



UNIVERSITÀ  
DI PAVIA

**Dipartimento di Scienze Economiche e Aziendali**

**Corso di Laurea [magistrale] in Finance**

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# **THE PRESENT STATE AND PERSPECTIVES OF ESG FUNDS**

**Relatore:**

**Chiar.mo Prof. Claudia Tarantola, PhD.**

**Tesi di Laurea  
di Romana Antalová**

**Matr. n. 524152**

**Anno Accademico 2023-2024**



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## **Acknowledgment**

I would like to express my sincere appreciation to my supervisors Claudia Tarantola, PhD. and doc. Ing. Peter Árendáš PhD. for the guidance, help and advice by elaborating of this thesis.

## **ABSTRACT**

ANTALOVÁ, Romana: The present state and perspectives of ESG funds. – University of Economics in Bratislava. The Faculty of Economics and Finance; Department of Banking and International Finance. – doc. Ing. Peter Árendáš, PhD. – Bratislava: NHF EU. University of Pavia; Department of Economics and Management – Claudia Tarantola, PhD. – Pavia, 2024, 69 p.

The aim of this thesis is to explore the relationship between Environmental, Social, and Governance (ESG) factors and fund performance. The concept of ESG is gaining popularity among investors, who increasingly prioritize the sustainability of the companies in which they invest, alongside financial performance. Therefore, the first chapter reviews ESG investing theories, investor motivations and approaches, and the significance of ESG reporting. The second chapter of the thesis outlines the objectives and research methods employed. The practical part, comprising the third chapter, delves into examining the relationship between fund performance and their ESG factors. We attempt to determine whether ESG funds outperform conventional ones and identify which specific ESG criteria contribute the most to this performance differential. The results of the study indicate a growing trend in investments into ESG funds, particularly in Europe. ESG funds tend to outperform conventional ones despite higher costs and volatility, attributed to their sustainability and corporate responsibility focus. The study highlights carbon intensity as a key ESG criterion, indicating that funds with lower carbon intensity values can yield higher returns.

**Key words:** ESG funds, Financial performance, ESG factors, Sustainability

## RIASSUNTO

ANTALOVÁ, Romana: Situazione attuale e prospettiva future per i fondi ESG. - Università di Economia di Bratislava. Facoltà di Economia e Finanza; Dipartimento di Banca e Finanza Internazionale. - doc. Ing. Peter Árendáš, PhD. - Bratislava: NHF EU. Università di Pavia; Dipartimento di Economia e Management - Claudia Tarantola, PhD. - Pavia, 2024, 69 p.

L'obiettivo di questa tesi è esplorare la relazione tra i fattori ambientali, sociali e di governance (ESG) e la performance dei fondi. Il concetto di ESG sta guadagnando popolarità tra gli investitori, che danno sempre più priorità alla sostenibilità delle aziende in cui investono, oltre che alla performance finanziaria. Pertanto, il primo capitolo passa in rassegna le teorie sugli investimenti ESG, le motivazioni e gli approcci degli investitori e l'importanza del reporting ESG. Il secondo capitolo della tesi delinea gli obiettivi e i metodi di ricerca utilizzati. La parte pratica, che comprende il terzo capitolo, si occupa di esaminare la relazione tra la performance dei fondi e i loro fattori ESG. Si cerca di determinare se i fondi ESG superano quelli convenzionali e di identificare quali criteri ESG specifici contribuiscono maggiormente a questo differenziale di performance. I risultati dello studio indicano una tendenza in crescita degli investimenti in fondi ESG, soprattutto in Europa. I fondi ESG tendono a sovraperformare quelli convenzionali nonostante i costi e la volatilità più elevati, grazie alla loro attenzione alla sostenibilità e alla responsabilità aziendale. Lo studio evidenzia l'intensità di carbonio come criterio ESG chiave, indicando che i fondi con valori di intensità di carbonio più bassi possono produrre rendimenti più elevati.

**Parole chiave:** Fondi ESG, Performance finanziaria, Fattori ESG, Sostenibilità

# Content

- INTRODUCTION..... 8
- 1. LITERATURE REVIEW..... 10
  - 1.1 History of ESG..... 11
  - 1.2 ESG performance..... 12
  - 1.3 ESG dimensions..... 15
  - 1.4 ESG rating providers..... 16
    - 1.4.1. *Sustainalytics* ..... 17
    - 1.4.2. *MSCI* ..... 17
    - 1.4.3. *Morningstar* ..... 18
    - 1.4.4. *Bloomberg*..... 19
  - 1.5 ESG Investment approaches ..... 20
  - 1.6 Motivation for integrating ESG factors into investment..... 22
  - 1.7 ESG disclosure..... 24
  - 1.8 ESG funds ..... 26
- 2. THE OBJECTIVE AND METHODOLOGY ..... 28
- 3. RESULTS AND DISCUSSION ..... 32
  - 3.1 ESG investments statistics ..... 32
  - 3.2 US Total Market..... 35
    - 3.2.1. *iShares ESG Aware MSCI USA ETF (ESGU)* ..... 36
    - 3.2.2. *Vanguard Total Stock Market ETF(VTI)* ..... 38
    - 3.2.3. *Comparison of „US Total Market” Funds* ..... 39
  - 3.3 Emerging market..... 42
    - 3.3.4. *iShares ESG Aware MSCI EM ETF (ESGE)* ..... 43
    - 3.3.5. *Vanguard FTSE Emerging Markets ETF (VWO)* ..... 44
    - 3.3.6. *Comparison of „Emerging Market” Funds* ..... 46
  - 3.4 Developed Market..... 49

3.4.7. <i>iShares ESG Aware MSCI EAFE ETF (ESGD)</i> .....	50
3.4.8. <i>Vanguard FTSE Developed Markets ETF (VEA)</i> .....	52
3.4.9. <i>Comparison of „Developed Market” Funds</i> .....	53
3.5 Relationship between ESG criteria and fund performance .....	55
3.5.10. <i>Analysis of outperforming and underperforming funds</i> .....	55
3.5.11. <i>Regression model</i> .....	57
3.5.12. <i>Results of relationship between ESG factors and fund performance</i> .....	59
CONCLUSION .....	62
REFERENCES.....	64

# List of figures, tables, and pictures

- Figure 1:Global ESG ETF assets from 2006 to November 2023 ..... 33
- Figure 2: Sustainable and traditional equity funds worldwide in 2023, by sector ..... 34
- Figure 3: ESG adoption challenges (Percentage of investors who agree)..... 35
- Figure 4:Sector weightings of ESGU fund..... 37
- Figure 5:Top 10 holdings of ESGU fund ..... 37
- Figure 6: Sector weightings of VTI fund ..... 38
- Figure 7:Top 10 holdings of VTI fund ..... 39
- Figure 8: Returns of „US Total Market” Funds ..... 40
- Figure 9: Sector weightings of ESGE fund ..... 43
- Figure 10:Top 10 holdings of ESGE fund..... 44
- Figure 11:Sector weightings of VWO fund..... 45
- Figure 12: Top 10 holdings of VWO fund ..... 46
- Figure 13: Returns of „Emerging Market” Funds ..... 47
- Figure 14:Sector weightings of ESGD fund..... 51
- Figure 15: Top 10 holdings of ESGD fund ..... 51
- Figure 16:Sector weightings of VEA fund..... 52
- Figure 17:Top 10 holdings of VEA fund ..... 53
  
- Table 1:ESG dimension..... 16
- Table 2:ESG sustainability investment style ..... 21
- Table 3: „US Total Market” funds ..... 35
- Table 4: Correlation of funds from US Total Market..... 36
- Table 5:Comparison of fundamental metrics of „US Total Market” Funds ..... 39
- Table 6: ESG criteria of „US Total Market” Funds ..... 41
- Table 7: Comparison of fundamental metrics of „Emerging Market ” Funds..... 42
- Table 8:Correlation of „Emerging Market” Funds..... 43
- Table 9:Comparison of fundamental metrics of „Emerging Market” Funds ..... 46
- Table 10:Comparison of fundamental metrics of „Developed Market” Funds..... 49
- Table 11: Correlation of „Developed Market” Funds ..... 50
- Table 12: ESG criteria of „Developed Market” Funds ..... 54
- Table 13: Performance and ESG criteria of funds..... 56
- Table 14:Funds Outperforming Benchmark SPY ..... 57



Picture 1: Sustainalytics ESG risk levels.....	17
Picture 2:MSCI ESG rating .....	18
Picture 3:Morningstar Sustainability Rating Categories .....	19
Picture 4: Most common ESG approaches in 2023 .....	22
Picture 5: Implied Temperature Rise.....	29
Picture 6: Carbon Intensity scale .....	29
Picture 7: OLS Regression Model.....	58
Picture 8: Shapiro-Wilk W test for normal data.....	58
Picture 9:Variance Inflation Factor (VIF) test.....	58
Picture 10: Breusch-Pagan/Cook- Weisberg test for heteroskedasticity .....	58

# INTRODUCTION

Nowadays, the concept of ESG (Environmental, Social, and Governance) is gaining increasing recognition. ESG analysis has evolved into a crucial aspect of the investment process, reflecting a growing acknowledgment of the importance of sustainability and corporate responsibility alongside financial objectives. For investment professionals, integrating ESG considerations into financial analysis offers a comprehensive understanding of the companies they invest in. This recognition highlights that environmental, social, and governance factors can have a substantial impact on a company's long-term success, leading investors to consider these factors when making investment decisions.

Currently, investors are presented with numerous investment options, with a particular focus on sustainability. Among these options are ESG ETF funds, which have seen a substantial increase in quantity over the past 17 years. According to Statista (2024), the allocated assets in ESG ETF funds surged from around \$5 billion in 2006 to \$480 billion by November 2023. The primary objective of this thesis is to examine the relationship between the financial performance of ETF funds and their ESG criteria. We aim to determine whether investments incorporating ESG criteria can outperform conventional funds solely focused on financial performance. Furthermore, we seek to analyse which ESG criteria may have the most significant relationship with fund performance. The master thesis complies with the official standards set by the University of Economics in Bratislava, maintaining a defined structure and segmentation.

To achieve our objective, our thesis will commence with the historical evolution of ESG investing, followed by a comprehensive review of research conducted by various authors regarding the correlation between ESG factors and investment performance. We will also delve into diverse investment methodologies and the rationale behind incorporating ESG criteria into investment strategies. Furthermore, we will undertake a comparative analysis of four prominent rating agencies specialized in assessing ESG investments. Finally, we will underline the significance of ESG disclosure while addressing the inherent challenges associated with it.

The second chapter includes goals and methodology of our research. The introductory segment of the analytical part, in the third chapter of the thesis, focuses on statistical data relating to ESG investing, providing valuable insights into the current state and perspectives of this concept. Subsequently, it includes a comparative analysis of ETF ESG funds across three distinct segments: US Total Market, Emerging Market, and Developed Market. These ESG funds will be evaluated against a benchmark represented by conventional funds, aiming to

explain the correlation between ESG factors and fund performance. Conclusively, the thesis delves into an examination of which ESG factors contribute most significantly to enhancing fund performance.

# 1. LITERATURE REVIEW

In recent years, sustainable investing has experienced rapid growth, thanks to an increasing number of institutional investors and funds integrating diverse Environmental, Social, and Governance (ESG) investment principles. These stakeholders aim to enhance the incorporation of long-term financial risks and opportunities into their investment decision-making processes with the goal of generating long-term value. Although the mainstreaming of sustainable finance is a positive development, there is significant variation in the terminology and practices associated with ESG investing. One of the reasons for this divergence is that ESG investing has evolved from earlier socially responsible investment philosophies to become a unique form of responsible investing (Boffo, Patalano 2020).

Socially responsible investment (SRI) places its emphasis on evaluating the impact of companies within specific areas of interest. This approach frequently utilizes a negative screening process, which involves excluding companies engaged in activities deemed objectionable by the investor. For instance, an SRI investment strategy may steer clear of companies involved in alcohol, gambling, tobacco, or weapons. Additionally, countries with documented human rights violations are often omitted from investment portfolios. The selection process is often facilitated using indexes provided by consultants. However, it is important to note that SRI doesn't solely revolve around excluding companies with negative attributes. It can also involve proactive investments in companies dedicated to social justice, environmental sustainability, or supporting local communities. Nevertheless, the key distinction lies in the fact that SRI primarily involves filtering out certain companies, whereas ESG investing offers guidance on which companies to include as part of an overall portfolio strategy (Hill, 2020).

"ESG," "sustainable investing" and "responsible investing" are comprehensive terms used to describe the integration of environmental, social, and governance (ESG) factors into investors' choices regarding their portfolios. Typically, investors evaluate ESG factors by analysing non-financial data related to environmental aspects, social aspects, and governance characteristics (Matos, 2020). They assess the potential risks and opportunities associated with investments and measure their long-term sustainability. ESG criteria can be applied as an additional layer in the investment strategy or can be integrated into every aspect of the investment process (Bank for International Settlements, 2020).

The ESG assessment complements traditional financial analysis by recognising a company's ESG challenges and risk. This includes the money a company could lose if it doesn't deal with ESG risks and the money it could make by taking advantage of ESG opportunities. It is essential to note that despite the consideration of these non-financial factors, the primary goal of ESG investing are strong financial returns (Zhou, 2022).

## **1.1 History of ESG**

ESG investing has its roots in the Methodist Movement, dating back over two centuries. At that time, individuals were raising their voices in protest against businesses involved in the production of products like tobacco and weapons. This early form of socially responsible investing laid the foundation for what we now know as ESG investing. In 1971, Pax World took a significant step by launching the first sustainable mutual fund in the United States. This pioneering initiative was led by two United Methodist ministers, Jack Corbett, and Luther Tyson. Their motivation was to ensure that the church's funds were not invested in companies contributing to the Vietnam War. They aimed to align their investments with their ethical and moral principles, emphasizing the importance of companies following to standards of environmental and social responsibility. Remarkably, this mutual fund remains active and operational to this day (Seth et al., 2021).

ESG investing expanded in the 1990s and was primarily focused on environmental activities such as the protection of natural resources to ensure cleaner air and water. Many events since the year 2000 have collectively expanded the horizon of ESG investing to include sustainable and responsible investment practices. Among these events belongs the breakdowns of companies such as Enron (in 2001) and WorldCom (in 2002), during which many investors lost their life savings. Furthermore, there are concerning discoveries about global warming and ozone layer depletion, influenced by events like the Chernobyl and Bhopal incidents. The oil spills in Alaska and the Gulf of Mexico also contribute to this series of events. These occurrences heightened ESG investing as shareholders demanded greater responsibility from the companies in which they invest (Meziani Seddik, 2014).

ESG investing started to become very popular at the beginning of year 2000 when the first studies were published. These studies demonstrated a positive correlation between strong corporate sustainability practices and favourable financial outcomes. While the concept of ESG investing initially emerged in Europe, it has since expanded its reach and influence on countries like Canada, Japan, Australia, and the United States. Today, ESG investing is a global

movement, driven by a commitment to both financial success and a more sustainable, responsible future (Seth et al., 2021).

## **1.2 ESG performance**

Early research on responsible investing concentrated on assessing how financial performance changed when Social Responsibility increased. The absence of precise tools, like ESG ratings, posed the challenge of determining which metrics more accurately reflected the Social Responsibility of enterprises analysed (Boffo, Patalano 2020).

In this part, we present a summary of the existing literature that examines the connection between a company's financial performance and its level of social responsibility assessed through ESG criteria.

Derwall et al. (2005) examine the influence of environmental responsibility on a company's financial performance. Their study focuses on U.S. companies from 1997 to 2003. Employing a high-low strategy, the Carhart four-factor model demonstrates a significant advantage in terms of performance for firms with high ESG ratings compared to those with low ratings.

