG Exchange-Traded Funds Compared to Conventional Exchange-Traded Funds

Evidence from European and U.S. Markets

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ABSTRACT:

This thesis examines the financial performance of environmental, social, and governance (ESG) exchange-traded funds (ETFs) in comparison with conventional ETFs in the equity markets of Europe and the United States. The growing popularity of responsible investing, along with the increasing interest in ESG factors, has raised questions regarding whether ESG investments can generate competitive financial returns relative to traditional investment strategies. The objective of this thesis is to determine whether ESG ETFs differ from conventional ETFs in terms of returns, risk-adjusted performance, and factor exposures.

The empirical analysis is based on daily return data obtained from the London Stock Exchange Group (LSEG) Datastream database. The sample consists of nine ETF pairs, in which each ESG ETF is matched with a conventional ETF that tracks a highly similar benchmark index. The selected ETF pairs represent major equity markets in Europe and the United States, including indices such as the S&P 500, Nasdaq 100, DAX, MSCI Europe, and Euro Stoxx 50. The analysis employs the Fama–French five-factor (FF5) model as well as the Sharpe ratio to evaluate the performance and risk–return characteristics of the ETF funds.

The empirical results indicate that ESG ETFs and conventional ETFs exhibit highly similar factor profiles and overall performance characteristics. In several ETF pairs, ESG ETFs achieve slightly higher Sharpe ratios compared to their conventional counterparts, suggesting somewhat superior risk-adjusted performance. However, the results do not provide consistent evidence that ESG ETFs systematically outperform conventional ETFs in terms of returns. Furthermore, the regression analysis indicates that ESG screening does not significantly alter the core investment characteristics of broadly diversified market ETFs.

The findings suggest that investors can incorporate ESG considerations into their investment strategies without significantly compromising financial performance. At the same time, the results highlight that any potential financial advantages of ESG investing are dependent on market conditions, index composition, and the selected time period.

KEYWORDS: ETFs, ESG, responsible investing, sustainable investing, portfolio performance, Fama-French five-factor, Sharpe ratio

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TIIVISTELMÄ:

Tämä tutkielma tarkastelee ympäristöön, yhteiskuntavastuuseen ja hyvään hallintotapaan (ESG) keskittyvien pörssinoteerattujen rahastojen (ETF) taloudellista suorituskykyä verrattuna perinteisiin ETF-rahastoihin Euroopan ja Yhdysvaltojen osakemarkkinoilla. Vastuullisen sijoittamisen kasvava suosio sekä lisääntynyt kiinnostus ESG-tekijöitä kohtaan ovat herättäneet kysymyksiä siitä, kykenevätkö ESG-sijoitukset tuottamaan kilpailukykyisiä taloudellisia tuottoja suhteessa perinteisiin sijoitusstrategioihin. Tutkielman tavoitteena on selvittää, poikkeavatko ESG-ETF:t perinteisistä ETF:istä tuoton, riskikorjatun suorituskyvyn ja faktorialtistusten osalta.

Empiirinen analyysi perustuu päivittäiseen tuottoaineistoon, joka on kerätty London Stock Exchange Groupin (LSEG) Datastream-tietokannasta. Otos koostuu yhdeksästä ETF-parista, joissa jokainen ESG-ETF on yhdistetty perinteiseen ETF:ään, joka seuraa hyvin samankaltaista vertailuindeksiä. Valitut ETF-parit edustavat keskeisiä Euroopan ja Yhdysvaltojen osakemarkkinoita, mukaan lukien indeksit kuten S&P 500, Nasdaq 100, DAX, MSCI Europe ja Euro Stoxx 50. Analyysissä hyödynnetään Fama–Frenchin viiden faktorin (FF5) mallia sekä Sharpen lukua ETF-rahastojen suorituskyvyn ja riski–tuotto-ominaisuuksien arvioimiseksi.

Empiiriset tulokset osoittavat, että ESG-ETF:illä ja perinteisillä ETF:illä on hyvin samankaltaiset faktoriprofiilit ja yleiset suorituskykyominaisuudet. Useissa ETF-pareissa ESG-ETF:t saavuttivat hieman korkeamman Sharpen luvun kuin perinteiset vertailukohteensa, mikä viittaa jonkin verran parempaan riskikorjattuun suorituskykyyn. Tulokset eivät kuitenkaan anna johdonmukaista näyttöä siitä, että ESG-ETF:t systemaattisesti ylittäisivät perinteisten ETF:ien tuoton. Regressioanalyysi osoittaa lisäksi, ettei ESG-seulonta merkittävästi muuta laajasti hajautettujen markkina-ETF:ien keskeisiä sijoitusominaisuuksia.

Tulokset viittaavat siihen, että sijoittajat voivat sisällyttää ESG-näkökulmia sijoitusstrategioihinsa ilman merkittävää heikennystä taloudellisessa suorituskyvyssä. Samalla tulokset korostavat, että ESG-sijoittamisen mahdollinen taloudellinen etu on riippuvainen markkinaolosuhteista, indeksien koostumuksesta sekä valitusta tarkastelujaksosta.

AVAINSANAT: ETFs, ESG, responsible investing, sustainable investing, portfolio performance, Fama-French five-factor, Sharpe ratio

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1 Introduction

Investing activity has increased significantly in recent years, and participation in financial markets has expanded among private households and retail investors (OP Media, 2021). In Finland, households invested substantial amounts in both shares and investment funds during 2021, while interest in responsible investment instruments also increased notably. This development reflects the growing popularity of sustainable investing and the broader accessibility of investment products.

Investment funds are professionally managed portfolios that allocate investors' capital across different asset classes according to a predetermined investment strategy (Nordea, 2023). Due to diversification benefits and relatively low investment thresholds, funds have become an increasingly common investment instrument among private investors. At the same time, exchange-traded funds (ETFs) have gained popularity because of their cost efficiency, liquidity, and ability to provide broad market exposure.

Responsible investing refers to the integration of ESG factors into investment decision-making (CFA Institute, 2024). ESG factors are non-financial criteria related to environmental, social, and governance issues. Sustainability is considered in a broader context, acknowledging that it extends beyond environmental concerns (Peterdy, n.d.). ESG investing emphasizes long-term sustainability considerations alongside traditional financial objectives. The growing interest in ESG investing has been driven by increasing awareness of climate change, social responsibility, and corporate governance issues, as well as rising investor demand for sustainable investment opportunities (Tucker & Jones, 2020). Recent crises, including the COVID-19 pandemic and challenges related to climate and human rights, have further strengthened public concerns regarding the sufficiency of natural resources, air quality, and overall sustainability. These concerns have additionally amplified interest in ESG investing.

In addition to private investors, corporate interest in responsible investing has grown considerably in recent years. Companies of various sizes increasingly recognize the

importance of incorporating ESG principles into strategic decision-making (Lau, n.d.). Numerous companies have acknowledged that integrating ESG principles into their operations may enhance long-term profitability and strengthen investor confidence.

1.1 Purpose of the thesis

The purpose of this thesis is to examine whether ESG ETFs outperform conventional ETFs in the European and U.S. equity markets. The analysis focuses on return, volatility, and risk-adjusted performance, while also applying regression analysis to control for market-related risk factors. Responsible investing is often considered less profitable because it excludes certain industries that have traditionally been viewed as highly profitable, such as oil and alcohol-related industries. In addition, responsible companies may face stricter operational and regulatory standards, which can limit opportunities for profit maximization.

This thesis also investigates the performance of ESG funds during periods of economic downturn. Economic crises represent an important aspect of financial markets, as periods of uncertainty may significantly affect portfolio values and investor behaviour. Throughout history, investors have encountered various financial crises (Alexandria, 2020). Since investing is inherently a long-term activity, investors are likely to encounter multiple periods of market instability during their investment horizon. Particular attention is given to the COVID-19 pandemic, which increased interest in sustainable investing.

ESG investing has increasingly attracted both private and institutional investors, although questions regarding its financial profitability remain subject to debate. Critics of ESG investing argue that responsible investment strategies may restrict investment opportunities by excluding profitable industries and imposing stricter operational standards on firms. Consequently, this thesis aims to contribute to the existing literature by examining whether ESG ETFs can deliver competitive financial performance relative to conventional ETFs.

1.2 Hypotheses

The hypotheses of this thesis are based on previous literature. Prior research provides mixed evidence regarding the performance and returns of ESG ETFs. Therefore, the hypotheses are formulated to examine potential performance differences between ESG ETFs and conventional ETFs. The hypotheses are presented as follows.

H_0: There is no statistically significant difference in performance between ESG ETFs and conventional ETFs.
H_1: There is a statistically significant difference in performance between ESG ETFs and conventional ETFs.
H_2: ESG ETFs may outperform conventional ETFs.

1.3 Structure of the thesis

This thesis consists of eight main chapters. Following the introduction, Chapter 2 discusses the concept and historical development of responsible investing and ESG. Chapter 3 introduces exchange-traded funds (ETFs), while Chapter 4 presents the theoretical framework and the key financial models applied in the study. Chapter 5 reviews previous literature concerning the performance of ESG and responsible investments, including their performance during periods of economic downturn. Chapter 6 presents the data and research methodology, while Chapter 7 reports the empirical findings of this study. Finally, Chapter 8 concludes the thesis by summarizing the main findings and discussing the implications of the results.

2 Responsible investing

This chapter presents the concept of responsible investing. Responsible investing refers to the consideration of non-financial factors as part of investment decision-making (CFA Institute, 2024). American economist Milton Friedman (1970) argued that the primary objective of firms and investors is profit maximization. Unlike traditional investors, responsible investors do not focus solely on profit maximization; they also consider non-financial factors. These non-financial factors are commonly referred to as ESG factors, which represent environmental, social, and governance criteria. In responsible investing, return and risk considerations are combined with ESG factors. ESG has become an established valuation framework among financial professionals (Leins, 2020).

2.1 Definition of ESG

The importance assigned to environmental, social, and governance factors depends largely on the investor's individual values and priorities (Hyrske et al., 2020, p.107). Hyrske et al. argues that some investors may place greater emphasis on environmental aspects, such as sustainability and climate-related issues, whereas others may prioritize social concerns, including labour rights and working conditions. Figure 1 illustrates examples of factors commonly associated with ESG criteria.

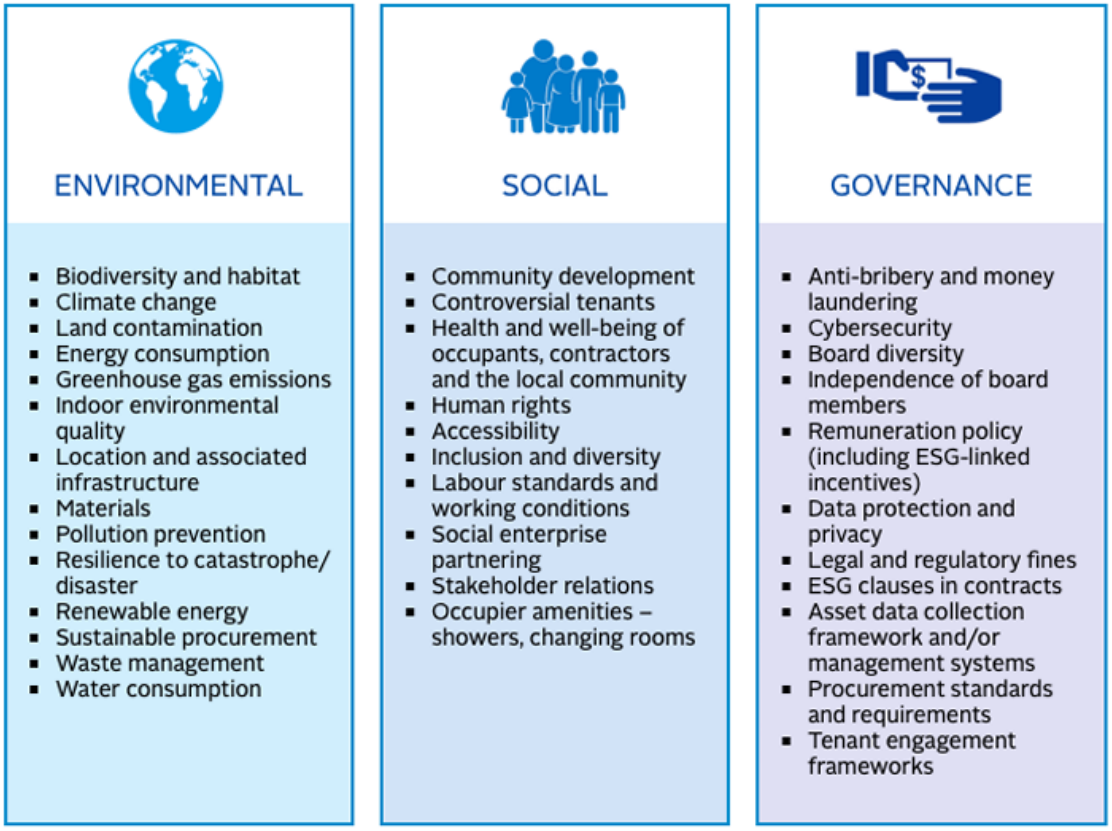

Figure 1. ESG factors (UNPRI, 2022).

In recent years, an increasing number of companies have integrated ESG factors into their strategic decision-making processes. According to Nasdaq (2018), ESG considerations have become increasingly important in maintaining long-term competitiveness and attracting investors. Large institutional investors expect companies to demonstrate proactive engagement in ESG-related policies and communication. A lack of commitment to ESG principles may lead investors to withdraw their support, making it increasingly important for companies to recognize the significance of sustainability-related issues. According to Nasdaq, several investment firms also incorporate ESG assessments into portfolio risk analysis. This suggests that capital may increasingly flow toward companies that adhere to ESG principles.

Moreover, ESG principles may enhance a company´s competitive position and long-term value creation (Nasdaq, 2018). It is important for companies to recognize the need to

adapt to changing socio-economic and environmental conditions. According to Nasdaq, understanding these developments may help firms identify strategic opportunities and respond more effectively to competitive challenges. In addition, proactive adherence to ESG principles may reduce reputational risks associated with environmental and social controversies. Historically, activist groups have targeted companies' environmental and social vulnerabilities in campaigns that have resulted in significant reputational damage. Companies that follow ESG principles often attract long-term investors who recognize that sustainable transformation requires time. Responsible investors are therefore often associated with a long-term value-oriented investment approach.

ESG investing is also commonly referred to as socially responsible investing (SRI), sustainable investing, or green investing. SRI incorporates ESG principles into portfolio selection and investment decision-making (Martini, 2021). During the investment selection process, investors evaluate both financial performance measures and non-financial ESG-related factors. Responsible investing therefore integrates personal values and broader social concerns into financial decision-making (Schueth, 2003). Responsible investors seek to maximize overall utility through investment decisions while also acknowledging the potential influence of investments on society and the environment. Schueth identifies two primary motivations among responsible investors. The first group seeks to allocate capital in a manner consistent with personal values and priorities, whereas the second group aims to improve societal and environmental well-being through investment activity.

Kurittu (2021) state that investors may either select individual stocks that align with their understanding of responsible investing or invest in ESG-focused funds. Fund investing is often considered one of the easiest ways to begin investing. Available fund alternatives include equity funds, fixed-income funds, and mixed funds. Financial professionals construct ESG funds by selecting companies that meet specific responsibility criteria, thereby simplifying the investment process for private investors. As a result, investors do

not need to independently identify responsible investment targets but may instead rely on the expertise of fund managers.

In fund investing, the definition of responsibility is largely delegated to the fund manager (Kurittu, 2021). Although investors are not required to familiarize themselves extensively with fund's holdings, understanding the fund's investment strategy may still be beneficial. Investors typically have access to information regarding fund holdings, costs, and risk levels. In addition, all investment funds operating with the European Union are required to provide a prospectus, which improves transparency and standardization across funds. Tucker and Jones (2020) note that the number of ESG and exchange-listed funds has increased significantly in recent years, demonstrating that ESG investment products have become an established part of mainstream investing. For example, the S&P 500 ESG Index (SPXESUP), launched by S&P Dow Jones in 2019, was designed to measure the performance of companies that meet sustainability criteria while maintain similar overall market exposure to the traditional S&P 500 index.

Today, investors have access to a wide range of responsible investment opportunities, and the number of available alternatives is expected to increase further due to growing demand (SSGA, 2020). Responsible investing has remained a major investment trend for several years, partly due to increasing concerns related to climate change and sustainability. According to SSGA companies face growing pressure to operate in an environmentally and socially responsible manner. ESG considerations are increasingly important because they may influence both corporate performance and the risk-return profile of investments (Hyrske et al., 2020, p. 102). Hyrske et al. argue that responsible investing can no longer be ignored, as it has become an integral part of both financial markets and broader societal discussion.

Responsible investing remains a broad concept, and there is still no universally accepted definition for it. According to Finland´s Sustainable Investment Forum (Finsif, n.d.), responsible investing reflects investor's values, objectives, and attitudes. Consequently,

investors may define responsible investing differently depending on their priorities and stakeholders. According to Finsif, the motives for responsible investing may include alignment between investments and personal values, risk management, the pursuit of improved risk-adjusted returns, and regulatory compliance. Due to the absence of a universally accepted definition, it is useful to present one of the most widely recognized definitions of SRI. Eurosif defines sustainable and responsible investment as follows:

> Sustainable and responsible investment ("SRI") is a long-term oriented investment approach which integrates ESG factors in the research, analysis and selection process of securities within an investment portfolio. It combines fundamental analysis and engagement with an evaluation of ESG factors in order to better capture long term returns for investors, and to benefit society by influencing the behaviour of companies (Eurosif, 2018, p. 12).

Eurosif (2018) promotes sustainable finance in Europe and presents organizations managing assets exceeding 20 trillion euros. Eurosif further notes that the absence of a precise definition of SRI has not slowed the growth or popularity of sustainable and responsible investing.

2.2 History of Responsible Investing

The origins of responsible investing are closely associated with ethical investing and religious principles. According to Renneboog et al. (2008), Jewish, Christian, and Islamic traditions have significantly influenced the development of responsible investment practices. These religious traditions include teachings concerning ethical financial behaviour and the responsible use of money, many of which are documented in religious texts. During the Middle Ages, Christians followed restrictions derived from the Old Testament regarding lending and investment practices. In 1139, the Catholic Church introduced a universal prohibition on usury, which remained in effect until the nineteenth century. In addition, John Wesley, the founder of Methodism, argued against engaging in activities considered sinful or profiting from the unethical treatment of others. As a result of these principles, the Methodist Church in the United Kingdom avoided investments in industries associated with weapons, tobacco, alcohol, and gambling (Renneboog et al, 2008).

Modern responsible investing is generally considered to have emerged during the 1960s (Schueth, 2003). Several major social and political events during this period, including the Vietnam War, concerns related to the Cold War, and movements advocating gender equality, increased public awareness of ethical and social issues. According to Schueth, consequently, the number of socially conscious and responsible investors increased substantially during the following decades.

The increasing emphasis on responsible investing during 1980s was strongly influences by opposition to the apartheid system in South Africa (Renneboog et al., 2008). Various organizations, including churches, universities, and municipalities, began to pressure companies to withdraw their operations from South Africa by incorporating ethical considerations into their investment strategies. Renneboog et al. argue that in both the United States and Europe, institutional investors and corporations increasingly encouraged firms to terminate business operations linked to the apartheid regime. Environmental disasters also contributed to the growing awareness of responsible investing. Events such as the Chernobyl disaster in 1986 and the Exxon Valdez oil spill increased investor awareness regarding the environmental consequences of industrial activity.

According to Renneboog et al. (2008), the first modern socially responsible investment fund, the Pax World Fund, was established in the United States in 1971. The fund was created for investors who opposed the Vietnam War and military-related industries more broadly. Its primary objective was to avoid investments in companies associated with weapons manufacturing and military activities. Since then, the number of responsible, SRI, and ESG-focused investment funds has increased significantly.

2.3 PRI and other frameworks

In April 2006, the United Nations introduced six Principles for Responsible Investment (PRI), which became one of the most significant global frameworks for responsible

investing (Martini, 2021). During this period, the term ESG also became more widely established within the financial industry. The primary objective of the PRI framework is to encourage investors and financial institutions to commit to responsible investment practices and integrate ESG considerations into investment decision-making (Hyrske et al., 2020). In addition to committing to the principles, signatories are expected to report their responsible investment practices and progress related to ESG implementation.

The PRI principles were developed by institutional investors and are voluntary in nature. Their primary purpose is to provide guidance on integrating ESG considerations into investment practices and ownership policies (PRI, n.d.). According to the PRI, ESG factors may positively influence the long-term value and risk profile of investment portfolios. The organization aims to promote a more sustainable and globally responsible financial system. The six Principles of Responsible Investment are presented below:

1. We will incorporate ESG issues into investment analysis and decision-making processes.
2. We will be active owners and incorporate ESG issues into our ownership policies and practices.
3. We will seek appropriate disclosure on ESG issues by the entities in which we invest.
4. We will promote acceptance and implementation of the principles within the investment industry.
5. We will work together to enhance our effectiveness in implementing the principles.
6. We will each report on our activities and progress towards implementing the principles. (PRI, n.d.)

The PRI principles can be regarded as one of the most influential developments in the field of responsible investing. According to UN Principles for Investment (UNPRI, 2021), more than 4,000 organizations across over 60 countries have become signatories to the

PRI. Charlin et al. (2022) argue that ESG investing has grown steadily since the introduction of the PRI principles and has maintained its relevance within financial markets. According to the PRI organization, an economically efficient and sustainable financial system is essential for long-term value creation. To support this objective, PRI actively encourages financial market participants to adopt and implement responsible investment principles. PRI identifies three main motivations for responsible investing: materiality, market demand, and regulation.

In addition to the PRI principles, the United Nations introduced 17 Sustainable Development Goals (SDGs) in 2015 to guide member states toward more sustainable economic and social development (Martini, 2021). These goals further strengthen the global emphasis on sustainability and responsible business practices.

Alongside PRI, the Paris Climate Agreement has also encouraged companies and governments to adopt more sustainable practices. The Paris Climate Agreement was signed by 196 countries in 2015 with the primary objective of limiting global warming (United Nations Climate Change, 2021). More specifically, the agreement aims to limit the increase in global temperature to well below 2 degrees Celsius and preferably to 1.5 degrees Celsius compared with pre-industrial levels. To ensure compliance, participating countries are required to submit national climate action plans, known as Nationally Determined Contributions (NDCs), every five years. The Paris Climate Agreement has increased pressure on companies to improve their environmental and sustainability-related practices.

In addition to global initiatives, several countries have established national organizations dedicated to promoting responsible investing. Hyrske et al. (2020) states that many countries operate their own Sustainable Investment Forums (SIFs). In Finland, Finland´s Sustainable Investment Forum (Finsif) was established in 2010 to promote responsible investing and facilitate dialogue between market participants. Similar organizations also operate internationally, including US SIF, Iceland SIF, and China SIF. According to Hyrske et al. these forums aim to increase awareness of responsible investing while considering county-specific perspectives and market conditions.

The Sustainability Accounting Standards Board (SASB) was established in 2011 to provide companies with sustainability reporting standards and tools (Hyrske et al., 2020). SASB aims to integrate economically relevant ESG variables into traditional accounting and financial reporting frameworks. According to Sustainability Accounting Standards Board (SASB, n.d.), its standards are industry-specific and currently applicable across more than 77 industries. These standards are designed to improve the availability of sustainability-related information for investors and other stakeholders.

Another responsible investing initiative is Climate Action 100+ (n.d.), which focuses on encouraging the world´s largest corporate greenhouse gas emitters to address climate change-related risks. The initiative emphasizes three key objectives: strengthening climate governance, reducing greenhouse gas emissions across corporate value chains, and improving climate-related financial disclosures. More than 700 investors currently participate in the initiative with the objective of enhancing long-term shareholder value through improved sustainability practices.