Eccles et al. (2014) use a combined methodology to distinguish between high and low sustainability companies among a pool of 180 U.S. firms. In addition to utilizing ESG ratings provided by ASSET4 and SAM, they incorporate insights from their own research and interviews. Their assessment, based on an overall impression, divides these companies into either high or relatively low sustainability categories. Using the Carhart four-factor model and a high-low strategy, they uncover annual abnormal returns of up to 4.8% during a period spanning from 1993 to 2010.

Another study conducted by Lee et al. in 2013 similarly examine the performance of U.S. firms based on their ESG ratings sourced from SAM. Utilizing the Carhart four-factor model over the period from 1998 to 2007, their research presents compelling evidence supporting the notable outperformance of both highly rated companies and highly rated sectors. It is important to note that this study specifically considers the overall ESG score and does not delve into the individual ESG components.

Kempf and Osthoff (2007) provided one of the initial studies using KLD ratings, where they compared the performance of companies with high and low ratings from the S&P 500 and DS 400 indices over the period from 1992 to 2004. They created value-weighted portfolios by applying a 10% threshold. Utilizing the Carhart four-factor model, their findings indicated a

noteworthy performance contrast between the high-rated and low-rated portfolios, with investors achieving an annual abnormal return of up to 8.7%.

In a related study, Statman and Glushkov (2009) also formed high and low portfolios based on KLD rating data spanning from 1992 to 2007. Unlike Kempf and Osthoff, their portfolios were equally weighted, and the threshold was set at one third. For most ESG categories, both the CAPM and the Carhart four-factor model showed a significant positive abnormal return associated with the high-low investment strategy.

Derwall et al. (2005), Eccles et al. (2014), Kempf and Osthoff (2007), and Statman and Glushkov (2009) all discover a notable positive influence of the ESG score on investment returns when using KLD, ASSET4, Innovest, and SAM ratings. These findings suggest that investors can potentially achieve above-average returns by engaging in ESG-based portfolio trading. While these researches primarily adopt the ESG portfolio approach, Manescu (2011) and Galema et al. (2008) take into account correlations across various factors. In both cases, these studies reveal a meaningful positive association between ESG factors and investment returns for at least a few indicators.

Halbritter and Dorfleitner conducted research in 2015, during which they employed ESG data from ASSET4, Bloomberg, and KLD for the U.S. market, covering the period from 1991 to 2012. Their analytical framework involved the use of an ESG portfolio approach with the Carhart four-factor model, along with cross-sectional Fama and MacBeth regressions. Prior empirical research has suggested a connection between ESG ratings and investment returns. In contrast, the ESG portfolios do not demonstrate a significant difference in returns between companies with high and low ESG ratings. While the Fama and MacBeth regressions discover a notable influence of several ESG variables, investors find it challenging to exploit this relationship. The extent and direction of this impact significantly vary based on the ESG rating provider, the company sample, and the specific time period under consideration.

While there is supporting evidence that a company's financial performance is linked to its ESG score, it is crucial to subject this issue to a comprehensive investigation. Most studies rely on a single ESG dataset. Findings of Halbritter and Dorfleitner (2015) show that ESG ratings from different providers exhibit significant disparities in terms of their distribution and risk profiles. This variability may also impact the potential correlation with financial metrics. The findings imply that investors should no longer expect abnormal returns from trading portfolios of companies with divergent ESG ratings.

Larsen (2016) observes a robust positive relationship between MSCI (formerly KLD) scores and actual returns in the years 2012 to 2016. Additionally, Larsen notes that stocks with high scores demonstrate reduced variability in returns, which is encouraging for ESG investors.

One of the most extensive research projects is the study by Friede, Busch, and Bassen (2015), where they perform a meta-analysis of 2200 empirical studies. Their findings indicate that a significant majority of studies report favourable results regarding the connection between ESG and corporate financial performance (CFP). The outcomes demonstrate that there is strong empirical support for the business rationale behind ESG investing.

Findings from studies conducted by Edmans (2011) and Dorfleitner et al. (2014) suggest that the financial advantages of strong Corporate Social Performance (CSP) may only become apparent when these stocks are held for a longer period. Many investors view social responsibility as a valuable category on its own, even in the absence of an additional return.

The findings of Velde et al. (2005) indicate that portfolios with high sustainability ratings have shown relatively better performance compared to low-rated portfolios. However, this performance difference may not be particularly significant, possibly since sustainable analysis of companies is a relatively new phenomenon, so the short investment horizon was considered.

Cochran and Wood (1984) conducted a study that concentrated on exploring the connection between corporate social responsibility and financial performance. They employed new methodologies, enhanced techniques, and industry-specific control groups. The research discovered a strong correlation between the average age of corporate assets and the ranking of social responsibility. Even after accounting for this factor, there is still some relationship between corporate social responsibility and financial performance.

There are several studies which come with the opposite results as the previous ones. Study conducted by Derwall and Verwijmeren (2007) show that certain high-quality stocks (those with a high ESG score) generate negative abnormal returns. This can be attributed to either mispricing or compensation for risk.

Alexander and Buchholz's (1978) research investigates the correlation between social responsibility and the stock market performance of U.S. corporations during the years 1970-1974. The findings from this study suggest a minimal and statistically insignificant connection between risk-adjusted performance and the level of social responsibility. Aupperle et al. (1985)



in their study used various research approaches and arrived at the similar results. They found no correlation between social responsibility and performance.

### **1.3 ESG dimensions**

Three dimensions of ESG are – Environmental, Social and (corporate) Governance aspects. In this section we provide overview of each dimension.

The environmental (E) dimension evaluates a company's influence on the natural environment, including factors like its emissions, the responsible use of natural resources during production, the management of pollution and waste, and initiatives aimed at innovatively designing eco-friendly products (Matos, 2020).

These are some factors included in environmental dimension:

- Water and air pollution
- Biodiversity loss
- Deforestation
- Waste management
- Carbon footprint, global warming
- Climate Change impact
- Natural resource conservation (Seth et al., 2021).

The social (S) dimension refers to a company's interactions with its employees, clients, and the broader society. It is aimed at maintaining loyal employees through factors like job quality, workplace safety, training, and professional growth. It also involves meeting customer expectations by delivering high-quality products and services that ensure customer well-being, as well as demonstrating responsible corporate citizenship in the communities where the company operates (Matos, 2020).

This dimension includes factors such as:

- Customer satisfaction
- Gender equality and diversity
- Human rights
- Employee involvement and satisfaction
- Labour laws
- Community relations
- Data protection and privacy

- Participating in volunteering activities to improve the socio-economic conditions (Seth et al., 2021).

The governance (G) dimension focuses on the structures established to ensure that management acts in the best interests of its long-term shareholders. This involves protecting shareholder rights, such as limiting anti-takeover measures and maintaining an effective board of directors composed of experienced, diverse, and independent members. This dimension is aimed also at preventing illegal activities such as fraud and bribery (Matos, 2020).

Other factors included in governance dimension are:

- Audit committee structure
- Lobbying
- Political associations and contribution
- Executive compensation (Seth et al., 2021).

Table 1:ESG dimension

Environmental	Social	Governance
<ul style="list-style-type: none"> <li>• Climate change and carbon emissions</li> <li>• Natural resource use and energy and water management</li> <li>• Pollution and waste</li> <li>• Ecodesign and innovation</li> </ul>	<ul style="list-style-type: none"> <li>• Workforce health and safety, diversity, and training</li> <li>• Customer and product responsibility</li> <li>• Community relations and charitable activities</li> </ul>	<ul style="list-style-type: none"> <li>• Shareholder rights</li> <li>• Composition of boards of directors (independence and diversity)</li> <li>• Management compensation policy</li> <li>• Fraud and bribery</li> </ul>

Source: (Matos, 2020)

### 1.4 ESG rating providers

There are several services which offer research on the ESG performance of corporations. In this section, we examine a few of them and compare their approaches and methodology.

It is important to highlight that ESG scores originate from different providers, each employing their own rating systems and assessment criteria, leading to a lack of standardization. Additionally, certain rating agencies prioritize either the environmental, social, or governance aspects more heavily. This absence of uniformity can result in discrepancies in scores for a single company when assessed by different rating agencies (Hayes, 2023).

### 1.4.1. *Sustainalytics*

Sustainalytics, a Morningstar subsidiary, offers information on more than 70 indicators, and they assign weights to these indicators based on their significance within each of the 42 industry categories. These indicators are categorized into three pillars representing Environmental (E), Social (S), and Governance (G) issues. Each company being assessed is evaluated based on its readiness, transparency, and performance related to each factor. The outcomes are converted into scores ranging from 1 to 100, and companies are ranked by percentile within their respective industry group. This evaluation is conducted on an annual basis. Apart from these ESG ratings, Sustainalytics also keeps track of daily news updates to identify any events that could have negative effects (Hill,2020).

Sustainalytics' ESG Risk Ratings evaluate a company's vulnerability to ESG risks that are related to its industry and assess how effectively the company is handling these risks. This comprehensive approach to measuring ESG risk incorporates both a company's management of these risks and its level of exposure to them, resulting in a definitive evaluation of ESG risk. Sustainalytics categorizes ESG risk severity into five levels, which can have an impact on a company's enterprise value (Sustainalytics, 2023).

Picture 1: Sustainalytics ESG risk levels

Negligible	Low	Medium	High	Severe
0 - 10	10 - 20	20 - 30	30 - 40	40+

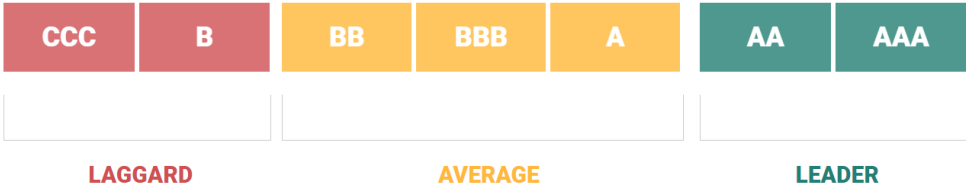
Source:(Sustainalytics, 2023)

### 1.4.2. *MSCI*

MSCI also provides ESG ratings, and it generates these ratings for approximately 7500 companies (including 13 500 total issuers, including subsidiaries) and over 650 000 equity and fixed income securities. It is worth noting that there have been consistently lower correlations between MSCI's Governance scores and those from Sustainalytics compared to the other ESG pillars. This difference is likely due to the fact that MSCI's Governance score primarily assesses the quality of corporate governance, with a focus on elements such as board composition and executive compensation. In contrast, Sustainalytics' comparable metric includes some of these aspects but also places significant weight on a company's governance of environmental and social issues (Hill,2020).

MSCI ESG Ratings try to assess how well a company manages ESG risks and opportunities that can affect its financial performance. It uses a rules-based methodology to recognise industry leaders and laggards according to their exposure to ESG risks and how effectively they handle those risks compared to their peers. ESG Ratings are classified into three categories: leaders (AAA, AA), average (A, BBB, BB), and laggards (B, CCC). The ESG rating of the fund is determined by its ESG Quality Score, which is evaluated on a scale ranging from 0 to 10. A score of 0 represents the lowest possible rating, while a score of 10 signifies the highest. Additionally, MSCI ESG ratings assess equity and fixed income securities, loans, mutual funds, ETFs, and even countries (MSCI, 2023).

Picture 2: MSCI ESG rating



Source: MSCI, 2023

Both MSCI and Sustainalytics assert that their services are specifically designed to assist investors in recognizing and understanding financially significant ESG risks and opportunities. This enables them to integrate these factors into their portfolio construction and management process (Boffo, Patalano 2020).

The main difference between Sustainalytics and MSCI is how they assess ESG risk. Sustainalytics uses an absolute approach, which means it evaluates companies using consistent standards regardless of their sector or location. In contrast, MSCI takes a "best in class" approach, where a company's score is compared only to others in the same sector. If clients want to include or exclude companies or entire sectors from their investment options based on specific ESG characteristics, they might prefer the absolute approach used by Sustainalytics (Morningstar, 2023).

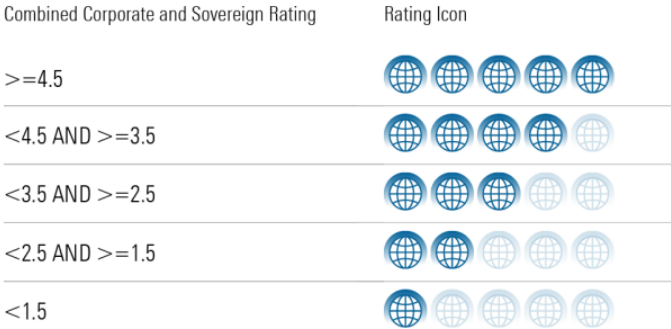
1.4.3. Morningstar

Morningstar is widely regarded as the top fund rating service, known for its detailed analysis of fund performance. Its recommendations have significant influence over the investment flows in and out of these funds. When assessing ESG funds, Morningstar relies on Sustainalytics ratings. This methodology was updated in late 2021 and Sustainalytics' Country Risk Ratings were included into Morningstar ratings. Morningstar offers Sustainability Ratings

for around 20 000 mutual funds and ETFs. These ratings are on a scale from one to five, representing a relative ranking within the investment's industry category. A rating of one means that the investment is not doing very well and is at the bottom of the range. Three indicates an average rating, and five signals that the investment performs exceptionally well in ESG within its industry group.

Some investors find these ratings valuable when choosing between sector-specific funds. They might prefer conventional funds over those labelled as ESG, because those investments may have industry weightings or other characteristics that don't align with the investor's objectives or could potentially lead to underperformance. However, by using Morningstar's Sustainability Ratings, investors can incorporate ESG considerations into their portfolios while keeping to their preferred investment style. For instance, if an investor wishes to invest in a large-cap growth fund, they can select one with a five ESG rating over a fund with only a one rating (Hill, 2020).

Picture 3: Morningstar Sustainability Rating Categories



Source: Morningstar

1.4.4. *Bloomberg*

Bloomberg offers ESG data that focuses on selecting metrics, especially emphasizing environmental and social impact metrics. In the case of Bloomberg, industries are categorized into broad groups for choosing metrics based on their environmental impact (higher, medium, and lower) and their social impact (higher and lower), while governance metrics remain consistent across all industries (Boffo, Patalano 2020).

Bloomberg provides ESG data for a more than 11 800 businesses across over 100 countries. This data is structured into approximately 2 000 distinct fields. One of the features they offer is ESG Disclosure Scores, which assess companies based on their extent of ESG

disclosure. These scores cover critical sustainability topics, such as climate change, human capital management, and shareholders' rights (Lovas, 2022).

## **1.5 ESG Investment approaches**

Different approaches to ESG investing can be grouped into six distinct forms, varying in how extensively asset managers utilize the ESG framework. Various organizations, such as the Global Sustainable Investment Alliance, the OECD and the CFA Institute offer categorizations for sustainable investment strategies. One approach involves straightforwardly removing certain companies, often based on moral reasons. The alternative is integrating ESG principles deeply into a company's investing culture, making it a fundamental part of how they operate and make decisions in investments, governance, and overall strategies. These approaches can work together, letting portfolios use more than one strategy at the same time (Boffo, Patalano 2020).

According to Boffo and Patalano (2020), these are six different forms of ESG investment approaches:

1. "Exclusion" or "avoidance": involves excluding companies and governments that do not support fundamental social values. Reasons for exclusion involve producing controversial weapons, engaging in activities like tobacco, alcohol, and casinos or having a significant portion of revenue from coal extraction or activities that harm social values.

2. "Norms-based" or "inclusive screening": This approach include or give more prominence to issuers that follow to international standards, such as those set by the OECD. This approach might involve "best in class" investment strategies, where companies achieving specific ESG score standards are included.

3. The third form, which is often a step following inclusion, involves reorganizing the remaining assets based on ESG scores. This means putting more focus on companies that have better ESG ratings and moving away from the ones with lower ratings in a portfolio.

4. "Thematic strategies": involves focusing on specific ESG themes within the environmental, social, or governance parts. These strategies can primarily focus on making money or on supporting certain values. Funds following these strategies might not necessarily exclude or adjust portfolios solely based on ESG scores. Instead, they might concentrate on specific aspects like the environmental score which included, for instance, carbon footprint. These thematic funds might align with specific social norms. In this case, the financial and

social goals can mix because the theme often has a purpose that is distinct from maximising long-term financial value.

5. “Impact focus approach”: Investors focusing on ESG impact aim for financial returns while enhancing companies' ESG practices. Their active engagement can contribute to better management and climate protection, improving market valuation and financial performance. This approach may involve investing in companies with lower ESG scores showing interest in improvement and could include shareholder voting and communication to change their practices. Such investment might also target specific ESG areas, like green finance. For instance, ESG impact investing could seek to maximize financial returns through green finance bonds.

6. “ESG integration”: This approach means carefully including ESG risks and opportunities in every important part of how institutional investors handle their investments. Unlike the best-in-class method, it doesn't always involve comparing against peers or choosing or avoiding top or bottom performers, because ESG factors are considered throughout asset selection, portfolio balancing and risk management. Signs of ESG integration often include expert oversight, resources devoted to evaluating ESG aspects within portfolios, clear policies excluding poor-scoring companies, and strategies to improve impact for those needing enhancement. It also involves using research and tools to measure performance.

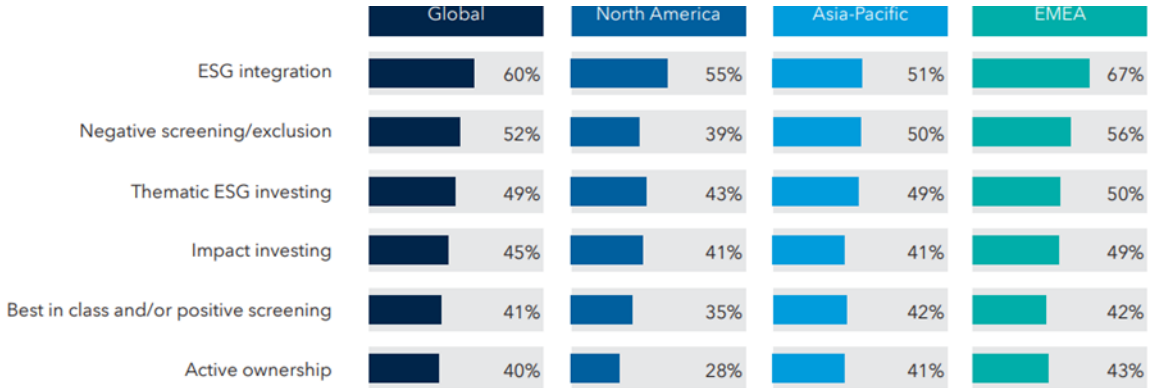
Table 2:ESG sustainability investment style

	Screened exclusion or norms	ESG rebalancing	Thematic Focus	Impact
<b>Objective</b>	Remove specific companies w/ objectionable activities	Invest based on ESG scores and rating systems	Invest with focus on particular E, S, or G issues.	Target specific non-financial outcomes along with financial returns.
<b>Key considerations</b>	Definition / financial impact on screens.	ESG data sources, desired risk taken.	Broad vs specific exposures.	Report on progress of impact outcomes.
<b>Examples</b>	Screening out producers of weapons, fossil fuels, etc., or screening in those who comply with agreed international norms.	Optimise ESG benchmarks, active strategies, etc.	Environmental focus on low-emissions.	Specific green bond mandates.

Source: (Boffo, Patalano 2020)

The ESG Global Study 2023 conducted by Capital Group provides insights into the most employed ESG approaches. ESG integration remains the predominant method, cited by six out of ten (60%) investors. Among respondents from the EMEA region, there is a particularly high preference for integration, with 67% favouring this approach. Notably, there has been an increase in the use of negative screening compared to the previous year, with 52% employing it in 2023 as opposed to 40% in 2022, making it the second most popular approach. Thematic ESG investing and impact investing are each utilized by just under half of the investors surveyed (49% and 45% respectively), while best-in-class and active ownership are adopted by two in five investors (41% and 40% respectively). Impact investing is particularly favoured in the EMEA region, reflecting the more mature European impact market (Capital Group, 2023).

Picture 4: Most common ESG approaches in 2023



Source: ESG Global Study 2023 (Capital Group)

### 1.6 Motivation for integrating ESG factors into investment

While capital markets have greatly contributed to resource allocation and wealth generation, the overall societal value of corporations depends on collaboration with stakeholders like employees, suppliers, and local communities in which they operate. Nowadays, it is evident that a company's engagement with elements such as environmental risks, social practices, and governance issues can significantly influence its long-term value. High-profile examples of such ESG-related incidents include the 2001 Enron Corporation accounting fraud, the 2010 Deepwater Horizon oil spill, the 2015 Volkswagen emissions test cheating, and the 2018 Facebook data privacy scandal (Matos,2020).

In recent investor surveys, prioritizing financial returns and improving risk management have consistently emerged as significant driving factors for ESG integration (Boffo, Patalano,2020).



Anthony Belcher, Head of Sustainable Finance from ICE Data Services, speaks in his study from 2021 about four motivations that drive ESG data use. These are “right thing”, risk, revenue, and regulation.

1. “Right thing” investing involves aligning investments with particular values. Creating a positive social impact remains a significant motivator for numerous investors. Fund managers are encouraged to incorporate it into their investment strategies and marketing. A focus on the “right thing” is evident in approaches like negative screening, where investors aim to omit companies whose activities conflict with their principles, such as those involved in tobacco or controversial weapons.

2. Risk: Lenders and issuers have consistently aimed to understand the risks they encounter by utilizing diverse data collections. This involves information concerning activities that might lead to financial penalties, like the emission of harmful substances, along with governance factors that could raise a company's risk assessment. If companies don't manage reputation risks well, it can seriously hurt them. Things like data breaches or human rights violations can badly affect their immediate and long-term financial flows. ESG data helps companies to study potential signals of these risks early, even before they happen. Therefore, ESG data can assist investors in identifying suitable investments and motivate them to involve ESG investments to their portfolio.

3. Revenue: A better understanding of companies through rich ESG data sets can help market participants achieve above-average results. Asset managers have found that ESG is beneficial for business, with the pandemic accelerating the demand for sustainable investments. Many major asset managers view ESG as a profit driver and are investing in platforms and processes specifically focused on ESG. Similarly, many companies consider ESG analysis as fundamental part of their investment process. Bank of America incorporates ESG metrics into its client research reports, supporting its global equity and credit analysis. In the corporate issuer space, many of the largest owners of equity and debt securities see ESG awareness as integral to profit generation.

4.Regulation: As ESG data and analytics become more widely used, governments and regulators are increasing their examination of this field. Initially, regulators aim to protect investors, particularly retail investors, by verifying the credibility of statements related to ESG data, investment strategies, and their impact. These regulations protect investors and motivate them to integrate ESG factors into their investments.

One common reason to include ESG in investing is to actively handle key elements that are supposed to be significant drivers of risk and returns. ESG criteria help to choose companies that handle these challenges well, reducing risks and benefiting from opportunities related to major environmental and social issues (Briand et al., 2011).

Currently, more and more companies are incorporating sustainable methods into their operations. Modern studies therefore focus on this issue, and their findings often serve as another motivation for investors to integrate ESG factors into their investments. Study released by Whelan et al. in 2021 came with six findings regarding the correlation between ESG and financial performance after reviewing over 1000 individual studies:

1. Higher financial performance resulting from ESG measures becomes more notable over longer time horizons.
2. When it comes to investing, using ESG integration seems to work better than just using negative screening approach, which means excluding certain companies.
3. ESG investing seems to help prevent losses, especially during social or economic crises.
4. Efforts by companies to be sustainable appear to improve their financial performance because they lead to better risk management and encourage more innovation.
5. Planning for a future with less carbon enhances financial performance.
6. ESG disclosure doesn't directly lead to improved financial performance.

## **1.7 ESG disclosure**

The worldwide force for sustainability has led organizations to increase transparency about their efforts in handling environmental, social, and governance risks. Consequently, stock exchanges, regulatory bodies, and government agencies have made ESG-related reporting mandatory, which is known as ESG disclosure. ESG disclosure is kind of public reporting that involves a company's management team sharing information with the public about how well environmental, social, and governance (ESG) concerns are addressed. This reporting allows stakeholders such as investors, employees, creditors, and potential customers to recognise how a company is handling ESG risks and opportunities (Peterdy, 2023).

Inaccurate or ineffective ESG disclosures could be viewed as greenwashing. Greenwashing involves the management team of an organization making misleading,

unverified, or entirely false statements or claims about the sustainability of a product, service, or even the overall business operations (Peterdy, 2023).

For analysts, ESG disclosure is crucial because without measurable and comparable data, it becomes impossible to measure success or apply accountability on management teams regarding their progress on these critical issues. Although not covering every aspect, here are some main reasons highlighting the importance of ESG disclosure:

- **Transparency and information symmetry:** Efficient ESG disclosure helps external stakeholders, such as asset managers, regulatory bodies, or potential customers, in gaining improved insight into operational, emission, or supply chain risks that were potentially undisclosed by company management in the past.
- **Supporting improvement towards a sustainable economy:** ESG disclosure should transparently outline a company's efforts in aligning with a net-zero economy. It also imposes responsibility on management teams either not advancing on ESG matters or causing negative effects through their business practices.
- **Fostering consumer trust and brand loyalty:** ESG disclosure that supports ethical practices or sustainable operations plays an important role in establishing and preserving brand loyalty. This holds significance for both existing and potential customers, employees, and partners within the supply chain (Peterdy, 2023).

Organizations that offer public ESG disclosure must present information in a format understandable by diverse stakeholders like investors, rating agencies, and customers. To achieve this, management teams identify the primary audience and choose a reporting framework that suits their requirements. Numerous frameworks, such as the Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board (SASB), the Principles for Responsible Investment (PRI) and others, are available. These frameworks ensure uniformity, standardization, and comparability of data across organizations and industries. It is important to share data that are comparable. As an example, a small technology firm might choose to disclose its overall carbon emissions. However, this disclosure alone doesn't enable stakeholders to compare these emissions against those of a considerably larger oil and gas company. Employing a standardized framework would facilitate both companies in presenting their distinct emissions in relative terms, such as emissions per unit of revenue or per employee.

This approach allows for a more meaningful comparison and understanding across companies of varying sizes and industries (Peterdy, 2023).

## **1.8 ESG funds**

An ESG fund is an investment instrument that integrates environmental, social, and governance concerns into its investment strategy. Critics judge the ESG approach as "woke" investing. Some asset managers have reduced the introduction of new ESG funds due to worries about substantiating claims related to environmental, social, and governance investing. Despite this, the interest among regular investors for ESG funds, which evaluate the social and environmental impacts of portfolio companies alongside financial basics, remains strong.

According to CFI institute there are three most common types of ESG funds: ESG mutual funds, ESG ETFs, and ESG index funds (Miller, 2023).

### **ESG mutual funds**

ESG mutual funds, managed by professionals, consist of stocks and bonds selected based on predefined ESG criteria. They offer investors diversification, liquidity, and the expertise of professional management. Just as publicly traded companies must disclose their performance and activities, mutual funds are also legally required to publicly disclose this information (Miller, 2023).

An ESG Index fund falls under the category of ESG mutual funds. While ESG mutual funds are actively overseen by a portfolio manager, an ESG index fund follows a passive approach, copying the ESG-centric companies traded on an index like the S&P 500 (Miller, 2023).

Best ESG mutual funds in 2023 according to Forbes advisor (Friedberg, 2023):

- Fidelity U.S. Sustainability Index Fund (FITLX)
- Fidelity International Sustainability Index Fund (FNIDX)
- Calvert US Mid Cap Core Responsible Index Fund (CMJAX)
- BlackRock Sustainable Advantage CoreAlpha Bond Fund (BIAAX)

### **ESG ETFs**

ESG Exchange Traded Funds (ETFs) resemble mutual funds as they both include a mix of ESG-focused stocks, bonds, and financial instruments. Nevertheless, unlike mutual funds that are bought and sold through the issuer, ETFs are freely traded on stock exchanges. Typically, ETFs have lower expenses compared to mutual funds (Miller, 2023).

Best ESG ETFs in 2023 according to Forbes advisor (Friedberg, 2023):

- Vanguard ESG U.S. Stock ETF (ESGV)
- Pimco Enhanced Short Maturity Active ESG ETF (EMNT)
- Nuveen ESG Dividend ETF (NUDV)
- iShares MSCI Global Sustainable Developmental Goals ETF (SDG)

## 2. THE OBJECTIVE AND METHODOLOGY

This study focuses on the relationship between ESG criteria and fund performance. Our primary goal is to determine whether ESG funds outperform conventional ones and to identify which specific ESG criteria contributes the most significant to this performance differential.

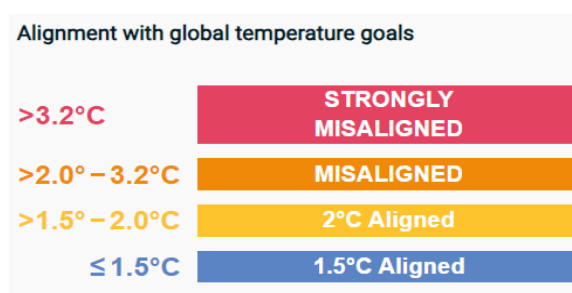
In the first part of the study, we review perspectives from different authors who investigate the correlation between fund performance and ESG criteria. Additionally, we explore essential theoretical concepts related to ESG investing, ESG rating agencies and their methodology, diverse ESG investment strategies, and the rationale behind incorporating ESG factors into investment decisions.

In the first part of the analytical section, our focus lies on examining statistics related to ESG investing, providing insights into their current state and future trends. Subsequently, we narrow our attention to comparing ESG ETF funds across three distinct market segments: the US Total Market, Emerging Market, and Developed Market. For each segment, we select four ESG ETF funds and compare them against a benchmark, which is not labelled as ESG. Initially, our study centres on examining the composition of these funds, followed by a detailed comparison of fund's fundamental metrics such as Returns, Expense ratio, Beta, Standard deviation, and Sharpe ratio. The data for our analysis were collected from websites such as [finance.yahoo.com](https://finance.yahoo.com) and [etfdb.com](https://etfdb.com). An exception is the beta indicator of ESG funds, which we recalculated based on historical data relative to a specific benchmark, against which we are comparing the selected ESG funds. The mentioned data for the selected funds were collected at the beginning of the year 2024. Additionally, when examining the performance trends, we focus on the period from 2019 to 2023, as older data are not available for most ESG funds.

Another crucial aspect of our study is the analysis of ESG factors for each fund. We examine the extent to which these funds follow the environmental, social, and governance norms. Based on these analyses, we try to provide an overview of how ESG factors influence the performance of funds. For our study, we utilized the ESG factors published on the website of the MSCI rating agency:

- **Implied Temperature Rise:** is an intuitive and forward-looking metric, presented in degrees Celsius. Its purpose is to illustrate the temperature alignment of companies, portfolios, and funds with the global temperature goals.

Picture 5: Implied Temperature Rise



Source: MSCI, 2024

- **Carbon Intensity:** reflects the current exposure of the fund to climate transition risks and opportunities. It is based on the weighted average carbon emissions per USD million sales. The carbon intensity spans from very low to very high.