The European Union has sought to establish ESG factors as an integral component of the financial system by introducing several sustainability-related regulations and initiatives (Martini, 2021). These developments reflect the European Union`s broader objective of promoting a more sustainable and environmentally responsible economy. Furthermore, Martini argues that clearer and more harmonized global sustainability guidelines are still required to support the continued development of responsible investing practices.

2.4 Different views about ESG

ESG investing remains a subject of ongoing debate among investors, policymakers, companies, and academics. These differing perspectives often arise from varying views regarding climate change, sustainability, corporate responsibility, and the role of ethical considerations in financial decision-making. In addition, some investors continue to

prioritize traditional shareholder value maximization over broader environmental and social objectives. Consequently, it is important to critically examine the diverse perspectives surrounding ESG investing to provide a balanced and comprehensive understanding of the topic.

According to Morgan Stanley (2019), interest in responsible investing has increased consistently in recent years. Investors are increasingly interested in understanding the composition of their portfolios and seek investment opportunities that align with their personal values and sustainability preferences. Morgan Stanley´s findings indicate that a substantial proportion of investors perceive responsible investing as both financially attractive and suitable for long-term investment strategies. Specifically, approximately 86% of investors believed that responsible investing represents a viable long-term investment approach. Although the study does not directly evaluate investment performance, it demonstrates favourable investor perceptions regarding ESG-oriented investment strategies.

Similarly, research conducted by PwC (2021) suggests that consumers and investors generally perceive ESG-related business practices positively. According to the study, approximately 83% of respondents believed that companies should adopt ESG-oriented operational practices. Private investors increasingly advocate not only for the exclusion of environmentally controversial industries, such as fossil fuel companies, but also for the inclusion of firms focused on sustainable solutions, including renewable energy and clean technology companies (Krull, 2022). This development reflects a broader shift in investor preferences toward sustainability-oriented investment strategies.

Despite its growing popularity, ESG investing has also faced considerable criticism. One frequently discussed concern relates to greenwashing, which refers to situations in which companies provide misleading or exaggerated information regarding the environmental or social impacts of their operations (Lin et al., 2023). According to Lin et al. ESG-

related greenwashing may contribute to the overvaluation of firms by creating an artificially positive perception among investors and financial markets.

In addition to concerns regarding greenwashing, ESG investing has also been criticized for the credibility and effectiveness of the overall ESG framework. Critics have questioned whether ESG investing genuinely promotes sustainability or whether it primarily serves as a reputational or marketing mechanism rather than a substantive sustainability framework (Krull, 2022). Scepticism toward ESG investing is often associated with broader debates concerning climate policy, corporate responsibility, and the role of financial markets in addressing environmental and social challenges. These criticisms and debates are discussed in greater detail in Chapter 5.

3 Mutual Investment Funds, ETFs and UCITS

This chapter introduces exchange-traded funds (ETFs), which constitute the primary investment instrument examined in this study. In addition, the chapter discusses the key differences between ETFs and mutual investment funds and reviews the structural characteristics of ETFs. Finally, the chapter presents the concept of UCITS and its relevance within the European investment fund market.

3.1 Mutual Investment Funds

Mutual investment funds raise capital by issuing shares to investors, after which the collected funds are pooled and invested in a diversified portfolio. Investors may adjust their exposure by purchasing additional shares or redeeming existing ones, with transactions conducted at prices based on the fund's net asset value (NAV), which is typically calculated daily. Mutual funds continuously issue and redeem shares in response to investor demand. Consequently, net cash inflows and outflows directly influence portfolio management decisions. Net inflows are typically invested in additional securities, whereas net outflows may require the sale of existing assets. This structure enables investors to benefit from diversification and professional portfolio management, which characterizes mutual funds as open-end investment instruments (Brealey et al, 2020, pp. 378–379).

Mutual funds provide investors with access to diversification and professional portfolio management, often at relatively low cost. For many investors, investing in mutual funds is more efficient than constructing a diversified portfolio on their own. Most actively managed mutual funds aim to outperform a benchmark index by identifying securities that are expected to provide above average returns. The fund's return is influenced by the fund manager´s expertise and investment choices. In return, fund managers charge management fees and other expenses associated with running the fund. For equity mutual funds, these costs typically amount to approximately one percent annually. For investors primarily seeking cost-efficient diversification, an alternative is to invest in index

funds which aim to replicate the performance of a broad market index rather than outperform it (Brealey et al, 2020, p. 379).

3.2 Exchange-Traded Funds

Exchange-traded funds (ETFs) are passively managed investment instruments designed to track the performance of a predefined benchmark index and are traded on organized exchanges in a similar way to individual equities (Brealey et al, 2020, p. 380). According to Brealey et al., they represent a basket of stocks that investors can buy or sell as a single security. The primary objective of ETFs is to replicate the performance of a specific market index. Lettau and Madhavan (2018) argue that the defining feature of ETFs is that they combine index-based portfolio construction with continuous secondary market trading. ETFs are traded continuously on the secondary market throughout the day, whereas traditional mutual fund shares are purchased and redeemed directly from the fund company at the net asset value (NAV), which is calculated at the end of each trading day. Their popularity has increased substantially due to their ability to provide cost-effective exposure to broad domestic and international markets, as well as to more specialized sector-, regional-, or country-specific indices.

According to Puttonen and Repo (2011), the first ETF was listed on January 29, 1993, on the American Stock Exchange. This ETF was named the S&P Depositary Receipts Trust Series 1, also known as the SPDR. Although ETFs date back to the 1990s it took about a decade for them to become widely popular and recognized as investment instruments. According to Puttonen and Repo, the popularity of ETFs was driven by the fast growth of commodities, oil stocks, and emerging markets during the period 2004–2005. In addition, the Global Financial Crises further boosted the demand for ETFs. Today, there are numerous ETF options available for investors, with many funds investing in different sectors or geographic regions. For example, investors can choose ETFs that focus on small-cap stocks, the energy sector, or value stocks.

According to the United Nations Conference on Trade and Development (UNCTAD, 2020), the global ETF market has experienced significant expansion in both the number of funds and the total assets under management. The number of ETFs worldwide rose from 453 in 2005 to 6,658 in 2019. Over the same period, assets under management increased from $418 billion to $5,436 billion. The UNCTAD report states that this substantial growth reflects the increasing acceptance of ETFs as efficient and accessible investment instruments and the trend is expected to continue. From a geographical perspective, the ETF market is largely concentrated in Europe and North America, which together represent more than two-thirds of all ETFs.

Brealey et al. (2020) argue that ETFs can be considered more efficient than traditional mutual funds in certain aspects. The purchase and sale of ETF shares are executed through a single market transaction, like the trading of individual stocks, which causes ETFs to resemble closed-end funds. However, unlike actively managed funds, ETFs typically do not rely on portfolio managers to actively select securities or attempt to outperform the market, but instead aim to replicate the performance of a specified benchmark index

ETFs are structured in the form of index funds, meaning that their objective is typically not to outperform the market, but rather to replicate the returns of a designated benchmark index as closely as possible (Lettau & Madhavan, 2018). The structure of the portfolio is therefore determined according to the rules of the underlying index, rather than the discretionary decisions of a fund manager. This characteristic classifies ETFs as passive investment instruments. The difference between ETFs and mutual funds is that mutual funds aim to outperform the market, whereas ETFs seek to track an index such as the S&P 500 (Brealey et al, 2020). Figure 2 illustrates the structural composition of exchange-traded funds.

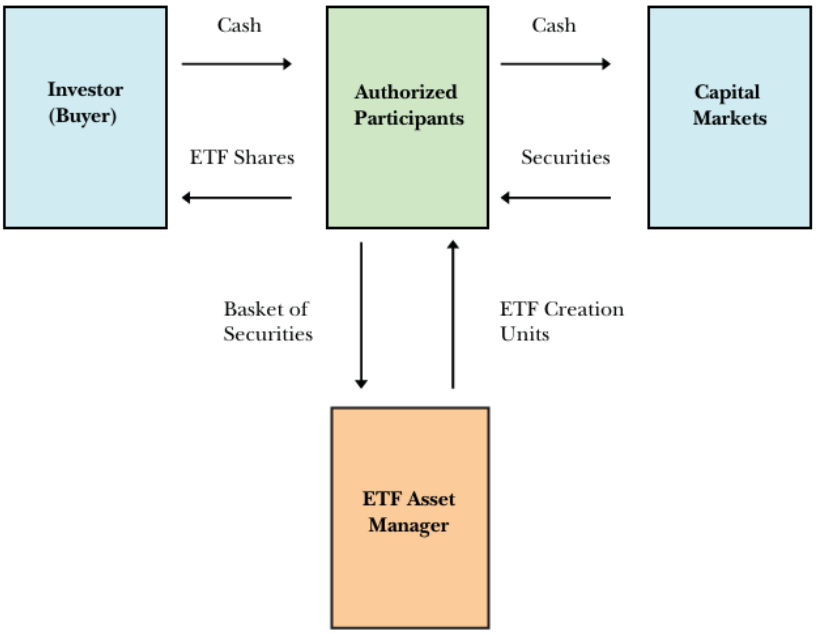

Figure 2. The ETF Architecture (Lettau & Madhavan, 2018).

3.3 ESG Exchange-Traded Funds

ESG oriented ETFs have emerged as a key financial instrument for incorporating sustainability considerations into passive investment strategies (Dumitrescu et al, 2023). These funds provide investors with a transparent and cost-efficient means of implementing responsible investment principles in practice. Dumitrescu et al. argue that by combining the advantages of passive investing with ESG criteria, ESG ETFs have become an increasingly relevant option for investors seeking both diversification and alignment with sustainability objectives. Responsible investing has experienced substantial growth in recent years, reflecting increasing investor interest in ESG factors. Despite changing attitudes towards ESG investing in certain markets, such as the United States, Gardner (2025) state that global sustainable open-end funds and ETFs continued to attract net inflows of approximately $4.9 billion in the second quarter of 2025. Over the same period, assets under management in sustainable funds rose by 10%, reaching $3.5 trillion. According to Gardner these developments indicate that responsible investment remains a significant and relevant component of the global financial system. The continued growth in

both fund flows and assets under management implies that investors increasingly consider ESG factors when making investment decisions.

3.4 UCITS ETFs

Shaw (2024) states, that UCITS ETFs (Undertakings for Collective Investments in Transferable Securities) are exchange-traded funds that operate under a European Union regulatory framework. They are designed to ensure investor protection, transparency and diversification. These funds are primarily intended for retail investors and provide access to a broad range of assets within a controlled risk environment. The UCITS framework, which was introduced in 1985, establishes strict requirements for diversification, liquidity, and risk management. As a result, UCITS ETFs are subject to a higher level of regulatory oversight compared to non-UCITS funds, which may allocate capital to more complex or riskier assets without being subject to the same regulatory limitations. This regulatory structure has become a standard for investment funds in Europe, promoting consistency and facilitating cross-border distribution. Therefore, UCITS ETFs are widely regarded as a reliable and transparent investment vehicle within the European market. In the empirical analysis presented later, only UCITS ETFs are used for the reasons outlined above.

4 Theory

This chapter presents the theoretical framework underlying the study. The chapter first discusses the measurement of responsibility and ESG-related evaluation methods, after which modern portfolio theory and traditional portfolio performance measures are introduced. Finally, the chapter reviews the main approaches to responsible investing that are commonly applied in financial markets.

4.1 How to measure responsibility

There is no single universally accepted method for measuring the responsibility or sustainability of investment funds. According to Hyrske et al. (2020), in recent years various organizations have emerged to develop standards, guidelines, and initiatives to define responsible investment practices. ESG rating agencies assess companies by evaluating their ESG performance, policies, and systems, sourcing information from various channels within the company. These agencies employ distinct methodologies that adjust company's score based on industry-specific factors. Also, the company's relative performance compared to its peers serves as a benchmark, enabling comparability across industries.

Hyrske et al. (2020) states that a strong ESG rating may indicate a company´s commitment to responsible business practices and may strengthen its reputation among investors and stakeholders. This, in turn, contributes to an improved brand reputation. Numerous American and European financial institutions incorporate ESG ratings into their investment screening processes. As a result, a favourable ESG rating may facilitate the attraction of investment and potentially reduce financing costs. Consequently, high ESG ratings may improve access to capital and increase investor interest.