Picture 6: Carbon Intensity scale



Source: MSCI, 2024

- **Green revenues:** This metric provides insight into the portion of a company's overall revenue generated from environmentally and socially sustainable business activities. It means revenues that company has derived from products or services related to alternative energy, energy efficiency, green building, pollution prevention, sustainable water, or sustainable agriculture.
- **Fossil-fuel based revenues:** These revenues are associated with non-renewable energy sources, such as coal, oil, and natural gas.
- The fund's exposure to **companies including Controversial Weapons, Tobacco, UNGC Violations and Red Flag Controversies:**
  - United Nations Global Compact (UNGC) Violations: activities of companies that are not committed to responsible business practices in the areas of human rights, labour, the environment, and corruption.
  - Red Flag Controversies: These controversies may be related to environmental issues, customer relations, human rights, labour rights, or governance, in accordance with the MSCI ESG Controversies methodology.

In the final segment of our research, we identify the ESG criteria that play the most essential role in determining fund performance. We gathered data on 93 funds from the [etfdb.com](https://www.etfdb.com) website and their corresponding ESG criteria from the MSCI rating agency website. The data on funds was collected at the beginning of 2024 and were chosen from three segments, as in the previous section. In this case, we did not focus on funds labelled as ESG, as it was challenging to find a larger number of ESG funds. We couldn't find a database solely dedicated to ESG funds. This is one of the limitations we encountered in our work, attributed to the fact that ESG investing is a relatively new trend. Subsequently, we compared the performance of the selected funds with the benchmark. The SPDR S&P 500 ETF Trust (SPY) fund was chosen as our benchmark. Funds that outperformed the benchmark were examined separately, with a focus on their ESG criteria.

To confirm the potential relationship between ESG factors and fund performance, we conducted Ordinary Least Squares (OLS) regression using the statistical software STATA. The dependent variable in our model is the annual performance of funds, while the independent variables are ESG factors, excluding the UNGC Violations factor. We excluded UNGC Violations factor from the regression model due to its high correlation with the Red-flag controversies factor, aiming to mitigate the effect of multicollinearity in the model. Both ESG factors involve companies associated with human rights violations, labour rights violations, corruption, or other inappropriate practices, making them highly similar. To ensure the reliability of the model, we performed tests for normality of data distribution, multicollinearity, and homoscedasticity.

In the study, we utilize a more research methods to achieve our goal. Among these methods is the deductive method, which allows us to logically derive conclusions from general principles and theories and apply them to specific cases in the analysis of ESG funds. Additionally, we employ the method of comparison, which enables us to observe similarities and differences between various groups of ESG funds and their non-ESG benchmarks. We also apply the analytical method, which helps us to break down the overall issue into smaller parts and thoroughly examine them. Finally, we utilize the synthesis method, which allows us to integrate findings from different sources and research methods to form a comprehensive conclusion. The combination of these methods provides us with a holistic view of the issue of ESG investing and enables us to effectively achieve the set goals in our thesis. In addition, we also utilize statistical methods such as arithmetic mean, correlation and regression, which assist us in identifying potential relationships between fund performance and ESG criteria.



The main sources of information for our research were secondary sources. Existing studies, scientific articles from various foreign authors, assisted us in developing the theoretical framework of the work. In the analytical section, we primarily worked with online databases providing data on funds and their ESG criteria. To obtain basic fund metrics, we utilized websites such as [finance.yahoo.com](http://finance.yahoo.com) and [etfdb.com](http://etfdb.com). The ESG criteria of the funds were sourced from the MSCI rating agency website, [msci.com](http://msci.com), which offers ESG Fund Ratings and a Climate Search Tool.

## **3. RESULTS AND DISCUSSION**

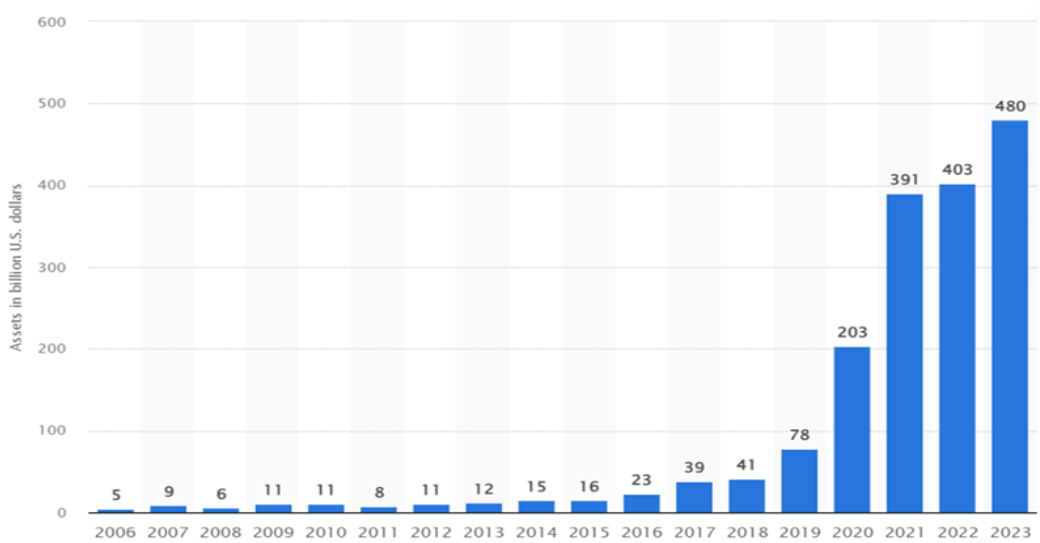
### **3.1 ESG investments statistics**

The ESG market is experiencing substantial growth. ESG investments represent over 25% of professionally managed assets worldwide (Cruz, 2023). This flow reflects the increasing trend of investors prioritizing non-financial considerations in their investment decisions. According to Bloomberg Intelligence, the total value of global ESG assets exceeded \$30 trillion in 2022, and it is expected to exceed \$40 trillion by 2030 (Bloomberg, 2024).

BI's projections indicate that Europe will maintain its position as the largest contributor to ESG assets, with an estimated value exceeding \$18 trillion by 2030. This would allow Europe to retain its 45% share of the global market, with a compound annual growth rate (CAGR) aligning closely with the global average of 3.5%, down from 8% during the period from 2014 to 2022. In contrast, the United States is expected to experience further slowdown, with a projected CAGR of 1.5%. This would result in total assets of \$9.5 trillion by 2030, causing its global market share to drop below 25%. Factors such as upcoming elections, backlash against ESG initiatives, and the high concentration of funds in the market are likely to limit its growth potential. Meanwhile, Japan, Canada, and Australia represent smaller yet rapidly expanding markets. Japan saw a significant increase in assets, rising by 50% to reach \$4.3 trillion during the period from 2020 to 2022. Although these regions are expected to continue growing at a pace faster than the global average, their CAGR is anticipated to stabilize at around 6% as regulatory measures and increased scrutiny lead to market consolidation (Bloomberg, 2024).

The assets dedicated to ETF funds integrating environmental, social, and governance (ESG) objectives surged from \$5 billion in 2006 to \$391 billion in 2021. By November 2023, these allocated assets had climbed to \$480 billion. The rise in investment in sustainable funds, including ETFs, was predominantly led by developed markets, particularly in Europe and the United States (Statista, 2024).

Figure 1: Global ESG ETF assets from 2006 to November 2023



Source: Statista, 2024

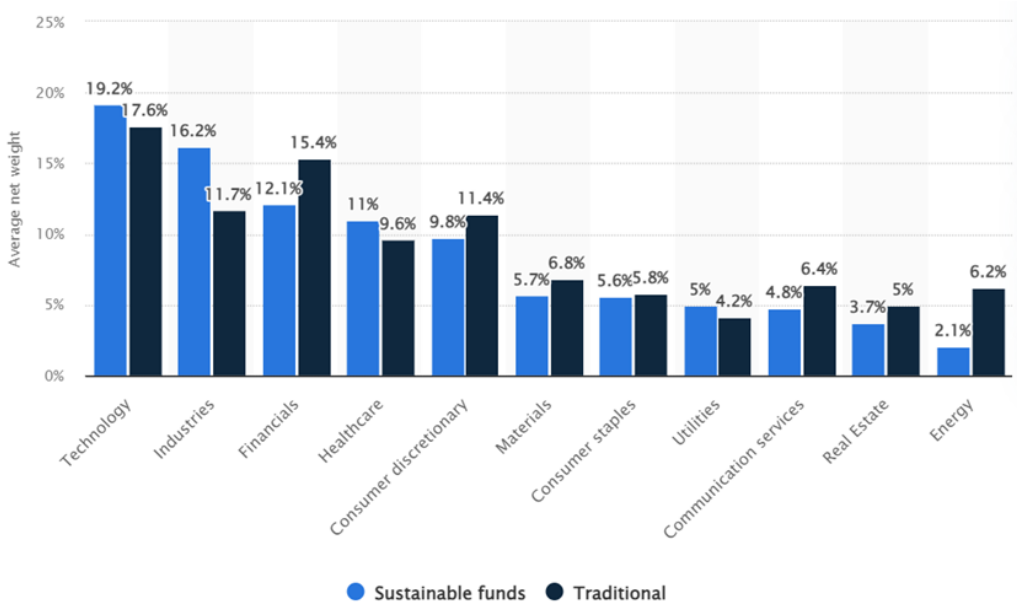
In a Capital Group report 2022, it was found that ESG plays a central role in the investment strategies of 31% of European investors, whereas only 18% of investors in North America prioritize it. In Europe, there have been over \$40 billion of capital inflows into ESG funds in the fourth quarter of 2022 alone, while the US experienced \$6.2 billion of outflows during the same period. Only 6% of European investors remain sceptical about ESG investing, in contrast to 20% of investors in North America. (Vitali, 2024)

In 2021, Statista conducted an online survey targeting investors' perspectives on moving to a fully sustainable portfolio. The study involved 23 950 participants, including investors meeting the criteria of planning to invest a minimum of 10 000 euros (or its equivalent) within the next 12 months, as well as those who have adjusted their investments over the past decade. Among the countries surveyed, investors in Thailand displayed the highest interest to this shift compared to others. Specifically, 76% of investors surveyed in Thailand expressed positivity towards investing exclusively in sustainable funds. In the United States, 65% of investors felt positive about ESG investing. Conversely, in Sweden, only 36% of respondents felt optimistic about transitioning to a fully sustainable portfolio (Statista, 2024).

Sustainable funds exhibit higher rates of survival compared to non-ESG vehicles. On average, 77% of ESG funds that were accessible a decade ago still remain, contrasting with 46% for conventional funds (Cruz, 2023). This phenomenon can be attributed to various factors, including performance, as well as the expectations and motivations of investors.

Figure 2 illustrate average net weight of sustainable and traditional equity funds according to the sectors in 2023. The technology sector represented the largest portion of portfolio allocation in both sustainable funds (nearly 20%) and traditional funds (18%). The industrial sector ranked second, accounting for 16.2% of the portfolio allocation in sustainable equity funds. In sustainable funds, the healthcare and utilities sectors held a higher proportion of equity compared to traditional funds. Conversely, financials had a higher equity allocation in traditional funds, comprising 15.4% compared to 12.1% in sustainable funds. The smallest allocations in portfolio holdings among sustainable funds were observed in the real estate sector (3.7%) and the energy sector (2.1%).

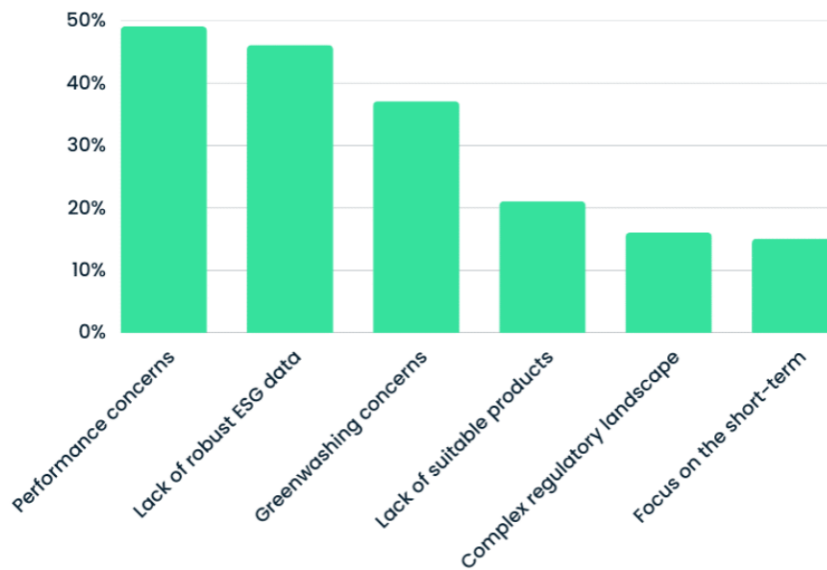
Figure 2: Sustainable and traditional equity funds worldwide in 2023, by sector



Source: Statista, 2024

The primary challenges within ESG investing include doubts about how well these investments perform, the lack of reliable data, and worries about greenwashing. Capital Group's 2022 ESG study indicates that investors are primarily focused on the performance and data quality of ESG funds, which are closely connected. The debate over whether ESG investments outperform traditional ones remains unresolved due to insufficient data, highlighting the need for more comprehensive research (Vitali, 2024).

Figure 3: ESG adoption challenges (Percentage of investors who agree)



Source: Investing in the web (Vitali, 2024)

### 3.2 US Total Market

This chapter focuses on comparing ETF funds from the segment of US Total Market. We have selected four ESG ETF funds: Vanguard ESG U.S. Stock ETF (ESGV), iShares ESG Aware MSCI USA ETF (ESGU), iShares ESG MSCI USA Leaders ETF (SUSL) and Xtrackers MSCI USA ESG Leaders Equity ETF (USSG). As their benchmark, we have chosen Vanguard Total Stock Market ETF (VTI), which is not classified as an ESG fund.

Table 3: „US Total Market” funds

Fund	Ticker	Inception date	Net assets
Vanguard Total Stock Market ETF	VTI	24.5.2001	1,46T
Vanguard ESG U.S. Stock ETF	ESGV	18.9.2018	7,46 B
iShares ESG Aware MSCI USA ETF	ESGU	1.12.2016	13,38B
Shares ESG MSCI USA Leaders ETF	SUSL	7.5.2019	1,12B
Xtrackers MSCI USA ESG Leaders Equity ETF	USSG	6.3.2019	1,06B

Source: Own processing based on data from finance.yahoo.com

All selected ESG funds exhibit strong correlation (see the table 4) with the VTI fund, indicating that these funds hold many of the same companies in their portfolios. Strong correlation among funds suggests that they are influenced by similar market factors, investment strategies, or economic conditions. First, we will introduce the ESGU fund, which boasts the largest net asset value among the selected ESG funds. We will also take a closer look at its benchmark, the VTI fund. Other ESG funds exhibit very similar sector compositions to ESGU and include many of the same companies in their portfolios, as evidenced by the strong

correlation between the funds. Primarily, we will focus on the sector composition within each fund and the top 10 companies held in these funds. Then, we will compare these funds based on fundamental metrics and ESG criteria. Through this comparison, we will reach a conclusion that will show us whether ESG-labelled funds are better option for investors or whether their performance is comparable to that of traditional funds.

Table 4: Correlation of funds from US Total Market

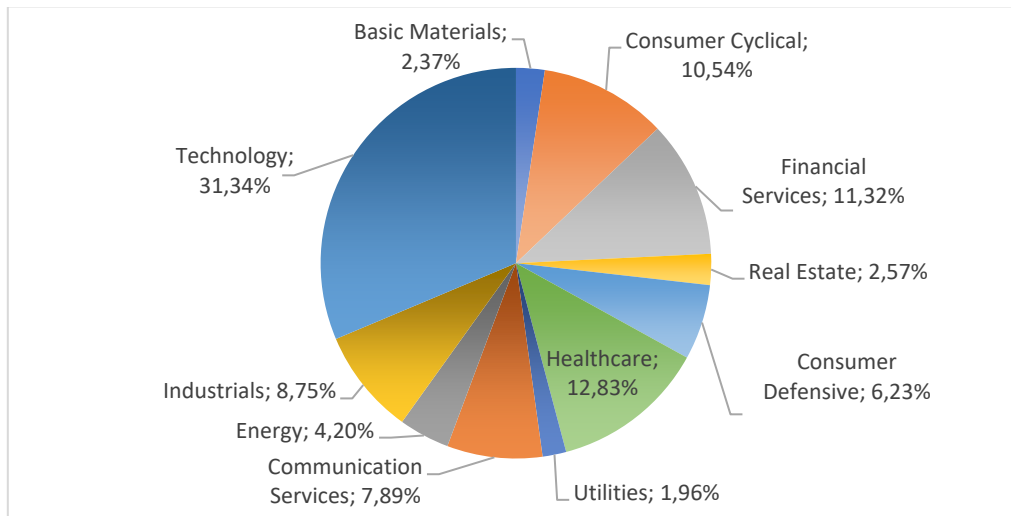
	<b>VTI</b>	<b>ESGV</b>	<b>ESGU</b>	<b>SUSL</b>	<b>USSG</b>
<b>VTI</b>	1	0,9964	0,9988	0,9932	0,9928
<b>ESGV</b>	0,9964	1	0,9978	0,9867	0,9857
<b>ESGU</b>	0,9988	0,9978	1	0,9937	0,9933
<b>SUSL</b>	0,9932	0,9867	0,9937	1	0,99995
<b>USSG</b>	0,9928	0,9857	0,9933	0,99995	1

Source: Own processing based on data from finance.yahoo.com

*3.2.1. iShares ESG Aware MSCI USA ETF (ESGU)*

The iShares ESG Aware MSCI USA ETF (ESGU) fund offers investors exposure to a diversified portfolio of large and mid-cap U.S. stocks while aligning with sustainable investment principles. Launched on 1.12. 2016 the fund has quickly established itself as a prominent player in the realm of Environmental, Social, and Governance (ESG) investing. Its total net assets value is 13,38 billion USD. The fund's investment strategy revolves around tracking the MSCI USA Extended ESG Focus Index, which emphasizes companies with admirable ESG ratings. By tilting towards stocks with favourable environmental, social, and governance characteristics, the fund not only seeks to deliver competitive financial performance but also strives to foster sustainability and responsible corporate practices within the U.S. market (BlackRock, 2024).

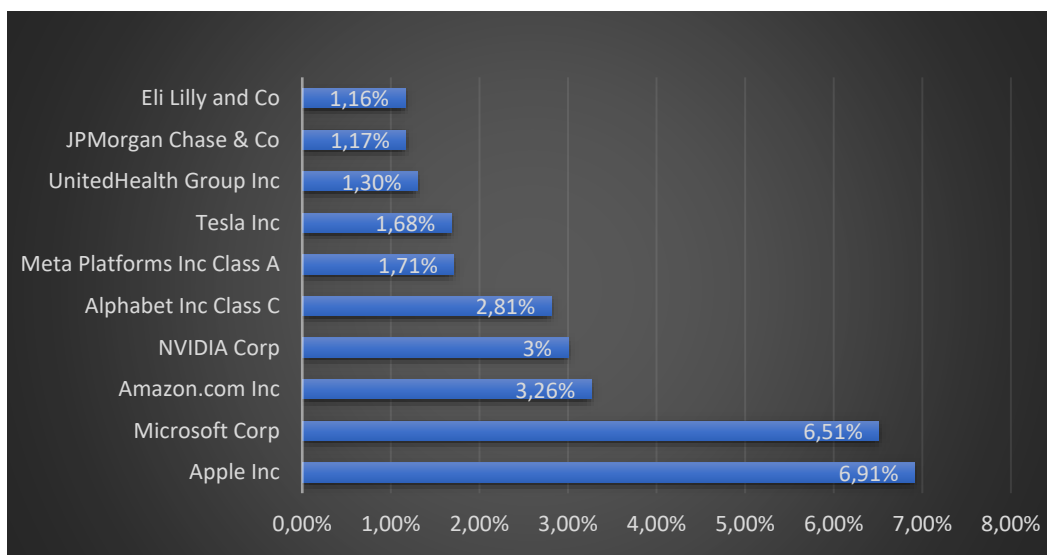
Figure 4: Sector weightings of ESGU fund



Source: Own processing based on data from finance.yahoo.com

The figure 4 shows the percentage distribution of sectors represented in the fund. The ESGU fund has up to 31% of companies from the technology sector in its portfolio. Just under 13% of companies belong to the healthcare sector, and more than 11% of companies are from the financial services sector. The smallest number of companies in this fund come from the utilities sector (2%) and real estate (2.6%).

Figure 5: Top 10 holdings of ESGU fund



Source: Own processing based on data from finance.yahoo.com

In Figure 5, we can observe the top 10 companies included in the ESGU fund. These 10 companies collectively account for 29,87% of the total assets of the ESGU fund. The largest percentages are held by technology giants such as Apple Inc (6,9%), Microsoft Corp (6,5%), and Amazon.com Inc (3,3%). Within the healthcare sector, among the fund's top 10 companies,

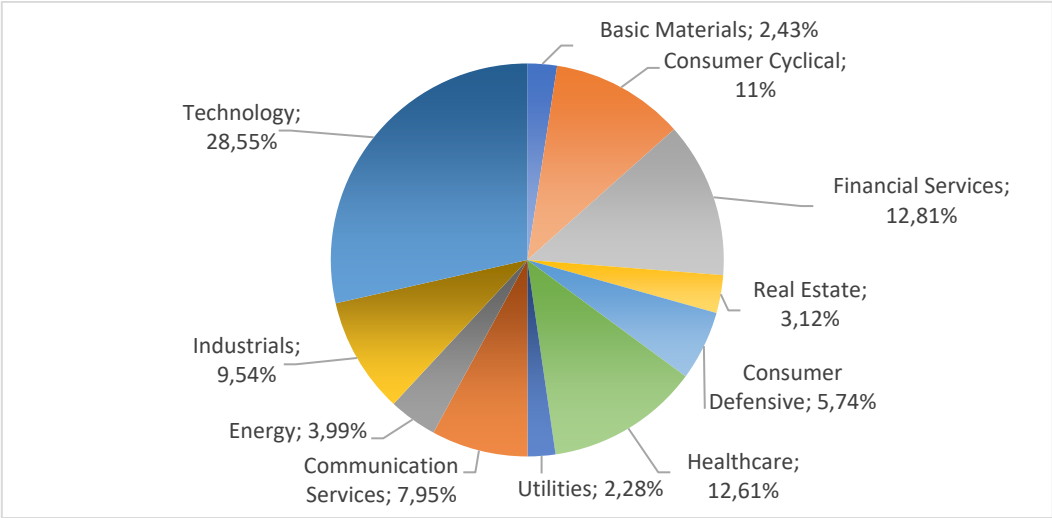
there are UnitedHealth Group Inc with a share of 1,3% and Eli Lilly and Co with a share of 1,16%. The only company from the financial services sector within the top 10 holdings is JPMorgan Chase & Co, with a share of 1,17%.

3.2.2. Vanguard Total Stock Market ETF(VTI)

The VTI fund provides extensive exposure to the U.S. stock market, investing in thousands of different securities across all sectors. VTI was established on 24.5.2001 and its net assets amount to 1,46 trillion. The fund tracks the CRSP US Total Market Index. One of its most appealing features, aside from its exceptionally broad holdings and well-balanced exposure, is its cost-effectiveness. This VTI fund belongs to the most affordable products. The fund is primarily focused on large-cap stocks. While VTI includes companies of all sizes, the allocations to mid-cap and small-cap stocks are not significant (VettaFi, 2024).

Figure 6 represents sector weightings of VTI fund. Just like the ESGU fund, the technology sector holds the largest share in this fund, accounting for 29%. It is followed by sectors such as Financial Services (12.8%), Healthcare (12.6%), and Consumer Cyclical (11%). The smallest share in the fund is held by the Real Estate (3%) and Basic Materials (2,5%) sectors.

Figure 6: Sector weightings of VTI fund



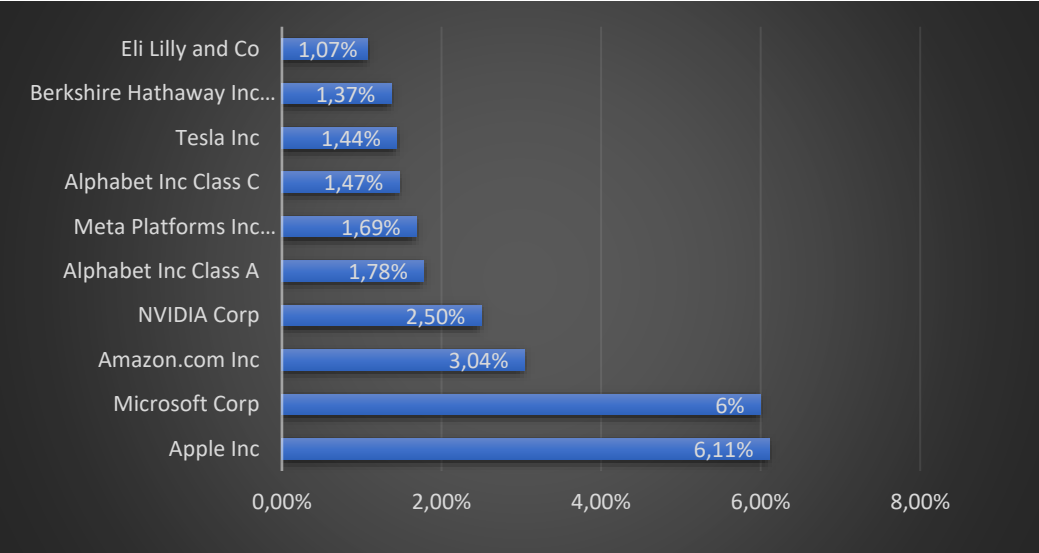
Source: Own processing based on data from finance.yahoo.com

The figure 7 shows the top 10 holdings of the VTI fund. These 10 companies represent 26.47% of the total assets of the fund. The largest representation in the fund is held by technology companies Apple Inc. and Microsoft (6%). Amazon.com Inc. account for over 3% of all shares in this fund. 2.5% of the fund's shares belong to the American technology company NVIDIA Corp. The VTI fund includes American insurance company Berkshire Hathaway Inc.



among its top 10 companies, with a share of 1.4%. It also holds positions in companies such as Tesla (1.4%), Meta (1.7%), and Alphabet (1.8%)

Figure 7: Top 10 holdings of VTI fund



Source: Own processing based on data from finance.yahoo.com

3.2.3. Comparison of „US Total Market” Funds

In this section, we will focus on comparing selected ESG funds with a non-ESG fund, which we can consider as their benchmark. In the table below, there is comparison of fundamental metrics of chosen funds.

Table 5: Comparison of fundamental metrics of „US Total Market” Funds

	VTI	ESGV	ESGU	SUSL	USSG	Average ESG funds
<b>P/E ratio</b>	22,77	25,66	24,76	27,85	28,92	26,80
<b>Beta (3y)</b>	1,00	1,04	1,01	1,01	1,00	1,02
<b>Expense ratio</b>	0,03%	0,09%	0,15%	0,10%	0,10%	0,11%
<b>1y return</b>	26,03%	30,90%	25,72%	29,07%	33,94%	29,91%
<b>3y return</b>	8,45%	7,89%	8,34%	10,63%	12,62%	9,87%
<b>5y return</b>	15,07%	16,10%	15,54%	x	x	15,82%
<b>Standard Deviation (3y)</b>	12,53%	18,57%	17,91%	18,15%	18,28%	18,23%
<b>Sharpe ratio (3y)</b>	0,46	0,44	0,47	0,59	0,59	0,52

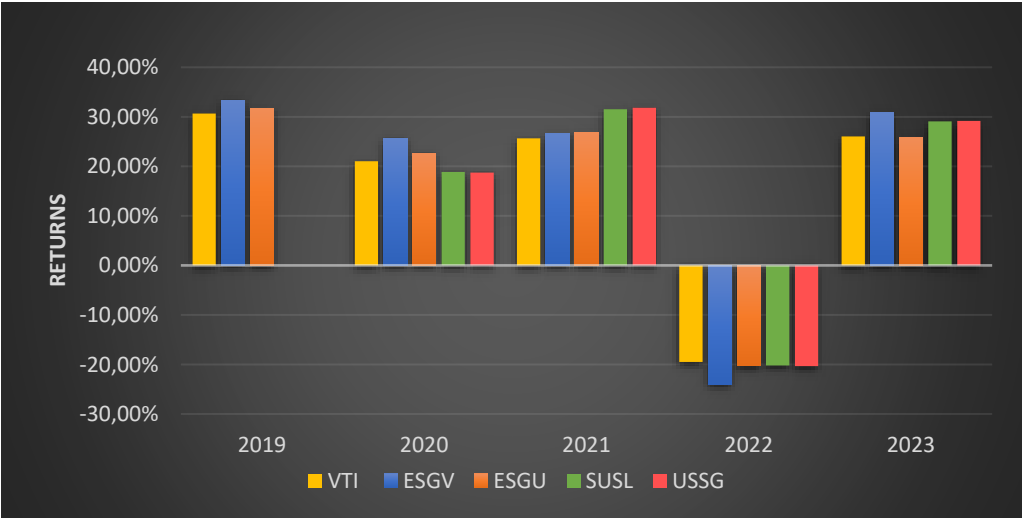
Source: Own processing based on data from finance.yahoo.com

Chosen ESG funds generally exhibit higher P/E ratios compared to the VTI fund, indicating potentially higher market expectations or a more optimistic valuation of the companies they comprise. Secondly, the expense ratio, reflecting the cost of owning the fund, is lower in non-ESG fund (0.03%), while ESG funds have higher expenses, averaging at 0.11%. This indicates that managing and maintaining ESG-focused portfolios may involve higher

costs. Over one-year periods, ESG funds typically yield returns almost 4 percentage point higher, and while this difference reduces over three and five years returns, ESG funds still outperform the VTI fund. However, it is essential to consider the trade-off in volatility. The VTI fund demonstrates a standard deviation of 12.53%, indicating its relative stability. In contrast, ESG funds exhibit notably higher volatility, with an average standard deviation almost 6 percentage point higher, at 18.23%. This suggests that while ESG investments may offer greater returns, they also involve increased fluctuations in value, potentially exposing investors to higher levels of risk. On the other side, the average Sharpe ratio for ESG funds is higher (0.52) compared to 0.46 for the non-ESG fund. This implies that, on average, ESG funds generate higher returns relative to the level of risk incurred. Investing in ESG funds offers potential benefits beyond financial returns, including alignment with ethical and sustainability objectives. Despite the higher volatility associated with these investments, the advantages they offer may outweigh this risk.

Figure 8 of the returns of chosen funds indicates that ESG funds consistently outperformed the VTI fund in almost every examined year. Only in 2020, the SUSL and USSG funds showed lower returns than the benchmark VTI and in 2023 the ESGU fund slightly lagged the non-ESG fund. In 2022, when there was a significant decline in returns across all funds and negative returns were achieved, the VTI fund proved to be the most stable, with the lowest decline in value. Nevertheless, the overall comparison of returns suggests that ESG funds provided better returns to investors compared to their non-ESG benchmark.

Figure 8: Returns of „US Total Market” Funds



Source: Own processing based on data from finance.yahoo.com

In addition to the basic metrics that investors typically consider when making decisions, we also examined ESG factors of funds. These factors have gained significant importance in

investment decision-making recently. The following table focuses on comparing the ESG factors of „US Total Market” funds.