Morningstar (2025) provides one of the most widely used sustainability rating systems for investment funds. Morningstar is an independent American financial services

company that evaluates the performance and sustainability characteristics of investment funds. Information is available for more than 20,000 funds globally. Morningstar has developed its own Morningstar Sustainability Rating to help investors better understand the ESG characteristics of their portfolios. The rating was published in 2016 but was updated in 2021 to incorporate Sustainalytics´ Country Risk Ratings.

Funds rated by Morningstar (2025) are classified on a scale from one to five globes. The rating process consists of five distinct steps designed to determine the appropriate classification. Funds are classified into specific categories and evaluated relative to other funds within the same category. As a result, ratings across different categories are not directly comparable. A low number of globes indicate that the portfolio has a higher level of ESG risk, whereas a high number of globes indicate lower ESG risk. Figure 3 illustrates the Morningstar´s responsibility rating distribution framework.

Figure 3. Responsibility rating distribution (Morningstar, 2025).

4.2 Portfolio theory

According to modern portfolio theory developed by Markowitz (1952), an investor should diversify their investment assets to maximize returns relative to risk. The purpose is to construct a portfolio that maximizes expected returns for a given level of risk. Markowitz states that effective diversification requires consideration of both industry and

geographical allocation. Greater diversification may reduce portfolio-specific risk and improve overall portfolio stability. However, a well-diversified portfolio is not a guarantee of positive returns; risk remains an inherent component of investing and is closely associated with expected returns.

According to Lean et al. (2015), one of the main criticisms directed toward SRI is that SRI portfolios may not fully align with the principles of modern portfolio theory. The potential increase in portfolio risk is often attributed to the screening process used in the construction of SRI portfolios. Lean et al. argues that consequently, SRI portfolios tend to exhibit lower levels of diversification compared to conventional portfolios. The exclusion of unethical or irresponsible assets from SRI portfolios results in a more focused but less diversified investment approach.

Barnett and Salomon (2006) further suggest that the process of SRI screening ensures that financially stable firms are selected for the portfolio. According to the authors, the screening process does not necessarily weaken portfolio performance or reduce expected returns. Careful evaluation and selection of investment targets may contribute to improved long-term portfolio stability and performance. Barnett and Salomon state that although costs may arise according to modern portfolio theory when limiting investment targets, the theory fails to consider the positive impacts and benefits of responsible investing. Investors who recognize the advantages of SRI may consider responsible investments attractive despite potential limitations related to portfolio diversification.

4.3 Traditional performance measures

Chapter 5 reviews various studies on the performance of ESG and conventional funds. Accordingly, the following subchapter introduces key financial metrics to facilitate the interpretation of the empirical results presented in the literature. The metrics presented are widely used within the financial sector and are therefore essential for understanding and evaluating funds' performance.

4.3.1 Sharpe ratio

In 1966, William Sharpe (1994) introduced a metric for evaluating fund performance. Originally, the metric was referred to as the reward-to-variability ratio. However, now it is known as the Sharpe Ratio (or Sharpe index/measure). The Sharpe ratio is a risk-adjusted return measure, calculated using the standard deviation of returns. The Sharpe ratio is computed by subtracting the risk-free rate from the portfolio´s average return and dividing the result by the standard deviation of the portfolio´s returns. A high Sharpe ratio indicates superior risk-adjusted performance, suggesting that the fund has generated higher returns per unit of risk. The Sharpe ratio can enhance investment decision-making, when applied appropriately. The formula below illustrates how the Sharpe ratio is calculated:

$$S = \frac{R_i - R_f}{Q_i}, \tag{1}$$

Where,

R_i = Average portfolio return

R_f = Risk-free rate

Q_i = Standard deviation of portfolio returns

4.3.2 Treynor ratio

The next well-known metric is the Treynor ratio. The formula of Treynor (1965) ratio is closely similar to Sharpe ratio, with the primary difference being the measure of risk employed. This metric is used to evaluate performance and compare different portfolios. The Treynor ratio is associated with the excess return earned over the risk-free rate per unit of risk. Instead of total risk, it utilizes systematic risk, which is typically measured by beta (Tajdini et al., 2021). Systematic risk refers to the part of total risk that cannot be reduced through diversification. According to the value obtained from the formula, the

higher the result, the better the performance of the portfolio (Treynor, 1965). Treynor defines the ratio as follows:

$$T_i = \frac{R_i - R_f}{B_i}, \quad (2)$$

Where,

R_i = Average portfolio return

R_f = Risk-free rate

B_i = The beta of a portfolio

4.3.3 Jensen´s alpha

Lastly, Jensen´s (1968) alpha is introduced as a performance measure. Jensen´s alpha measures the abnormal return of portfolio relative to the return predicted by Capital Asset Pricing Model (CAPM). This comparison considers the portfolio´s volatility relative to the market though its beta, as well as the market return and the risk-free rate. Jensen´s alpha involves utilizing regression analysis, which examines the relationship between the portfolio´s excess returns and the market´s excess returns. Below is presented the formula of Jensen´s alpha:

$$R_i - R_f = a_i + B_i(R_m - R_f), \quad (3)$$

Where,

R_i = Average portfolio return

R_f = Risk-free rate

a_i = Jensen's alpha

B_i = The beta of portfolio

R_m = Total market return

4.4 Approaches to Responsible Investing

Finsif (n.d.) argue that individuals may engage in responsible investing through a variety of approaches, which are often tailored to their specific preferences and circumstances. In addition, several well-established strategies exist that investors may choose to adopt. The approaches are not mutually exclusive, and investors may therefore combine multiple strategies. According to Hyrske et al. (2020) several decades ago, responsible investment approaches were almost as diverse as the investors themselves. Due to the substantial growth and increasing popularity of responsible investing, these approaches have become more standardized, allowing for clearer classification into more distinct categories.

Selecting the most suitable approach depends on various factors, such as the amount of investment assets, the overall investment strategy, and the investor's objectives, principles, and available resources for responsible investing (Eurosif, 2018). The following section presents the different SRI strategies developed by Eurosif in 2012. These are widely recognized and commonly applied approaches. The classifications proposed by Eurosif are very consistent with those developed by other entities operating in the field, although minor differences or additional insights may be present. These seven approaches are presented below.

Best-in-Class

In this strategy, investors evaluate companies based on their ESG scores within a specific industry and select those with the highest ratings. The abbreviation BIC (Best-in-Class) is commonly used to refer to this strategy. Portfolios constructed using BIC approach typically include companies that perform well in both ESG and financial assessments. However, best-in-class portfolios are not always substantially different from conventional portfolios that do not explicitly incorporate responsible investment criteria. This strategy has gained significant popularity over the last few years, indicating a generally positive reception among investors. Similar approaches include best-in-universe and best-effort

strategies. The best-in-class strategy has been particularly popular in France (Eurosif, 2018).

Sustainability themed investing

This strategy involves selecting assets that are associated with specific sustainability themes and are included in funds focusing on at least one such theme. By analysing the thematic focus of the funds, investors' preferences for specific areas of sustainable development can be identified. The themes that may be represented in these funds include renewable energy, energy efficiency, sustainable transport, the building sector, land use/agriculture, water management, waste management, and others. In the past, none of these themes consistently dominated the others. However, in recent years, investor attention has shifted towards funds that focus on climate change and water-related issues (Eurosif, 2018).

Norms-based screening

Norm-based screening allows investors to select companies for inclusion in a portfolio in accordance with internationally recognized norms and standards. There are various norms, and investors may choose to follow those they consider most relevant to their objectives. These norms are related to areas such as human rights, environmental protection, labour standards, and anti-corruption measures. Norms are widely adopted, as they are embedded in international initiatives and guidelines. Norm-based screening has been popular in Nordic countries. This strategy can be applied independently or combined with other responsible investment approaches. The most popular pair with this strategy is engagement and/or exclusion strategies (Eurosif, 2018).

ESG Integration

The ESG integration strategy focuses on evaluating the potential impact of ESG factors on a company´s financial performance. It influences the entire investment decision-making process by considering both the positive and negative implications of ESG factors. Asset managers include ESG-related risks and opportunities into conventional financial

analysis and investment decisions through a structured and systematic approach (Eurosif n.d.).

Engagement and voting

This strategy is closely associated with the role of asset managers and shareholders, as well as their responsibility toward beneficiaries. Consequently, it is linked to the concept of fiduciary duty. Engagement and voting require investors to actively monitor the companies included in their portfolios. Investors cannot rely solely on selecting popular stocks, as this approach necessitates continuous monitoring and in-depth analysis of a company's performance and practices. This strategy is the second most widely adopted approach and is particularly prevalent in the United Kingdom. In 2017, the strategy's total assets under management amounted to €4.8 trillion (Eurosif, 2018).

Exclusion

This is the most popular and used strategy among responsible investment approaches. Moreover, this is the oldest strategy, with origins tracking back to religious groups in the early 18th century. In this approach, the central idea is to exclude harmful investment options. This means that companies or countries that participate in certain prohibited activities are systematically excluded. Such harmful industries include, for example, tobacco, weapons, animal experimentation, and adult entertainment industries. Exclusion can be applied at the individual fund level, as well as the asset manager or asset owner level. According to Eurosif (2018), for the strategy to be meaningful, it should be combined with engagement and voting strategy. In recent years, the growth of this strategy has slowed, which may be attributed to the increasing availability of alternative responsible investment approaches and greater conceptual clarity among them. Furthermore, many investors may incorporate exclusion criteria implicitly within their investment processes, applying them as a default screening mechanism when evaluating potential investment targets (Eurosif, 2018).

Impact investing

Impact investing is driven by the objective of generating positive societal outcomes (Finsif, n.d.). An impact investment is considered successful when the intended social or environmental change is achieved through the allocation of capital. According to Eurosif (2018) key concepts that distinguish impact investing from other responsible investment approaches include additionality, intentionality, and measurability. The purpose is to generate measurable positive outcomes from both social and environmental point of view, while simultaneously provide private capital. This strategy has attracted considerable attention and has experienced significant grown in popularity, especially among new SRI investors.

Figure 4 presents an illustrative overview derived from the Eurosif (2018) European SRI study, which reflects the use and growth of SRI strategies in Europe from 2015 to 2017. As noted earlier in this chapter, exclusion emerges as the most widely adopted approach.

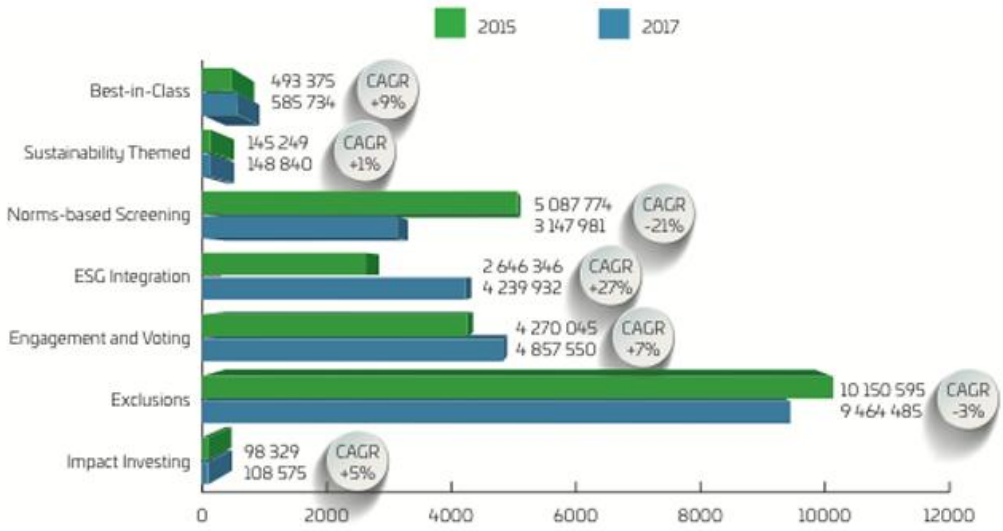

Figure 4. Overview of SRI strategies in Europe (Eurosif, 2018, p.16).