Table 6: ESG criteria of „US Total Market” Funds

ESG Criteria	VTI	ESGV	ESGU	SUSL	USSG
ESG quality score	6,53	6,65	7,44	7,61	7,44
ESG score	A	A	AA	AA	AA
ITR	<b>misaligned</b>	aligned	<b>misaligned</b>	<b>misaligned</b>	<b>misaligned</b>
Carbon intensity	<b>moderate</b> <b>(102,4 tons)</b>	low (45,1tons)	low (66,6 tons)	low (57,1tons)	low (56,2tons)
Green revenues	6,50%	7,10%	7,40%	11,10%	10,70%
Fossil-Fuel-Based Revenues	3,30%	0%	2,70%	0,70%	0,70%
Controversial weapons	<b>0,90%</b>	0%	<b>0,3%</b>	<b>0,20%</b>	0%
Tobacco	<b>0,50%</b>	0%	0%	0%	0%
UNGC Violations	0%	0%	0%	0%	0%
Red Flag Controversies	0%	0%	0%	0%	0%

Source: Own processing based on data from website of MSCI rating agency

Based on data from MSCI agency, we can observe several differences in the sustainability of non-ESG fund and ESG funds. Although the overall ESG score of VTI fund falls within the same category (A level) as the ESG score of the ESGV fund, it achieves a slightly lower numerical value in terms of ESG quality score. Three other ESG funds ended up with ESG scores at the AA level, according to MSCI, they are classified as leaders. An interesting point is that three out of the four ESG funds are categorized in the same level as the non-ESG fund in terms of Implied temperature rise and are assessed as misaligned. However, a difference can be observed in Carbon intensity, where the VTI fund evidently performed worse than the ESG funds. Additionally, the VTI fund yields the lowest returns from so-called green activities and the highest percentage returns from activities associated with fossil fuels. Moreover, the VTI fund includes 0.5% of companies involved in tobacco production and 0.9% of companies involved in controversial weapons production. However, it should be noted that the ESGU and SUSL funds also have a small percentage (0.3% and 0.2%) of companies associated with controversial weapons in their portfolios. Nevertheless, it is evident that ESG funds generally achieve better results in sustainability.

In summary, from our analysis, it is evident that selected ESG funds yield higher returns than non-ESG fund. ESG funds also exhibit higher P/E ratios than their benchmark VTI fund. This could be attributed to the fact that ESG funds frequently invest in companies that prioritize long-term sustainability and innovation. These companies may have higher growth potential, which can be reflected in their higher P/E ratios. However, it is important to consider that they

also come with higher volatility and slightly higher costs. Even though ESG funds typically exhibit higher volatility, their Sharpe ratio suggests that they achieve higher returns relative to risk compared to non-ESG fund. This implies that ESG funds may provide better risk-adjusted performance. Nevertheless, when taking ESG factors into account, ESG funds clearly outperform their benchmark VTI fund and represent a more sustainable option for investors. In this scenario, investors are encouraged to assess their risk tolerance and dedication to sustainability before making decisions. If they are comfortable with assuming higher risk, ESG funds represent the preferable option for them, as they emerge as prosperous investment opportunities for the future.

### 3.3 Emerging market

This chapter is focusing on „Emerging Market” funds. Specifically, we are looking into four ESG funds: iShares ESG Aware MSCI EM ETF (ESGE), Xtrackers MSCI Emerging Markets ESG Leaders Equity ETF (EMSG), iShares ESG Advanced MSCI EM ETF (EMXF) and iShares ESG MSCI EM Leaders ETF (LDEM). These are being compared against the Vanguard FTSE Emerging Markets ETF (VWO) that is not labelled as the ESG fund.

Table 7: Comparison of fundamental metrics of „Emerging Market” Funds

Fund	Ticker	Inception date	Net assets (USD)
Vanguard FTSE Emerging Markets ETF	VWO	4.3.2005	101,76B
iShares ESG Aware MSCI EM ETF	ESGE	28.6.2016	4.07B
Xtrackers MSCI EM ESG Leaders Equity ETF	EMSG	4.12.2018	24.11 M
iShares ESG Advanced MSCI EM ETF	EMXF	6.10.2020	67.15 M
iShares ESG MSCI EM Leaders ETF	LDEM	5.2.2020	32.66M

Source: Own processing based on data from finance.yahoo.com

The selected ESG funds have a strong correlation with the non-ESG fund, indicating that they tend to move in a similar direction and exhibit similar performance over a certain period of time. This suggests that the funds are influenced by similar market factors or are invested in similar assets. First, we will introduce the iShares ESG Aware MSCI EM ETF (ESGE) fund, which is the largest among the given ESG funds in terms of net assets. We will focus on its sector composition and the top 10 companies in its portfolio. Additionally, we will introduce the Vanguard FTSE Emerging Markets ETF (VWO) which serves as the benchmark for the selected ESG funds.

Table 8: Correlation of „Emerging Market” Funds

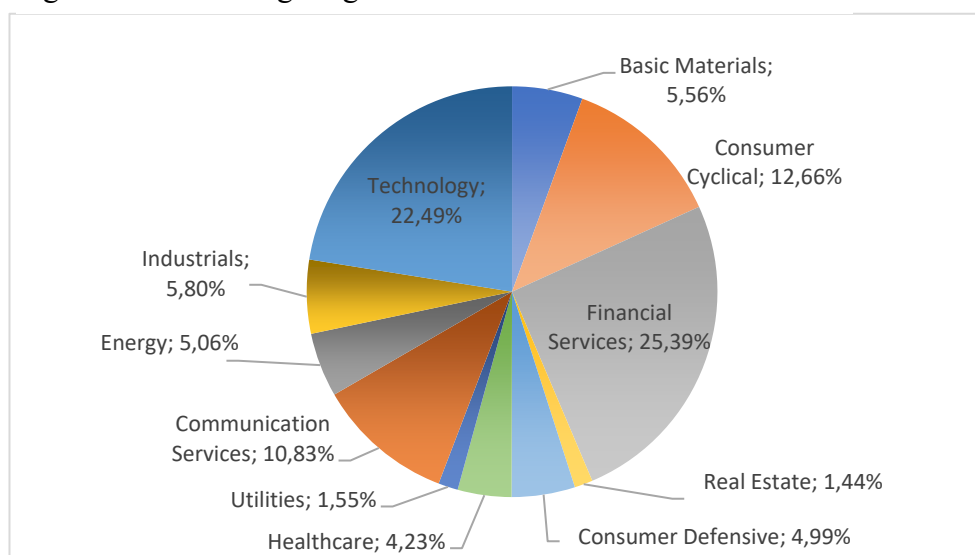
	VVO	ESGE	EMSG	EMFX	LDEM
VVO	1	0,99704	0,99498	0,99139	0,99361
ESGE	0,99704	1	0,8904	0,9831	0,99548
EMSG	0,99498	0,8904	1	0,8874	0,99384
EMFX	0,99139	0,9831	0,8874	1	0,9856
LDEM	0,99361	0,9955	0,9938	0,9856	1

Own processing based on data from finance.yahoo.com

### 3.3.4. *iShares ESG Aware MSCI EM ETF (ESGE)*

Since selected ESG funds exhibit high correlation among themselves, indicating their compositions are very similar, we are focusing on the largest one, the iShares ESG Aware MSCI EM ETF (ESGE). This fund is among the selected ESG funds largest in terms of the value of its net assets, which amount to \$4.07 billion. This fund selects and allocates stocks based on their positive environmental, social, and governance (ESG) attributes, while maintaining a risk and return profile that closely reflects the broader market. The ESGE fund was established on 28.6.2016 and tracks the MSCI Emerging Markets Extended ESG Focus Index, composed of large and mid-sized companies primarily from emerging market economies (VettaFi, 2024).

Figure 9: Sector weightings of ESGE fund



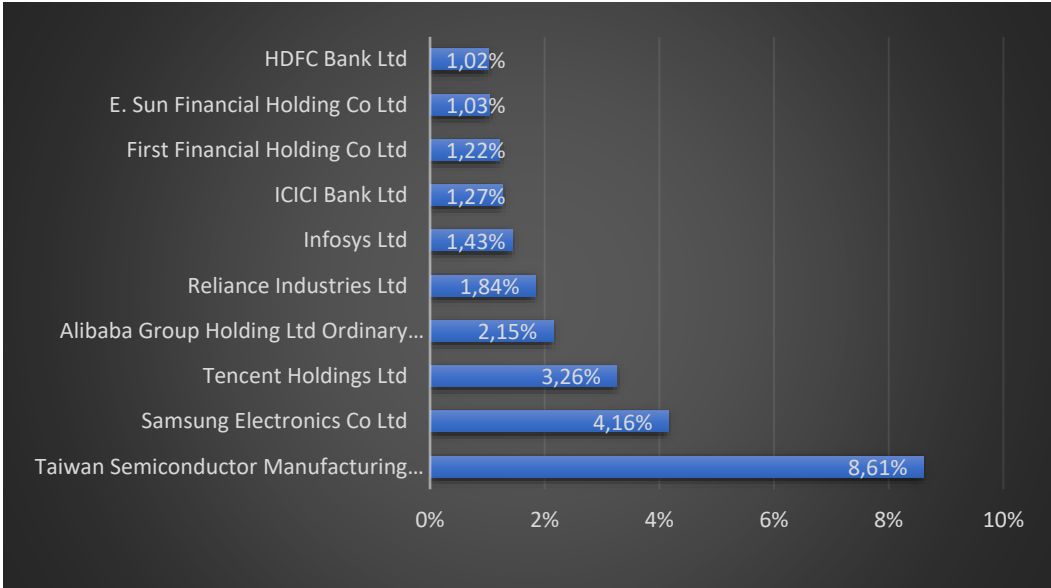
Source: Own processing based on data from finance.yahoo.com

The figure 9 represents sectors in which the ESGE fund invests. The largest share belongs to the sector of financial services (25,4%) and technology (22,5%). Following that, sectors such

as Consumer Cyclical (12,7%) and Communication Services (10,8%). The lowest shares in the fund are held by sectors of Utilities (1,6%) and Real Estate (1,4%).

The figure 10 illustrates top 10 holdings of ESGE fund. The company with the largest share in the fund is Taiwan Semiconductor Manufacturing Co Ltd, accounting for 8.6%. Then following technology giants like Samsung Electronics Co Ltd at 4,2%, Tencent Holdings Ltd at 3,3%, and the Chinese corporation Alibaba Group Holding Ltd Ordinary Shares at 2,2%. Additionally, among the top 10 holdings are Indian firms such as Infosys from the technology sector (1.4%) and ICICI Bank Ltd (1.3%).

Figure 10:Top 10 holdings of ESGE fund



Source: Own processing based on data from finance.yahoo.com

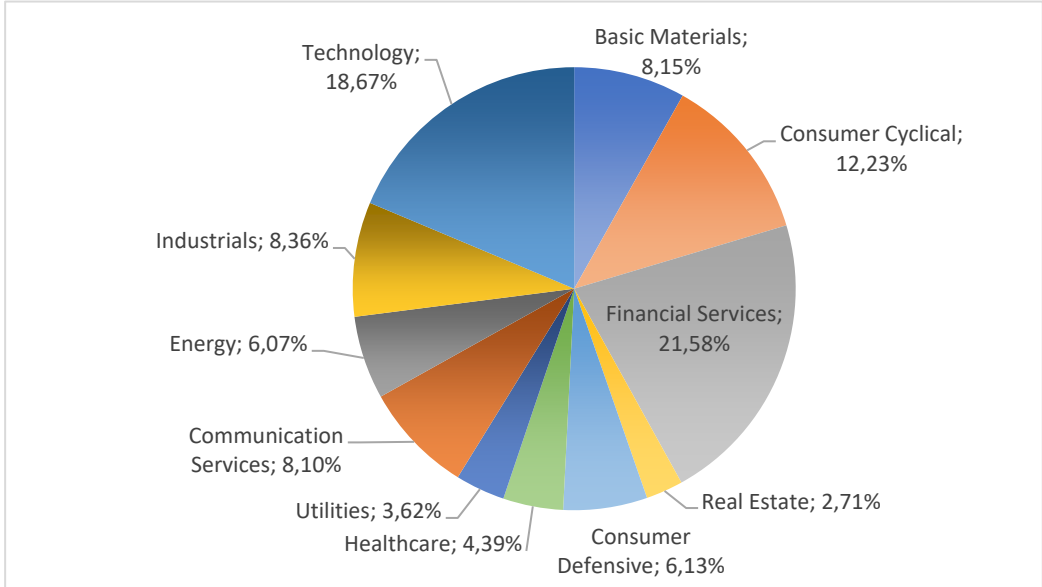
3.3.5. *Vanguard FTSE Emerging Markets ETF (VWO)*

Vanguard FTSE Emerging Markets ETF (VWO) stands out as one of the largest ETFs globally with its net value assets of \$101,76 billion and is appreciated by investors for its effectiveness in gaining access to emerging markets. VWO was established on 4.3.2005 and tracks the FTSE Custom Emerging Markets All Cap China A Inclusion Net Tax (US RIC) Index. This fund appeals to various investor types. It serves as a multipurpose option, suitable for short-term trading or as an initial element in a long-term investment strategy. It is worth mentioning that VWO tends to attract investors with longer-term perspectives. (VettaFi, 2024).

The VWO fund is primarily composed of companies from the financial services sector (21,6%) and technology sector (18,7%). Additionally, it includes companies from the consumer cyclical sector (12,2%), as well as industrial (8.4%) and communication services (8.1%)

sectors. Companies from the real estate sector have the lowest representation in the fund, accounting for 2.71%.

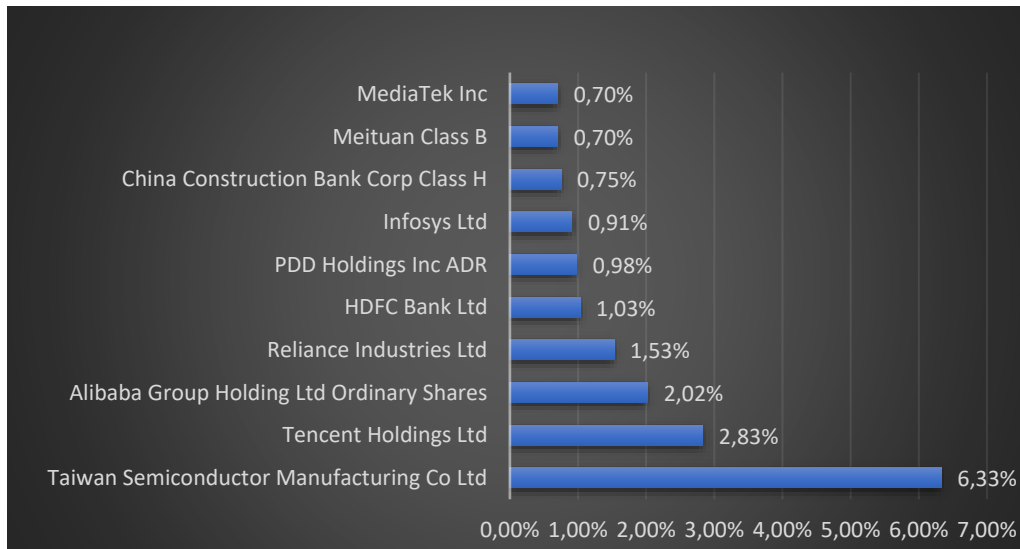
Figure 11:Sector weightings of VWO fund



Source: Own processing based on data from finance.yahoo.com

Figure 12 displays the top 10 companies in which the VWO fund invests. These 10 companies represent 17.78% of the fund's total assets. The largest holding in the fund is the technology company Taiwan Semiconductor Manufacturing Co Ltd, accounting for 6.3%. Similarly to the ESGE fund, technology companies such as Tencent Holdings Ltd (2.8%) and Alibaba Group Holding Ltd Ordinary Shares (2%), are represented in the VWO fund. Among the top 10 companies is also the Irish company PDD Holdings Inc ADR, with a share of around 1%, focusing on internet retail. Within the VWO fund, holdings also include the Indian energy firm Reliance Industries Ltd, constituting 1.5% of the fund, alongside the Indian bank HDFC Bank, which holds a 1% share

Figure 12: Top 10 holdings of VWO fund



Source: Own processing based on data from finance.yahoo.com

### 3.3.6. Comparison of „Emerging Market” Funds

This section is dedicated to examining and comparing selected ESG funds with their non-ESG benchmark, which is represented by the VWO fund. Our initial focus lies in comparing fundamental metrics of the fund, such as the P/E ratio, expense ratio, and the 1, 3, and 5-year returns of the funds. Additionally, we are comparing the volatility of these funds based on the Standard deviation and Sharpe ratio. The table provided below presents these fundamental metrics of chosen funds.

Table 9: Comparison of fundamental metrics of „Emerging Market” Funds

	VWO	ESGE	EMSG	EMXF	LDEM	Average ESG funds
<b>P/E ratio</b>	11,34	11,29	11,99	11,95	11,81	11,76
<b>Beta (3y)</b>	1,00	1,08	1,15	1,00	1,12	1,09
<b>Expense ratio</b>	0,08%	0,25%	0,20%	0,16%	0,17%	0,20%
<b>1y return</b>	8,52%	9,41%	-7,36%	-6,45%	2,35%	-0,51%
<b>3y return</b>	-4,52%	-6,17%	-10,47%	-6,13%	-8,32%	-7,77%
<b>5y return</b>	2,97%	3,24%	-0,03%	x	x	1,61%
<b>Standard Deviation (3y)</b>	16,39%	18,25%	18,81%	17,22%	18,46%	18,19%
<b>Sharpe ratio (3y)</b>	-0,38	-0,49	-0,56	-0,35	-0,53	-0,48

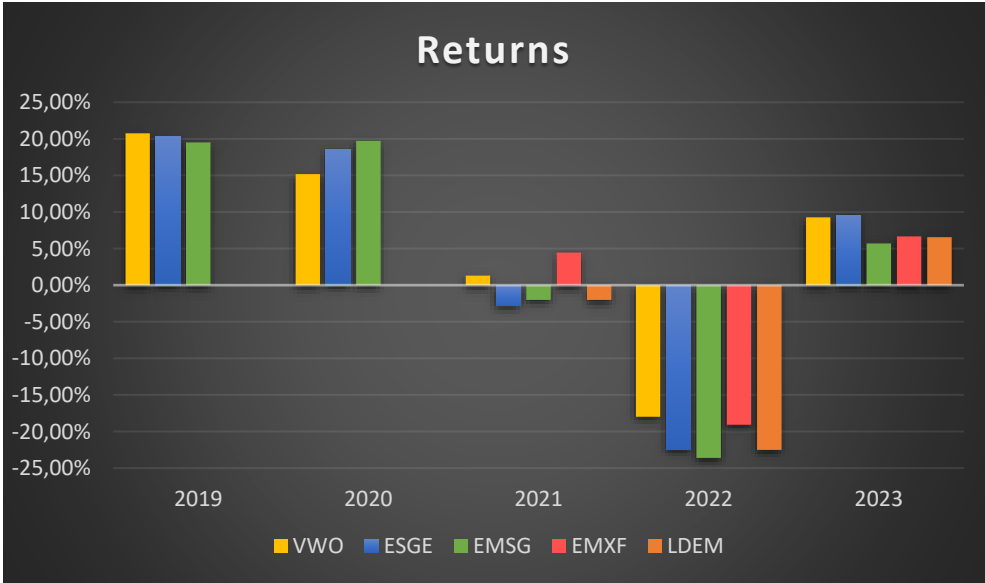
Source: Own processing based on data from finance.yahoo.com

Selected ESG funds demonstrate in average slightly higher P/E ratios in contrast to the VWO fund, suggesting potentially greater market expectations or a more positive valuation of the companies they include. The beta coefficient indicates that ESG funds have slightly higher



sensitivity to market movements compared to the benchmark represented by VWO fund. A notable difference emerges when considering the expense ratios of the funds. While the average expense ratio of ESG funds stands at 0.2%, the VWO fund incurs lower costs, with expense ratio at 0.08% When comparing the returns of these funds, we can observe significant differences, even among ESG funds. While the EMSG and EMXF funds show negative annual returns, the ESGE fund exceeded the established benchmark (VWO fund) in annual returns. Similarly, in terms of 5-year returns, the ESGE fund achieved a slightly higher percentage return (3.2%) compared to the non-ESG VWO fund (2.97%). Additionally, it is important to note that over a three-year horizon, when all monitored funds experienced negative returns, the VWO fund exhibited the lowest decline. Considering the volatility of these funds, we do not observe significant differences in standard deviations, as was the case of funds in the US Total Market segment. Although ESG funds have slightly higher standard deviations than the VWO fund, the difference is only around 1,5 percentage point. The Sharpe ratio for Emerging Market funds is negative, indicating that these funds yield low returns relative to the risks they entail. Furthermore, ESG funds perform even more unfavourably in this scenario compared to the benchmark (VWO), carrying higher risk per unit of return.

Figure 13: Returns of „Emerging Market” Funds



Source: Own processing based on data from finance.yahoo.com

The figure 13 illustrates the performance trends of chosen funds since 2019. Although the VWO fund outperformed the other two ESG funds in 2019, the tables turned in 2020 when the performance of ESG funds surpassed their benchmark. In 2021, all funds experienced decreased returns, with three out of four ESG funds recording negative returns.

Nonetheless, the ESG fund EMXF emerged as the top performer, yielding a return of 4.47%, even surpassing the VWO fund's return of 1.3%. The year 2023 proved to be the most successful year for the ESGE fund, which exceeded all other ESG funds as well as the established benchmark, the VWO fund.

In addition to the fundamental parameters of the funds, the following table focuses on comparing ESG factors of each fund. These factors will provide us with a better insight into the performance and prospects of individual funds, as sustainability and so-called green investing are becoming increasingly favoured in investment decision-making.

Table 9: ESG criteria of „Emerging Market” Funds

ESG Criteria	VWO	ESGE	EMSG	EMXF	LDEM
<b>ESG quality score</b>	5,46	7,39	6,81	6,72	6,64
<b>ESG score</b>	BBB	AA	A	A	A
<b>ITR</b>	misaligned	misaligned	misaligned	misaligned	misaligned
<b>Carbon intensity</b>	high (383,3 tons)	moderate (117,8 tons)	moderate (230,3 tons)	moderate (99,2 tons)	moderate (241,4 tons)
<b>Green revenues</b>	4%	5,5%	6%	4%	5,1%
<b>Fossil-Fuel-Based Revenues</b>	3,9%	2,5%	2,1%	0%	2,4%
<b>Controversial weapons</b>	0,5%	0%	0%	0%	0%
<b>Tobacco</b>	0,3%	0%	0%	0%	0%
<b>UNGC Violations</b>	1,1%	0%	0%	0%	0%
<b>Red Flag Controversies</b>	1,1%	0%	0%	0%	0%

Source: Own processing based on data from finance.yahoo.com

The first significant difference between ESG funds and the VWO benchmark lies in their ESG scores. The VWO fund exhibits a lower rating compared to other funds, with its ESG score at the BBB level and. The highest rating among the selected funds was awarded to the ESGE fund, which, according to MSCI, ranks among the leaders with a rating of AA. Another noticeable contrast lies in the assessment of carbon intensity. The VWO fund shows poorer results than ESG funds, with its carbon intensity level rated as high, while ESG funds maintain a moderate carbon intensity level. It is noteworthy that all funds generate higher returns from green activities compared to activities associated with fossil fuels. However, the non-ESG fund (VWO) records the highest percentage of returns from activities that aren't considered sustainable. Furthermore, this fund also includes companies involved in tobacco production (0.3%), controversial weapons (0.5%), and companies engaging in activities that violate human or labour rights or other activities flagged as red flags (1,1%). ESG funds do not include companies with such characteristics at all.

After comparing the selected ESG funds with the benchmark VWO, several noteworthy conclusions emerge. Firstly, ESG funds exhibit slightly higher P/E ratios (beside ESGE fund), suggesting positive forecasts. On the other hand, ESG funds have higher expense ratios, meaning they are associated with higher costs compared to the VWO fund. In terms of performance, the ESGE fund stands out as the top performer, surpassing the benchmark (VWO). Nevertheless, other ESG funds show lower returns compared to the VWO fund. The volatility of ESG funds is little bit higher than the volatility of their benchmark, indicating that ESG funds present slightly riskier investment option. This is confirmed also by the Sharpe ratio, which indicates that ESG funds yield lower returns relative to their risk. The analysis of „Emerging Market” funds indicates that ESG funds are riskier and less profitable investments for investors compared to their non-ESG fund benchmark. Only the ESGE fund outperformed the benchmark, but it still presents higher volatility and lower risk-adjusted performance. However, it is worth highlighting that all ESG funds outperform VWO fund in sustainability metrics. In this case, ESG funds may be appealing solely to investors focused on sustainability rather than purely financial performance.

### 3.4 Developed Market

In this section, we are focusing on „Developed Market” Funds, specifically ESG funds: Nuveen ESG International Developed Markets Equity ETF (NUDM), Xtrackers MSCI EAFE ESG Leaders Equity ETF (EASG), iShares ESG Aware MSCI EAFE ETF (ESGD), and iShares ESG Advanced MSCI EAFE ETF (DMXF). These funds will be compared with the non-ESG fund Vanguard FTSE Developed Markets ETF (VEA), chosen as their benchmark.

Table 10: Comparison of fundamental metrics of „Developed Market” Funds

Fund	Ticker	Inception date	Net assets
Vanguard FTSE Developed Markets ETF	VEA	20.7.2007	178,27B
iShares ESG Aware MSCI EAFE ETF	ESGD	28.6.2016	7,36B
Nuveen ESG International Developed Markets Equity ETF	NUDM	6.6.2017	390,06M
Xtrackers MSCI EAFE ESG Leaders Equity ETF	EASG	5.9.2018	47,62M
iShares ESG Advanced MSCI EAFE ETF	DMXF	16.6.2020	612,25 M

Source: Own processing based on data from finance.yahoo.com

All ESG funds exhibit strong correlation with the selected benchmark, indicating they are influenced by similar market factors and hold similar companies in their portfolios. This fact makes them suitable for our analysis, aimed at highlighting the perspective of ESG funds.

Additionally, ESG funds also demonstrate strong correlation among themselves, as indicated by the table 11.

Table 11: Correlation of „Developed Market” Funds

	<b>VEA</b>	<b>NUDM</b>	<b>EASG</b>	<b>ESGD</b>	<b>DMXF</b>
<b>VEA</b>	1	0,9902	0,9902	0,9949	0,9833
<b>NUDM</b>	0,9902	1	0,9935	0,9927	0,9907
<b>EASG</b>	0,9902	0,9935	1	0,9956	0,9916
<b>ESGD</b>	0,9949	0,9927	0,9956	1	0,9820
<b>DMXF</b>	0,9833	0,9907	0,9916	0,9820	1

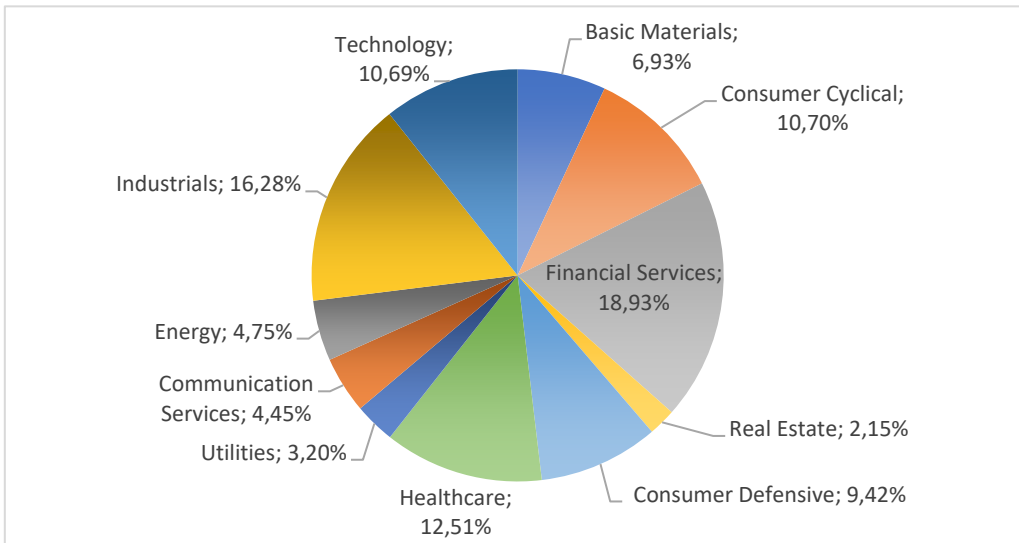
Source: Own processing based on data from finance.yahoo.com

*3.4.7. iShares ESG Aware MSCI EAFE ETF (ESGD)*

iShares ESG Aware MSCI EAFE ETF (ESGD) provides exposure to large- and mid-cap stocks across Europe, Australia, Asia, and the Far East, with a focus on companies that have favourable environmental, social, and governance (ESG) ratings. Established on June 28, 2016, ESGD currently holds net assets valued at \$7.36 billion. Its objective is to copy the performance of the MSCI EAFE Extended ESG Focus Index and is utilized to construct a sustainable equity portfolio for long-term investment.

The figure 14 depicts the sectoral composition of the ESGD fund. The largest representation is in the financial services sector, accounting for 18.9%. Industrials make up 16.3% of the companies held in the fund's portfolio. The third-largest representation comes from the healthcare sector, comprising 12.5% of the portfolio. Technology companies and those in the Consumer Cyclical sector each make up 10.7% of the fund. The smallest allocations in the fund are in the Real Estate sector (2.15%) and Utilities (3.2%).

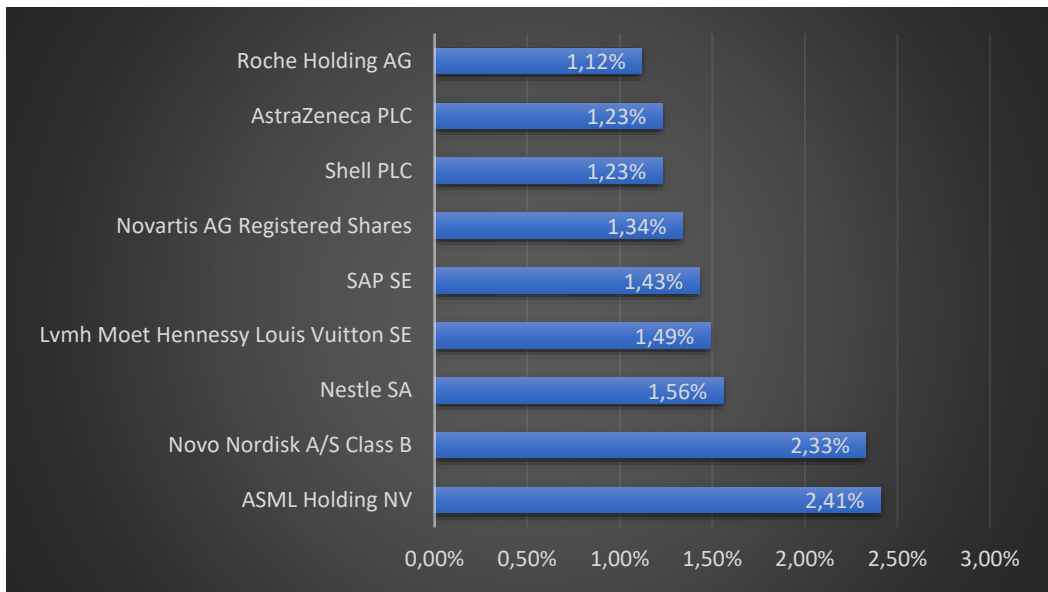
Figure 14: Sector weightings of ESGD fund



Source: Own processing based on data from finance.yahoo.com

In the following figure 15, we can observe the top 10 companies of ESGD fund. The largest representation is from the Dutch technology company ASML Holding NV (2.41%) and the Danish pharmaceutical company Novo Nordisk A/S (2.3%). Among the top 10 companies, we also find the well-known Swiss company Nestle AS (1.6%) and the Anglo-Dutch oil and gas company Shell PLC (1.2%). The German software company SAP SE accounts for 1.43% of this fund. ESGD also includes the French company LVMH Moët Hennessy - Louis Vuitton SE, specializing in luxury goods production, in its portfolio. From the healthcare sector, AstraZeneca PLC is also among the top 10 companies with a share of 1.12%.