5 Literature review

This literature review examines previous research related to the financial performance of ESG and socially responsible investments. Although the primary emphasis of this thesis is on ESG ETFs, earlier literature concerning socially responsible investing has traditionally focused more extensively on mutual funds and broader SRI portfolios. For this reason, the review also incorporates studies related to responsible mutual funds and other sustainable investment instruments to provide a more comprehensive understanding of the existing research literature. In addition, the chapter reviews studies addressing ESG performance during periods of economic uncertainty and discusses the main criticism associated with ESG investing.

5.1 Overview of empirical findings

In the 1990s, Statmann (2000) conducted a study examining the performance of responsible funds compared to conventional funds. During the period from 1990 to 1998, he compared the responsible Domini Social Index with the S&P 500 index. The findings indicated that the responsible index achieved superior risk-adjusted returns, outperforming the S&P 500 index. While the difference was not statistically significant, the findings provided evidence revealing the outperformance of the responsible index during that sample period. Goldreyer et al. (1999) conducted a comprehensive comparison of 49 responsible investment funds with a randomly selected group of conventional funds in their study. The review period was from 1981 to 1997. They used performance metrics such as Sharpe´s ratio, Jensen´s alpha, and Treynor´s alpha to evaluate the impact of social screening on investment fund returns. Contrary to expectations, Goldreyer et al. state that social screening has no systematic effect on the return of the investment fund. The results of the study suggest that in most instances, responsible funds generate higher returns than non-responsible funds. Responsible funds yielded returns either on par with or exceeding the non-responsible funds.

According to Morgan Stanley (2015), responsible investments have frequently matched or outperformed traditional investments in terms of financial performance. Their analysis found that most of the sustainable equity mutual funds exceeded the median return of conventional equity funds. Similarly, the MSCI KLD 400 Social Index demonstrated slightly higher long-term annual returns than the S&P 500 index since its establishment in 1990. These findings support the view that incorporating ESG and SRI principles into investment strategies does not necessarily weaken portfolio performance and may, in certain cases, improve risk-adjusted returns.

Fiordelisi et al. (2023) find that passive SRI focused ETFs generated higher average returns and exhibited greater liquidity than comparable non-SRI passive ETFs over the 2008–2019 period. Their study further suggests that this relative outperformance became particularly evident around the time of the 2015 Paris Climate Agreement, a period associated with increasing global awareness of climate-related issues.

A broad sample of 500 European and 248 North American SRI funds were investigated to obtain information on the fund performance and persistency (Lean et al., 2015). The sample period was from January 2001 to December 2011, and the research was carried out by Lean et al. They found that both European and North American SRI funds outperformed the market benchmark. The study posits that investors adhering to ESG principles can attain favourable returns without compromising personal values. The findings indicate that financial performance does not suffer from the more precise portfolio screening of SRI funds. In the country comparison, the study found that North American SRI funds perform better than European SRI funds, while European SRI funds exhibited greater performance persistency. The study also found that the return variability is greater for European SRI funds in a bear market, because of heightened downside risk inherent in the structure of European SRI funds.

Omura et al. (2021) report that responsible investments tend to outperform conventional investments. The authors argue that companies adhering to ESG principles may

benefit from stronger corporate governance, more ethical business practices, and greater investor loyalty. In addition, responsible firms may cultivate a positive corporate image, which can strengthen brand loyalty and improve operational efficiency. The study further highlights that investors in responsible companies may be less likely to withdraw investments during periods of market uncertainty, as ESG considerations often extend beyond purely financial motives.

In contrast to studies reporting positive ESG performance, Galema et al. (2008) present more critical findings regarding responsible investments. Examining the U.S. stock market, the authors find that SRI investing does not generate positive alpha and may reduce the book-to-market ratio of stocks. Their results further suggest that certain ESG dimensions, particularly environmental, diversity, and product-related factors, can influence stock returns. Overall, the study highlights the inconsistency between theoretical assumptions and the empirical findings surrounding ESG and SRI performance.

According to Kanuri (2020) the performance of ESG ETFs between 2005 and 2019 produced inconsistent results when compared with U.S. and global equity markets. While ESG portfolios occasionally experienced periods of stronger performance, the benchmark portfolios representing both U.S. and international markets generally achieved higher returns over the full sample period. The study further demonstrates that ESG ETFs slightly underperformed the U.S. equity index in terms of both absolute and risk-adjusted returns, whereas their performance remained more comparable to the global market index. These findings imply that the relative success of ESG ETFs is strongly influenced by prevailing market conditions and the specific time horizon examined.

Revelli and Viviani (2015) and Halbritter and Dorfleitner (2015) provide a neutral view of the performance of SRI funds. The findings of Revelli and Viviani indicate that globally there is no consistent financial advantage or disadvantage for investors to invest in SRI. Halbritter and Dorfleitner discover in their study that, when comparing companies with high and low ESG ratings, the ESG rating does not indicate performance in terms of

returns. Both studies state that the returns from responsible investments are equivalent to those from conventional investments. Revelli and Viviani (2015), and Halbritter and Dorfleitner (2015) hope that future research will delve deeper into exploring the impact of ESG on returns.

Overall, prior literature provides mixed evidence regarding the financial performance of ESG and SRI investments. While several studies report superior or comparable returns relative to conventional investments, others find evidence of underperformance or inconsistent results depending on the market environment and evaluation period. These conflicting findings highlight the need for further research on ESG ETF performance using more recent data and robust risk-adjusted performance measures.

5.2 ESG funds' performance during economic downturns

This chapter examines the performance of ESG and SRI investments during periods of economic downturn, with a particular focus on the COVID-19 pandemic. Economic crises are especially relevant in the context of responsible investing, as they provide insight into the resilience and downside protection characteristics of ESG-oriented investments.

Various crises have generally increased awareness and concern regarding the influence of companies and their operations on the economy, environment, and people (Martini, 2021). The global financial crisis of 2007–2008 demonstrated the significant impact that weakly managed corporate governance and risk management can have on the global economy. Following these crises, terms such as responsible investment and corporate social responsibility have increased in importance, especially after the financial downturn, becoming part of the general investment discourse (Leins, 2020). The depletion of natural resources and the rapid acceleration of climate change have forced companies to think about their operating methods, prompting a shift toward a more sustainable direction.

According to the paper written by Nofsinger and Varma (2014), funds that follow ESG principles outperform traditional funds in times of market crises. The study indicates that SRI investing can generate negative abnormal returns over time but suggests being profitable in times of market crises. Both SRI and ESG strategies mitigate the risk associated with economic downturns. The results suggest that companies aligning ESG principles experience fewer losses during economic upswings or downswings. The study reveals that conventional funds do 0.67–1.7 % better than SRI funds during non-crisis times. SRI funds, on the other hand, outperform 1.61–1.70% better in times of crisis. The counterbalancing factor for the commendable performance of funds following SRI principles is their relatively weaker performance compared to conventional funds during non-crisis periods. Their study examined 240 U.S. domestic funds that follow SRI principles, and it was carried out from 2000 to 2011. Gangi and Trotta (2015) investigated European SRI funds during the 2008 and 2011 crises. They observe that SRI funds contribute to increased stability and reduced volatility during market downturns.

Lins et al. (2017) conducted a study in which they investigated whether a company´s social capital benefits during a crisis of trust, specifically focusing on the financial crisis period from 2008 to 2009. The data was retrieved from the MSCI ESG Stats database, and the study encompassed 1673 non-financial companies whose performance was measured. The study found that companies with high corporate social responsibility (CSR) ratings at the beginning of the crisis period exhibited approximately 4-7 percent higher stock returns. Companies with lower CSR ratings therefore had notably inferior stock returns during the crisis period. The result of the study implies that when trying to internalize the factors determining company-level performance during a crisis of trust, it is particularly important to direct attention beyond financial capital. Traditionally, the influence of cash holdings and leverage has been emphasized to have a strong impact on returns in times of crisis. Lins et al.´s findings highlight that the financial importance of social capital to the return on shares is at least half as great. The study found no difference in the profitability of stocks during the recovery from the crisis between companies with high and low CSR ratings. In conclusion, Lins et al. state that the increase in social

capital has an effect in times when there is a crisis or when general trust in the company is weak. In addition, the research reveals that companies with high CSR also have more productive employees, higher profitability, and greater growth in both profit and sales. Aligning with the research period of this research, the 2008 financial crisis, Khan (2021) states in his own research that SRI stocks have outperformed conventional stocks before, during, and after the 2008 financial crisis.

Despite the economic conditions and profound crisis caused by the COVID-19, the popularity of investing grew during the pandemic time. Particularly, Socially Responsible Investing and climate change investing have gained a lot of visibility and popularity (Khan, 2021). Furthermore, sustainable investing has recently increased its position in emerging markets. In 2020, the investment inflow into ESG funds doubled in Asia, reaching over 60 billion U.S. dollars compared to the previous year (Sharma, 2022). This strongly points to an increase in popularity, which has also been mentioned earlier in this thesis.

The COVID-19 restrictions, which drastically changed the daily routines of individuals, showed companies how strongly corporate objectives and sustainable practices are linked to each other (Khan, 2021). The pandemic forced companies to reconsider the role of sustainability that plays across various domains. In addition to new investment perspectives, Khan states that the COVID-19 has made people rethink the transition to clean energy, the importance of environmentally friendly infrastructure, and diverse approaches for achieving a carbon-free economy. The connection between green and conventional indexes has experienced pronounced strengthening since the COVID-19 (Sharma, 2022). This trend suggests the view that investors around the world are increasingly interested in sustainable investment opportunities. In terms of sustainable development, this connection between indexes is important. It underscores how much potential there is in responsible investing and how seamless the transition from conventional investing to responsible investing can be. In addition, Sharma et al. state that according to their research findings, the investor’s transition to responsible investments does not reduce the risk-adjusted return. Sharma et al. state that the unfortunate repercussion of

the pandemic has been that renewable energy projects have faced a slight decline during the pandemic, impacting investor sentiment and confidence.

Landi et al. (2024) examine the impact of ESG related risks on ETF performance in the United States and Europe using data from 2020 to 2023. By applying the Sharpe ratio as a performance measure the authors conclude that ETFs with stronger adherence to ESG principles generally outperformed those with lower ESG compliance. Their results suggest that investors increasingly preferred bond-based ESG investments over equities during periods of uncertainty. In contrast, Pavlova and Boyne (2022) found that highly rated ESG ETFs did not provide meaningful protection during the COVID-19 crises. Their findings further indicate that lower-rated ESG ETFs achieved stronger performance before the pandemic.

Huang (2024) argues that ESG ETFs may offer a degree of downside protection during periods of financial crises, despite not necessarily delivering superior risk-adjusted returns overall. This defensive characteristic is linked to the tendency of ESG ETFs to allocate capital toward larger and more conservative firms with lower book-to-market ratios. The study further concludes that ESG ETFs neither consistently outperform the market over the long term nor exhibit significant underperformance relative to conventional investments.

Omura et al. (2021) findings indicate that responsible investments outperformed conventional investments during the COVID-19. They also state that this phenomenon was already noticeable before the start of the COVID-19 pandemic. Excluding Japan, the study observed that SRI indexes outperformed during the pandemic. However, a noteworthy observation is that the ESG exchange-traded funds did not outperform the benchmark.

Before the COVID-19 pandemic ESG investing had been gaining momentum globally, but a notable development after the COVID-19 pandemic has been the heightened adoption

of ESG investing (Nasdaq, 2021). Responsible investing is also expected to grow in distribution, as there has been a growing demand in the number of private and institutional investors. Nasdaq states that despite various difficulties, responsible investment targets have shown regular success during times of crises. According to SSGA (2020), ESG funds received globally 45.7-billion-dollars inflows during the first quarter of 2020. While markets reacted to the pandemic downturn conventional funds experienced an outflow of 384.7 billion dollars.

5.3 Criticism faced by ESG

While ESG has been a longstanding aspect of the investment world, it divides opinion among investors and companies. Doubts about the credibility and necessity of ESG have emerged, prompting this chapter to present diverse perspectives on ESG investing. By addressing criticism, the chapter not only adds versatility to the thesis but also increases its credibility. Chapter 2 discussed the association of terms like greenwashing and sham with ESG investing, but this chapter delves into a more comprehensive criticism. A discussion concerning the criticism of ESG investing is included to provide a more balanced evaluation of responsible investment practices.

Charlin et al. (2022) compared different ESG rating agencies in their research, especially focusing on four prominent agencies: ISS, MSCI, S&P, and Sustainalytics. Their research outcomes indicate a deficiency in the reliability and consensus of ESG ratings. Their results suggest the view that ESG investments lack profitability due to the absence of an effective and dependable measurement system to gauge their outcomes. The research result is more strongly related to the H2 of this thesis. The study emphasizes the confusion within the ESG sector and PRI regulations, attributing it to incomplete classifications. They present an example to support their view of confused ESG principles, by examining Vanguard, an American investment advisory company. They highlight how Vanguard is thinking about whether they can be related to tobacco and opioid-related companies. At the same time, however, Vanguard already collaborates with companies that are

linked to adult entertainment and gambling. Given the involvement of industries such as tobacco, opioids, adult entertainment, and gambling, a common expectation arises that these sectors should be excluded from ESG activities. Taparia (2022) also highlights that the biggest problem with ESG investing is the rating industry. According to Taparia rating agencies (MSCI, S&P, and Sustainalytics) measure how much ESG factors have an impact on a company´s financial performance, and not how much a company´s overall impact is on environmental and social responsibility. Coca-Cola and Pepsi, despite being major contributors to health issues such as diabetes and obesity, as well as contributors to global plastic pollution, have received high ESG scores and are featured in many ESG funds.

Serafeim and Yoon (2022) agree that ESG performance evaluation is very multidimensional, and there is no single agreed method for the evaluation. Because of this, it becomes less evident how one can effectively assess or determine the quality of ESG. Consequently, a rising sum of literature has emphasized the observation that disparate raters assign significantly divergent ratings to the same company. This prompts contemplation on the efficacy of ESG ratings.

Lins et al. (2017) pointed out in their research that several studies use conventional mutual funds as the benchmark when assessing the financial performance of responsible funds. The authors argue that this comparison may be controversial, because behind the operation of the fund is the manager. The manager of the fund holds a lot of power in selecting items for the funds and determining their weights, introducing a potentially confounding variable that may distort the evaluation of responsible funds. The responsibility of the fund therefore depends a lot on the knowledge of the manager and his views about ESG.

The research written by Pucker and King (2022) claims that ESG investing is not a solution for global issues or a solution to address climate change. Pucker and King critique that ESG funds are based on ratings that are unregulated, highlighting that fossil fuel

companies can have a better ESG rating than a company that manufactures electric vehicles. The reason for this is that ESG ratings are based on comparative rankings of the industry. They argue that the purpose of ESG funds is to make a profit instead of addressing global sustainability challenges. Although they criticize ESG funds, they do not claim that they are not profitable.

In ESG investing, new issues will arise in the future. Animal rights, cannabis, modern slavery, and tax footprint have been predicted as rising trends (Hyrske et al, 2020). When the definition of ESG and responsibility becomes more precise, they create new items that may need to be removed from the portfolio. At the same time, they can bring out items that should be added to the responsible portfolio. New information about responsible investing is constantly obtained through new studies.

Overall, the literature suggests that ESG and SRI investments may provide competitive performance and downside protection during periods of market uncertainty, although findings remain inconsistent across different regions, methodologies, and time periods. Furthermore, criticism related to ESG measurement and rating reliability continues to raise questions regarding the effectiveness of ESG classifications. These inconsistencies create motivation for further empirical analysis of ESG ETF performance.

6 Empirical part

The empirical part consists of the data description and the methodology used in the research. The empirical analysis is based on the hypotheses presented in the introduction chapter. The primary hypothesis examines whether a statistically significant performance difference exists between ESG ETFs and conventional ETFs. Formally, the null hypothesis assumes that no such difference exists, while the alternative hypothesis allows for the presence of a statistically significant performance gap. In addition, a third hypothesis is considered, which reflects the possibility that ESG ETFs may outperform their conventional counterparts.

6.1 Data

The data of this research is based on daily ETF return data collected from the London Stock Exchange Group (LSEG) database through Datastream. The data consists of both conventional and ESG exchange-traded funds (ETFs). The ETFs represent major European and U.S. equity markets. The research focuses on UCITS ETFs, as these ETFs are standardized investment products widely available for European investors like presented in Chapter 3. In addition, accumulating (ACC) ETFs were preferred whenever possible to ensure that dividend payments are automatically reinvested into the funds, improving comparability between the selected ETFs.

The sample consists of nine ETF pairs, resulting in a total of 18 ETFs. Each ETF pair includes one conventional ETF and one ESG ETF that track highly similar underlying indices. The selected indices are DAX, Nasdaq 100, S&P 500, MSCI USA, MSCI Europe, MSCI EMU, Euro Stoxx 50, Stoxx Europe 600, and CAC40. The ETF pairs were constructed by first selecting a conventional ETF tracking the standard benchmark index after which the ESG ETF with closest possible index exposure was selected. Highly specialized ESG ETFs were excluded from the sample to maintain comparability between the ESG and conventional ETFs.

The selected ETFs are not restricted to single ETF providers such as Vanguard or iShares. Instead, the primary objective was to identify ETF pairs with the closest possible index exposure and the longest available overlapping return history. Since ESG ETFs are relatively newer investment products compared with conventional ETFs, the available historical data for ESG ETF is more limited. Therefore, for each ETF pair the ESG with the longest available return history was selected.

The observation periods differ between the ETF pairs due to differences in ETF inception dates and data availability. The data for each ETF pair begins from the earliest point at which return data was available for both the ESG ETF and the conventional ETF simultaneously. The longest sample period begins in 2010, while the dataset extends until the beginning of 2026.

MSCI World Index was selected as the benchmark index for the study because the ETF sample covers both European and U.S. equity markets. The benchmark index therefore provides a broad representation of developed equity markets included in the research.

Daily ETF returns were calculated from the adjusted closing prices obtained from Datastream. The daily returns were calculated using the percentage change between consecutive trading days. Since the Fama-French factor model is based on excess returns, the ETF returns were adjusted by subtracting the risk-free rate (RF) from the daily ETF returns before conducting the regression analysis. Daily returns were utilized in the empirical analysis to increase the number of observations, improve statistical reliability of the regression estimates, and capture short-term variations in ETF performance more effectively than lower-frequency data.

The empirical analysis applies the Fama-French five-factor (FF5) model. The factor data were downloaded from Kenneth R. French´s online library, using the developed markets five-factor dataset. The analysis utilizes the market factor (Mkt-RF), size factor (SMB),

value factor (HML), profitability factor (RMW), investment factor (CMA), and risk-free rate (RF).

Since the Kenneth R. French factor data are reported in U.S. dollars while the ETF return data from Datastream are in euros, the ETF prices were converted from euros to U.S. dollars using the EUR/USD exchange rate. Daily ETF returns were then calculated from the converted price series. In addition, the Kenneth R. French factor data are reported in percentage form, and therefore all factor values were divided by 100 before conducting the regression analysis to ensure consistency between the datasets.

The Sharpe ratios are presented as descriptive measures of risk-adjusted performance between the ETF pairs. However, no separate statistical significance tests were conducted for differences between Sharpe ratios, as the primary focus of the study is on Fama-French five-factor regression analysis.

The study is subject to certain limitations related to the sample size and data availability. The analysis includes a limited number of ESG and conventional UCITS ETFs due to the relatively short historical availability of ESG ETFs and the requirement that ETF pairs track highly comparable benchmark indices. Despite the limited sample size, the selected ETFs provide a consistent and comparable basis for evaluating the performance differences between ESG and conventional ETFs across major European and U.S. equity markets.

6.2 Methodology

This research focuses on the performance of ESG exchange-traded funds (ETFs) compared to conventional ETFs. The empirical analysis applies Fama-French five-factor model (FF5) to evaluate the factor exposures and risk-adjusted performance of selected ETF pairs. In addition, the Sharpe Ratio is applied, as previously introduced in Chapter 4.

6.2.1 Matching approach

The empirical analysis is conducted using a matching approach, creating ETF pairs in which each ESG ETF is paired with a conventional ETF tracking highly similar market index. The purpose of the matching approach is to minimize structural differences between the paired ETFs and therefore improve the reliability of the comparison. The selected ETF pairs are presented in Table 1 below.

Table 1. Selected ETFs.

Conventional ETF	ESG ETF	Region	Index
XTRACKERS DAX UCITS	XTRACKERS DAX ESG SCREENED UCITS	Europe	DAX
INVESCO EQQQ NASDAQ-100 UCITS	INVESCO NASDAQ-100 ESG UCITS	U.S.	Nasdaq 100
AMUNDI CORE S&P 500 SWAP UCITS	AMUNDI S&P 500 ESG UCITS	U.S.	S&P 500
XTRACKERS MSCI USA UCITS	XTRACKERS MSCI USA SCREENED UCITS	U.S.	MSCI USA
AMUNDI MSCI EUROPE UCITS	XTRACKERS MSCI EUROPE ESG UCITS	Europe	MSCI Europe
ISHARES MSCI EMU UCITS	AMUNDI MSCI EMU ESG SELECT UCITS	Europe	MSCI EMU
AMUNDI EURO STOXX 50 II UCITS	DEKA EURO STOXX 50 ESG FILTERED UCITS	Europe	Euro Stoxx 50
AMUNDI CORE STOXX EUROPE 600 UCITS	AMUNDI STOXX EUROPE 600 ESG UCITS	Europe	STOXX Europe 600
AMUNDI CAC 40 UCITS	AMUNDI CAC 40 ESG UCITS	Europe	CAC 40

6.2.2 Fama-French three-factor model

The Fama-French three-factor model was developed by Eugene F. Fama and Kenneth R. French (1993) to address limitations of the Capital Asset Pricing Model (CAPM) in explaining stock returns. CAPM is one of the fundamental frameworks in modern financial economics. Originally developed independently by Sharpe (1964), Lintner (1965), and

Mossin (1966), the CAPM is based on a market equilibrium theory of asset pricing under risk and builds directly upon the principles of modern portfolio theory introduced by Markowitz (1952). Prior empirical research had identified patterns in returns that could not be captured by CAPM. Especially the relationship between average returns and firm size as well as the relationship between returns and valuation metrics such as the book-to-market ratio, commonly referred to as the value factor.

Fama and French (1993) introduced two additional factors, size and value, which alongside the market factor improve the model´s ability to explain variation in portfolio returns. These factors have been shown to capture a significant portion of abnormal returns. In addition, the model is widely used in evaluating portfolio performance and estimating the cost of capital. The Fama-French three-factor model is presented below:

$$R_{it} - R_{ft} = \alpha_i + \beta_i\left(R_{mt} - R_{ft}\right) + s_i SMB_t + h_i HML_t + \varepsilon_{it,} \quad (4)$$

Where*:*

R_{it} = return of asset

R_{ft} = risk-free rate of return

R_{mt} = total market portfolio return

$R_{it} - R_{ft}$ = expected excess return

$R_{mt} - R_{ft}$ = market risk premium

SMB_t = size factor (small minus big)

HML_t = value factor (high minus low)

α_i = abnormal return (alpha)

$\beta_{i,} s_{i,} h_i$= factor coefficients

ε_{it}= error term

It can be concluded that the key significance of the Fama-French Three-Factor Model lies in its ability to deepen the understanding of the factors that influence stock market returns. Furthermore, it enhances the ability to develop investment strategies that align

with an investor's risk and return objectives. Recognizing these premiums therefore has significant implications for portfolio construction and asset allocation.

6.2.3 Fama-French five-factor model

Fama and French (1993) faced criticism regarding the limitations of their three-factor model which led to the introduction of the Fama-French five-factor model as an extension of the original framework. Novy-Marx (2013) demonstrated that firm profitability measured as gross profits divided by total assets can explain the cross-sectional variation in average stock returns, as well as the relationship between book-to-market ratios and returns. Furthermore, it was observed that value stocks and highly profitable firms exhibit a negative correlation.

Motivated by these findings, the three-factor model was revised to incorporate two additional factors: profitability and investment. The inclusion of these factors improved the explanatory power of the model. Fama and French (2015) argue that the five-factor model provides a superior framework for explaining stock returns compared to the three-factor model. This is supported by empirical evidence indicating a strong relationship between profitability, investment factors and stock returns. They also claim that a considerable proportion of the variation in average returns linked to these dimensions remain unexplained within the three-factor model. The Fama-French five-factor model is presented below.

$$R_{it} - R_{ft} = \alpha_i + \beta_i\left(R_{mt} - R_{ft}\right) + s_i SMB_t + h_i HML_t + r_i RMW_t + c_i CMA_t + \varepsilon_{it}, \quad (5)$$

Where*:*

RMW_t = profitability factor (robust minus weak)

CMA_t = investment factor (conservative minus aggressive)

ri, ci = factor loadings for profitability and investment

The Fama-French five-factor model was selected instead of the traditional three-factor model because it provides a more comprehensive framework for explaining differences in portfolio returns. In addition to the market, size, and value factors included in the three-factor model, the five-factor model incorporates profitability and investment factors, which may be particularly relevant in the context of ESG investing.

7 Results

This chapter presents the results of the Fama-French five-factor (FF5) analysis conducted for the selected ETF pairs. The results are examined one ETF pair at a time to provide a clear and systematic comparison between conventional ETFs and their ESG counterparts. Each subsection focuses on the factor exposures, statistical significance, and overall risk-return characteristics of each ETF pair.

The ETF pairs are presented in an order that begins with the strongest and most widely recognizable market indices, after which the analysis gradually progresses toward broader regional and more specialized ETF pairs. The analysis begins with the DAX ETF pair, followed by the Nasdaq 100 and S&P 500 ETF pairs. The remaining ETF pairs are then analysed sequentially using the same methodological approach to ensure consistency and comparability throughout the chapter. All tables apply the same significance levels, as specified here. Statistical significance is denoted by asterisks, where *, ** and *** indicate significance at the 10%, 5%, and 1% levels.

7.1 DAX

Table 2 presents the Fama-French five-factor regression results for the DAX ETF pair consisting of the conventional DAX ETF and the DAX ESG ETF. The sample period for the DAX ETF pair extends from 2012 to 2026. Overall, the findings indicate that both ETFs exhibit highly similar factor exposures, suggesting that the ESG ETF has only a limited impact on the overall risk-return characteristics of the ETFs.

The Sharpe ratios of 0,39 for the conventional ETF and 0,37 for the ESG ETF indicate nearly identical risk-adjusted performance. The alpha coefficients are closely to zero and statistically insignificant, implying the absence of abnormal returns. Both ETFs exhibit strong and significant exposure to the market factor, with nearly identical betas, indicating similar levels of systematic risk and close tracking of market movements.

The SMB and HML coefficients are positive and statistically significant for both ETFs, reflecting comparable exposure to smaller-cap and value-oriented firms. The profitability factor (RMW) is also positive and significant, with slightly higher loading for the ESG ETF, while negative and significant CMA coefficients indicate exposure to firms with more aggressive investment behaviour.

The explanatory power of the regressions is also nearly identical, with R-squared values of 0,523 for the conventional ETF and 0,519 for the ESG ETF. Taken together, the findings suggest that the DAX ESG ETF does not materially differ from the conventional DAX ETF in terms of FF5 exposures.

Table 2. DAX ETF Pair**.**

ETF	**DAX**	**DAX ESG**
Sharpe Ratio	0,39	0,37
Alpha	0,000	0,000
Mkt−Rf	1,083***	1,085***
SMB	0,587***	0,589***
HML	0,382***	0,381***
RMW	0,148**	0,177***
CMA	-0,222***	-0,214***
R-Squared	0,523	0,519
N	3442	3442

7.2 Nasdaq 100

Table 3 presents the FF5 results for the Nasdaq 100 ETF pair. The Nasdaq 100 ETF pair covers the period from 2021 to 2026 due to the more limited historical availability of the ESG ETF. The results show that both the conventional Nasdaq 100 ETF and the Nasdaq

100 ESG ETF have very similar factor exposures, indicating that ESG screening does not substantially change the overall characteristics of the portfolio.

The ESG ETF achieved a slightly higher Sharpe ratio of 0,46 compared with the conventional ETF of 0,43, suggesting moderately superior risk-adjusted performance during the sample period. This finding is broadly consistent with the positive and statistically significant alpha observed for the ESG ETF.

Both ETFs show strong and statistically significant exposure to the market factor, with betas of 1,117 for the conventional ETF and 0,892 for the ESG ETF. This suggests that the returns of both ETFs are strongly influenced by overall market movements, while the conventional ETF exhibits higher market sensitivity.

The SMB coefficients are positive and statistically significant for both ETFs, with coefficients of 1,277 and 0,790. This suggests exposure toward smaller-cap firms, although the conventional ETF demonstrates clearly stronger size exposure. In contrast, the HML coefficients are negative and statistically significant for both ETFs, suggesting a growth-oriented investment profile rather than exposure toward value stocks.

The RMW factor is positive and statistically significant in both regressions, while negative CMA coefficients suggest exposure to firms with more aggressive investment behaviour. Both ETFs also exhibit small but statistically significant positive alphas.

The explanatory power of the regressions remains relatively similar, with R-squared values of 0,554 for the conventional ETF and 0,519 for the ESG ETF. The findings suggest that the Nasdaq 100 ESG ETF remains highly similar to the conventional Nasdaq 100 ETF, although differences are more visible in the market and size factor exposures.

Table 3. Nasdaq 100 ETF Pair.

ETF	Nasdaq 100	Nasdaq 100 ESG
Sharpe Ratio	0,43	0,46
Alpha	0,001**	0,001**
Mkt−Rf	1,117***	0,892***
SMB	1,277***	0,790***
HML	-0,322***	-0,398***
RMW	0,668***	0,492***
CMA	-0,497***	-0,458***
R-Squared	0,554	0,519
N	1132	1132

7.3 S&P 500

Table 4 presents the FF5 results for the S&P 500 ETF pair. The sample period for the S&P 500 ETF pair extends from 2016 to 2026. The results indicate that the conventional S&P 500 ETF and the S&P 500 ESG ETF have relatively similar factor exposures, although some differences can be observed between them.

The ESG ETF also demonstrated a slightly higher Sharpe ratio of 0,76 than the conventional ETF of 0,72, indicating somewhat stronger risk-adjusted returns. However, the difference remains relatively modest, suggesting that the overall performance characteristics of the ETFs are closely aligned.

S&P 500 ETFs demonstrate strong and statistically significant exposure to the market factor, with market betas of 0,936 for the conventional ETF and 0,856 for the ESG ETF. This implies that the returns of both ETFs are largely explained by overall market movements. The conventional ETF exhibits slightly higher market sensitivity.

The SMB coefficient differs more clearly between ETFs. The conventional ETF shows an insignificant SMB coefficient close to zero (-0,002), whereas the ESG ETF has a positive and statistically significant coefficient of 0,607. This suggests that the ESG ETF has greater exposure toward smaller-cap firms compared with the conventional S&P 500 ETF.

The HML coefficients are statistically insignificant for both ETFs, indicating that neither portfolio shows a strong tilt toward either value or growth stocks. However, the ESG ETF exhibits a positive and statistically significant profitability factor (RMW) coefficient of 0,337. The conventional ETF´s RMW coefficient remains statistically insignificant. Similarly, the CMA coefficient is insignificant for the conventional ETF but negative and statistically significant for the ESG ETF, suggesting exposure toward firms with more aggressive investment behaviour.

The regression models also show relatively high explanatory power with relatively high R-squared values for both ETFs. Conventional ETF has 0,626 and ESG ETF has 0,522. In general, findings suggest that the ESG S&P 500 ETF remains highly similar to the conventional ETF, although some differences emerge particularly in the SMB and profitability factor exposures.

Table 4. S&P 500 ETF Pair.

ETF	**S&P 500**	**S&P 500 ESG**
Sharpe Ratio	0,72	0,76
Alpha	0,000	0,000*
Mkt−Rf	0,936***	0,856***
SMB	-0,002	0,607***
HML	-0,039	0,043
RMW	0,053	0,337***
CMA	0,049	-0,131**
R-Squared	0,626	0,522
N	2421	2421

7.4 MSCI USA

Table 5 presents the FF5 results for the MSCI USA ETF pair. The ETF pair covers the period from 2015 to 2026. The results show that the conventional MSCI USA ETF and the MSCI USA ESG ETF have relatively similar factors exposures, although some differences can be observed between the coefficients.

In contrast to some of the previous ETF pairs, the conventional ETF achieved a higher Sharpe ratio of 0,68 than the ESG ETF of 0,56. This indicates stronger risk-adjusted performance for the conventional ETF during the same period.

Both ETFs show statistically significant exposure to the market factor, with market betas of 0,848 for the conventional ETF and 0,914 for the ESG ETF. This indicates that the returns of both ETFs are largely driven by general market performance, while the ESG ETF shows slightly higher market sensitivity.

The SMB coefficients are positive and statistically significant for both ETFs, with values of 0,499 for the conventional ETF and 0,652 for the ESG ETF. This suggests that the ESG ETF has somewhat stronger exposure toward smaller-cap firms. The HML coefficient is insignificant for the conventional ETF, while it is positive and statistically significant for the ESG ETF. This implies a stronger value tilt in the ESG portfolio.

The RMW coefficient is positive and statistically significant for the conventional ETF, whereas the coefficient for the ESG ETF remains statistically insignificant. This suggests that profitability exposure is stronger for the conventional ETF, while the ESG ETF does not exhibit statistically significant profitability exposure. The CMA coefficients remain negative for both ETFs, implying exposure toward firms with more aggressive investment behaviour.

The explanatory power of the regressions is high, with very similar R-squared values for both ETFs. Overall, the results suggest that the MSCI USA ESG ETF closely resembles the conventional MSCI USA ETF, but with slightly higher market, size and value factor exposure.

Table 5. MSCI USA ETF Pair.

ETF	**MSCI USA**	**MSCI USA ESG**
Sharpe Ratio	0,68	0,56
Alpha	0,000	0,000
Mkt−Rf	0,848***	0,914***
SMB	0,499***	0,652***
HML	0,034	0,141***
RMW	0,138***	0,091
CMA	-0,158***	-0,207***
R-Squared	0,519	0,525
N	2854	2854

7.5 MSCI Europe

Table 6 presents the FF5 results for the MSCI Europe ETF pair over the 2018–2026 sample period. The findings indicate that the conventional and ESG ETFs exhibit broadly similar factor exposures, although minor differences are observed.

The Sharpe ratios are comparable (0,39 for the conventional ETF and 0,34 for the ESG ETF), suggesting only limited differences in risk-adjusted performance. Both ETFs display strong and statistically significant exposure to the market factor, with betas close to unit, indicating high sensitivity to overall market movements.

The SMB coefficients are positive and highly similar, reflecting comparable exposure to smaller-cap firms. While both ETFs exhibit positive and significant HML coefficients, the conventional ETF shows a stronger tilt toward value-oriented companies.

The profitability factor (RMW) is positive and statistically significant for both ETFs, whereas negative CMA coefficients indicate exposure to firms with more aggressive investment behaviour.

The regressions demonstrate high and comparable explanatory power, with R-squared values of 0,594 for the conventional ETF and 0,576 for the ESG ETF, confirming that MSCI Europe ESG ETF closely aligns with its conventional counterpart in terms of factor exposures and overall risk-return characteristics.

Table 6. MSCI Europe ETF Pair.

ETF	**MSCI Europe**	**MSCI Europe ESG**
Sharpe Ratio	0,39	0,34
Alpha	0,000	0,000
Mkt−Rf	0,960***	0,932***
SMB	0,857***	0,855***
HML	0,266***	0,152***
RMW	0,320***	0,346***
CMA	-0,120*	-0,133**
R-Squared	0,594	0,576
N	2035	2035

7.6 MSCI EMU

Table 7 presents the FF5 results for the MSCI EMU ETF pair. The ETF pair covers the period from 2010 to 2026. The results show that the conventional MSCI EMU ETF and the

MSCI EMU ESG ETF share several similar characteristics, although clearer differences are observable compared with some of the previous ETF pairs.

The Sharpe ratios of the ETFs are nearly identical, with values of 0,35 for the conventional ETF and 0,34 for the ESG ETF. This indicates that both ETFs delivered highly similar risk-adjusted performance over the same period.

Both ETFs exhibit strong and statistically significant exposure to the market factor, with market betas of 1,114 for the conventional ETF and 1,158 for the ESG ETF. This indicates that both ETFs are highly sensitive to overall market movements, while the ESG ETF demonstrates slightly higher market exposure.

The SMB coefficients are also positive and statistically significant, indicating exposure toward smaller-cap firms. However, the conventional ETF shows somewhat stronger size exposure with a coefficient of 0,510 compared with 0,396 for the ESG ETF.

The HML coefficients are also positive and statistically significant, indicating exposure toward value-oriented firms. In this case, the ESG ETF exhibits stronger value exposure, with an HML coefficient of 0,499 compared to 0,352 for the conventional ETF.

The RMW coefficients remain statistically insignificant for both ETFs, revealing that profitability does not significantly explain portfolio returns. Larger differences appear in the CMA factor, where the ESG ETF shows a strongly negative and statistically significant coefficient of -1,152, indicating stronger exposure toward firms with aggressive investment behaviour.

The ESG ETF also demonstrates higher explanatory power with an R-squared value of 0,646 compared with 0,553 for the conventional ETF. Overall, the results suggest that the MSCI EMU ESG ETF remains broadly comparable to the conventional ETF, although clearer differences emerge in the value and investment factor exposures.

Table 7. MSCI EMU ETF Pair.

ETF	MSCI EMU	MSCI EMU ESG
Sharpe Ratio	0,35	0,34
Alpha	0,000	0,000
Mkt−Rf	1,114***	1,158***
SMB	0,510***	0,396***
HML	0,352***	0,499***
RMW	0,021	0,089
CMA	-0,089	-1,152***
R-Squared	0,553	0,646
N	4203	4203

7.7 Euro Stoxx 50

Table 8 presents FF5 results for the Euro Stoxx 50 ETF pair. The sample period is from 2015 to 2026. The results indicate that the conventional Euro Stoxx 50 ETF and the Euro Stoxx 50 ESG ETF exhibit relatively similar factor exposures, although some differences emerge in the profitability and investment factors.

The ESG ETF achieved a higher Sharpe ratio of 0,47 compared with the conventional ETF Sharpe ratio of 0,39, suggesting somewhat stronger risk-adjusted performance during the sample period.

Market exposure remains the dominant explanatory factor for both ETFs, with market betas of 1,086 for the conventional ETF and 1,076 for the ESG ETF. This indicates that both ETFs are highly influenced by overall market movements. The SMB coefficients are positive and statistically significant for both ETFs, indicating exposure toward smaller-

cap firms, while the positive HML coefficients illustrate a tilt toward value-oriented companies.

The profitability factor (RMW) is positive and statistically significant for both ETFs, with ESG ETF showing a slightly stronger profitability loading. More noticeable differences appear in the CMA factor. Although both ETFs exhibit negative and statistically significant CMA coefficients, the ESG ETF demonstrates substantially stronger exposure toward firms with aggressive investment behaviour, with a coefficient of -1,228 compared with -0,254 for the conventional ETF.

The explanatory power of the regressions is relatively high, with R-squared values of 0,557 for the conventional ETF and 0,608 for the ESG ETF. The findings suggest that the Euro Stoxx 50 ESG ETF remains broadly comparable to the conventional ETF, although differences are more visible in the profitability and investment factor exposures.

Table 8. Euro Stoxx 50 ETF Pair.

ETF	**Euro Stoxx 50**	**Euro Stoxx 50 ESG**
Sharpe Ratio	0,39	0,47
Alpha	0,000	0,000
Mkt−Rf	1,086***	1,076***
SMB	0,659***	0,666***
HML	0,394***	0,354***
RMW	0,146**	0,174***
CMA	-0,254***	-1,228***
R-Squared	0,557	0,608
N	2813	2813

7.8 Stoxx Europe 600

Table 9 presents the FF5 results for the STOXX Europe 600 ETF pair over the 2013–2026 sample period. The findings indicate that the conventional and ESG ETFs exhibit highly similar factor exposures across most Fama–French factors.

The Sharpe ratios remain highly comparable between the ETFs, with values of 0,42 for the conventional ETF and 0,41 for the ESG ETF. This further suggests the conclusion that ESG screening has only limited impact on the overall risk-return profile of the ETF pair.

Both ETFs demonstrate strong sensitivity to market movements, with market betas of 1,003 and 1,025. Positive and statistically significant SMB coefficients indicate exposure to smaller-cap firms, while positive HML coefficients reflect a tilt toward value-oriented companies.

The profitability factor (RMW) is positive and statistically significant in both regressions, although the conventional ETF exhibits marginally higher exposure. In contrast, the CMA coefficients are statistically insignificant, suggesting that the investment factor does not meaningfully explain returns.

The regressions show similar explanatory power, with R-squared values of 0,568 for the conventional ETF and 0,590 for the ESG ETF. In general, the findings highlight that the ESG-screened Stoxx Europe 600 ETF remains highly comparable to the conventional ETF in terms of FF5 exposure and overall risk-return characteristics.

Table 9. STOXX Europe 600 ETF Pair.

ETF	**STOXX Europe 600**	**STOXX Europe 600 ESG**
Sharpe Ratio	0,42	0,41
Alpha	0,000	0,000
Mkt−Rf	1,003***	1,025***

ETF	STOXX Europe 600	STOXX Europe 600 ESG
SMB	0,691***	0,625***
HML	0,259***	0,253***
RMW	0,199***	0,155***
CMA	-0,051	-0,027
R-Squared	0,568	0,590
N	3346	3346

7.9 CAC 40

Table 10 presents the final FF5 results for the CAC 40 ETF pair over the sample period from 2019 to 2026. The results indicate that the conventional and the CAC 40 ESG ETF exhibit nearly similar factor exposures across all five factors.

Both ETFs achieved an identical Sharpe ratio of 0,48, suggesting equivalent risk-adjusted performance. This finding further emphasizes the high degree of similarity between the conventional and ESG ETF with the CAC 40 market.

Market exposure remains the dominant explanatory factor for both ETFs, with market betas of 1,028 for the conventional ETF and 1,037 for the ESG ETF. This implies that both ETFs are strongly influenced by overall market movements. The SMB coefficients are positive and statistically significant for both ETFs, indicating exposure toward smaller-cap firms, while the positive HML coefficients suggest exposure toward value-oriented companies.

The profitability factor (RMW) is positive and statistically significant for both ETFs, with very similar coefficients of 0,441 and 0,446, while negative and significant CMA coefficients indicate a tilt toward firms with more aggressive investment strategies.

The regressions exhibit comparable explanatory power, with R-squared values of 0,557 and 0,551 confirming that the ESG ETF closely mirrors the conventional ETF in terms of FF5 exposures and overall risk–return characteristics.

Table 10. CAC 40 ETF Pair.

ETF	**CAC 40**	**CAC 40 ESG**
Sharpe Ratio	0,48	0,48
Alpha	0,000	0,000
Mkt−Rf	1,028***	1,037***
SMB	0,936***	0,948***
HML	0,414***	0,382***
RMW	0,441***	0,446***
CMA	-0,250***	-0,235***
R-Squared	0,557	0,551
N	1850	1850

7.10 Summary of results

The empirical results indicate that ESG ETFs and conventional ETFs exhibit highly similar factor exposure and risk-return characteristics across most ETF pairs. The FF5 regressions show that market exposure explains a substantial proportion of ETF returns, while differences between ESG and conventional ETFs remain relatively limited. The findings suggest that that ESG screening does not fundamentally alter the investment characteristics of broad market ETFs.

The Sharpe ratio results provide mixed evidence regarding the risk-adjusted performance of ESG ETFs. In several ETF pairs, including Nasdaq 100, S&P 500, and Euro Stoxx 50. ESG ETFs achieved slightly higher Sharpe ratios than their conventional counterparts, suggesting improved risk-adjusted performance. However, this pattern was not

consistent across all ETF pairs, as some conventional ETFs demonstrated equal or superior Sharpe ratios.

The results suggest that ESG screening may slightly influence portfolio composition by altering exposure toward firms with different profitability or investment characteristics. This was especially evident in ETF pairs such as MSCI EMU and Euro Stoxx 50, where ESG ETFs exhibited notably stronger negative CMA coefficients, implying greater exposure toward firms with more aggressive investment behaviour. In addition, some U.S. ESG ETFs demonstrated relatively stronger SMB and profitability exposure compared with their conventional counterparts.

Overall, the findings support the hypothesis that ESG ETFs can provide performance comparable to conventional ETFs, although the results do not indicate consistent or statistically significant outperformance across all markets and ETF pairs.

8 Conclusions

This thesis examined the financial performance of ESG exchange-traded funds (ETFs) compared with conventional ETFs in the European and U.S. equity markets. The purpose of the study was to investigate whether ESG ETFs differ from conventional ETFs in terms of return, risk-adjusted performance, and factor exposures. The analysis was conducted using the Fama-French five-factor model and Sharpe ratio based on daily ETF return data.

The empirical findings indicate that ESG ETFs and conventional ETFs exhibit highly similar factor exposures and overall risk-return characteristics. The regression results showed that market exposure explained a substantial proportion of ETF returns, while differences between ESG and conventional ETFs remained relatively limited across most ETF pairs. In several cases, ESG ETFs achieved slightly higher Sharpe ratios compared with conventional ETFs, suggesting moderately stronger risk-adjusted performance. However, the results did not provide consistent evidence that ESG ETFs systematically outperform conventional ETFs across all markets and ETF pairs.

Overall, the findings support the hypothesis that ESG ETFs can provide financial performance comparable to conventional ETFs. At the same time, the results suggest that ESG screening does not fundamentally alter the investment characteristics of broad market ETFs. The results further suggest that the financial performance of ESG ETFs is influenced by factors such as market conditions, index composition, and the specific ESG screening methodology applied. These findings are broadly consistent with previous literature, which has reported mixed evidence regarding the financial benefits of ESG investing.

The topic remains important due to the continuously growing role of sustainable investing within global financial markets. Increasing awareness of climate change, corporate governance issues, and social responsibility has strengthened investor interest in ESG-related investments. At the same time, institutional investors, regulators, and companies are placing greater emphasis on sustainability considerations within financial decision-making. Therefore, understanding the financial implications of ESG investing is increasingly relevant for both private and institutional investors.

Certain limitations should be acknowledged. First, the sample size of the study remained relatively limited, consisting of nine ETF pairs. In addition, the observation periods differed between ETF pairs due to variations in ETF inception dates and data availability. Since ESG ETFs are relatively new investment instruments, the available historical data was more restricted compared with conventional ETFs. Furthermore, the study focused only on broad market UCITS ETFs and therefore does not capture the behaviour of more specialized ESG investment strategies or actively managed sustainable funds. The Sharpe ratios were also analysed descriptively without conducting formal statistical significance tests between the ratios.

Future research could extend the analysis by utilizing larger ETF samples, longer observation periods, and additional geographical markets. Further studies could also investigate sector-specific ESG ETFs, actively managed ESG funds, or the performance of ESG investments during different market regimes and crisis periods. In addition, future research could apply formal statistical tests for differences in Sharpe ratios and compare the explanatory power of alternative asset pricing models.

In conclusion, the results of this thesis suggest that investors may integrate ESG considerations into their investment strategies without significantly compromising financial performance. Although ESG ETFs did not consistently outperform conventional ETFs, the findings indicate that responsible investing can provide competitive risk-adjusted returns while simultaneously supporting broader sustainability objectives. From a practical perspective, the results imply that investors do not necessarily face a trade-off between financial performance and sustainability preferences when selecting broadly diversified ESG ETFs.

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