Figure 15: Top 10 holdings of ESGD fund

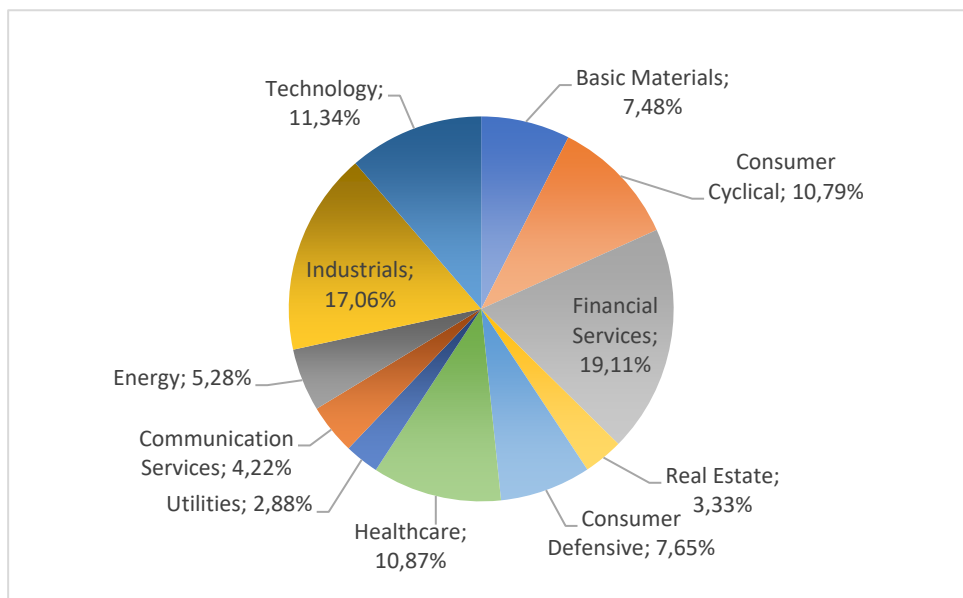


Source: Own processing based on data from finance.yahoo.com

### 3.4.8. Vanguard FTSE Developed Markets ETF (VEA)

This exchange-traded fund (ETF) provides exposure to developed markets beyond North America, including Japan, Western Europe, and Australia. Established on July 20, 2007, VEA tracks the FTSE Developed ex US All Cap Net Tax (US RIC) Index and holds net assets valued at \$178.27 billion. VEA is a fundamental component of numerous long-term investment portfolios. Like many other Vanguard funds, this ETF impresses with its extensive holdings, comprising nearly 1000 component securities, and its cost efficiency. VEA predominantly features exposure to large-cap stocks, which may introduce potential sector biases (VettaFi, 2024).

Figure 16: Sector weightings of VEA fund



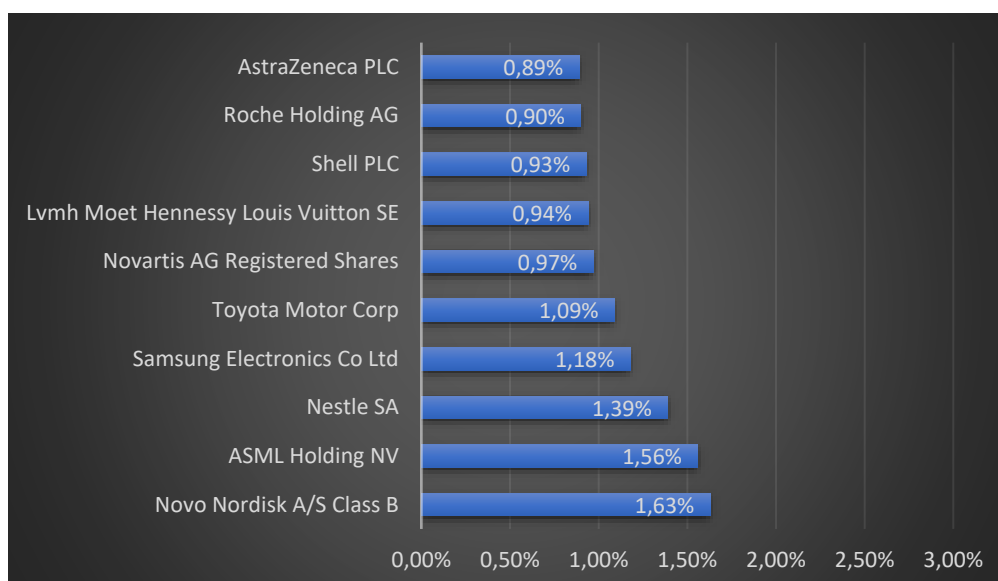
Source: Own processing based on data from [finance.yahoo.com](https://finance.yahoo.com)

The figure 16 illustrates the sectoral composition of the VEA fund. Similar to the ESGD fund, the financial services sector holds the largest representation, accounting for 19%, followed by the Industrials sector at 17%. Over 11% of the companies in the fund are from the technology sector, with approximately the same representation from the healthcare (10.9%) and Consumer Cyclical sectors (10.8%). The sectors with the lowest representation are Utilities (2.9%) and Real Estate (3.3%).

Among the top 10 holdings of the VEA fund are the Danish pharmaceutical company Novo Nordisk A/S, the Dutch technology company ASML Holding NV, and the Swiss company Nestle SA. In addition to these companies, the VEA fund also includes the technology company Samsung Electronics and the Japanese automotive company Toyota Motor Corp in its portfolio. Similar to the ESGD fund, the VEA fund also features the Anglo-Dutch oil and

gas company Shell and the British multinational pharmaceutical and biotechnology company AstraZeneca.

Figure 17: Top 10 holdings of VEA fund



Source: Own processing based on data from finance.yahoo.com

### 3.4.9. Comparison of „Developed Market” Funds

In this section, we will focus on comparing selected ESG funds with their benchmark (VEA). Initially, we will compare the basic metrics of the funds, as shown in the table below. Based on these metrics, we will gain a better overview of the performance and risk profile of the ESG funds.

Table 12: Comparison of fundamental metrics of „Developed Market” Funds

	VEA	NUDM	EASG	ESGD	DMXF	Average ESG funds
<b>P/E ratio</b>	13,29	16,6	16,81	14,94	19,41	16,94
<b>Beta (3y)</b>	1,00	1,01	1,01	1,00	1,02	1,01
<b>Expense ratio</b>	0,05%	0,31%	0,14%	0,20%	0,12%	0,19%
<b>1y return</b>	7,02%	8,49%	10,63%	8,13%	18,91%	11,54%
<b>3y return</b>	3,56%	3,66%	3,87%	4,17%	3,82%	3,88%
<b>5y return</b>	6,61%	7,49%	7,44%	6,99%	x	7,31%
<b>Standard Deviation (3y)</b>	17,87%	17,30%	17,26%	17,72%	18,84%	17,78%
<b>Sharpe ratio (3y)</b>	0,13	0,13	0,15	0,16	0,14	0,15

Source: Own processing based on data from finance.yahoo.com

The P/E ratio of ESG funds is higher than that of the VEA fund. Higher P/E ratio can be attributed to their growth potential or investors' increased confidence in sustainable investments. Investors might assign extra value to ESG factors and be willing to pay more for

shares of ESG-oriented companies because of their alignment with environmental and social principles. This increased demand could push stock prices higher, leading to a higher P/E ratio. On average, ESG funds achieve a higher P/E ratio by approximately 3 units. As indicated by the beta, the ESG funds exhibits slightly higher sensitivity to market movements compared to the benchmark (VEA fund). A significant difference is observed in the expenses associated with these funds. In this case, the non-ESG option (VEA) is a cheaper investment, with its expense ratio at 0.05%. The average expense ratio of the selected ESG funds is as high as 0.19%. Regarding fund performance, it is evident that ESG funds outperform their benchmark in one-year, three-year, and five-year horizons. While the one-year return of the VEA fund stands at 7.02%, the top-performing ESG fund, DMXF, achieved a one-year return as high as 18.91%. There is not as significant difference in performance in the three-year returns, but while the VEA fund achieved a return of 3.56%, the ESGD fund has three-year returns at 4.17%. When looking at the volatility of the selected funds, no significant differences are observed. The standard deviation of the VEA fund is at 17.87%, while the average standard deviation of ESG funds stands at 17.78%. This indicates that ESG funds have a comparable level of risk to their benchmark non-ESG fund. When examining Sharpe ratio indicator, we similarly find no significant differences between funds. Although ESG funds on average achieve marginally higher Sharpe ratios, indicating a slightly greater ability to generate returns relative to the risk they undertake.

In the following table, we can observe a comparison of the ESG factors of each fund. We are focusing on ESG criteria assessed by MSCI rating agency, which provide a better insight into the sustainability of each fund.

Table 12: ESG criteria of „Developed Market” Funds

ESG Criteria	VEA	NUDM	EASG	ESGD	DMXF
ESG quality score	7,42	8,72	8,50	8,52	8,06
ESG score	AA	AAA	AA	AA	AA
ITR	<b>misaligned</b>	aligned	aligned	<b>misaligned</b>	<b>misaligned</b>
Carbon intensity	<b>moderate</b> <b>(115 tons)</b>	low (34,6 tons)	low (62,6 tons)	<b>moderate</b> <b>(77,5 tons)</b>	low (59,6 tons)
Green revenues	4,90%	5,50%	4,70%	5,40%	5%
Fossil-Fuel-Based Revenues	3,80%	0,90%	3%	3,30%	0%
Controversial weapons	0%	0%	0%	0%	0%
Tobacco	<b>0,60%</b>	0%	0%	0%	0%
UNGC Violations	<b>1,30%</b>	0%	0%	0%	0%
Red Flag Controversies	<b>1,40%</b>	0%	0%	0%	0%

Source: Own processing based on data from website of MSCI rating agency



Among the selected funds, NUDM achieved the highest ESG score, getting an AAA rating, positioning it among the leaders. In terms of ESG quality score, the selected benchmark (VEA), received the lowest rating. Additionally, VEA exhibits the poorest results in the Carbon intensity category, with a value of 115 tons, whereas NUDM's Carbon intensity is only at 34.6 tons. A positive aspect of VEA is the percentage of returns generated from so-called green activities, which stands at 4.9%. In this parameter, VEA outperformed the ESG fund EASG, whose returns from green activities are at 4.7%. However, regarding returns from activities related to fossil fuels, ESG funds achieve better results than the VEA benchmark. Moreover, VEA holds 1.4% of companies classified under red flag controversies, 1.3% companies associated with human rights violations or corruption, and 0.6% companies involved in tobacco production. Such companies are not present in any of the selected ESG funds. Based on ESG criteria, we can consider NUDM to be the overall best-rated fund.

After comparing the fundamental metrics of the funds and subsequently analysing ESG criteria, we can draw the following conclusions. ESG funds focused on developed markets, demonstrate higher performance compared to the non-ESG benchmark. They also exhibit higher P/E ratios, indicating their potential for the future growth and increased investor confidence. Regarding risk, they are comparable to traditional funds and do not display higher volatility. However, ESG funds represent a slightly more expensive investment option due to their higher expense ratios. On the other hand, they clearly present more sustainable investment opportunities as they achieve better ratings based on ESG criteria. These findings underline the attractiveness of ESG funds for investors seeking both financial returns and environmental, social, and governance considerations.

### **3.5 Relationship between ESG criteria and fund performance**

In this chapter, our aim is to investigate whether fund performance varies depending on the primary ESG criteria under examination. We seek to determine the potential relationship between ESG factors and fund performance, with the goal of identifying which ESG factor demonstrates the strongest correlation with performance.

#### *3.5.10. Analysis of outperforming and underperforming funds*

Initially, we are examining a sample of 93 funds spanning across US Total Market, Emerging Market, and Developed Market segments, evaluating their performance against the market benchmark represented by the SPDR S&P 500 ETF Trust (SPY) fund. Subsequently,

we are focusing on those funds that outperformed the benchmark and try to identify which ESG criteria could contribute most significantly to this achievement.

The table below presents the average values of the monitored parameters for all selected funds, along with their respective benchmark (SPY). It also distinguishes between funds that have outperformed the benchmark in both 1-year and 3-year performance and those that have underperformed the benchmark. Out of the 93 selected funds, only 8 funds outperformed their benchmark (SPY fund). As we can observe, on average, these funds also achieve better results in ESG criteria compared to the SPY fund. Additionally, they have surpassed the average results of all monitored funds. On the other hand, funds that have underperformed the benchmark exhibit, on average, lower ESG scores, higher levels of carbon intensity, and lower green revenues compared to the SPY benchmark. The only ESG factor, Implied Temperature Rise (ITR), is at the same level (misaligned) in all four cases.

Table 13: Performance and ESG criteria of funds

	SPY	All funds (average)	Above SPY (average)	Under SPY (average)
<b>1y return</b>	32,21%	19,90%	43,31%	17,20%
<b>3y return</b>	11,35%	4,30%	13,11%	3,20%
<b>ESG score</b>	6,57 (A)	6,35 (A)	6,69 (A)	6,31 (A)
<b>ITR</b>	misaligned	misaligned	misaligned	misaligned
<b>Carbon intensity (tons)</b>	moderate (90,6)	moderate (196,09)	low (36,13)	moderate (215,56)
<b>Green revenues</b>	7,30%	5,42%	9,46%	5,00%
<b>Fossil-fuels revenues</b>	3,30%	3,50%	0,65%	3,70%
<b>Tobacco</b>	0,50%	0,40%	0%	0,50%
<b>Controversial weapons</b>	0,70%	0,30%	0,28%	0,30%
<b>Red flag controversies</b>	0%	0,40%	0%	0,40%
<b>UNGC Violations</b>	0%	0,30%	0%	0,40%

Source: Own processing based on data from [finance.yahoo.com](http://finance.yahoo.com) and [msci.com](http://msci.com)

Table 14 presents the funds that outperformed the benchmark alongside their corresponding ESG criteria. This table facilitated a more effective analysis of the relationship between fund performance and ESG criteria.

Table 14: Funds Outperforming Benchmark SPY

Fund	1y return	3y return	ESG score	ITR	Carbon intensity (tons)	Green Revenues	Fossil fuel Revenues	Tabacco	Contr. weapons	Red flag contr.	UNGC Violations
QUAL	36,97%	11,92%	6,87 (A)	misaligned	low (56,8)	4,4%	3,2%	0,0%	1,2%	0,0%	0,0%
VGT	40,71%	14,51%	7,21 (AA)	aligned	low (19,5)	12,3%	0,0%	0,0%	0,0%	0,0%	0,0%
IWF	42,23%	12,60%	6,61 (A)	misaligned	low (28,6)	9,4%	0,2%	0,0%	0,4%	0,0%	0,0%
QQQ	42,93%	12,72%	6,6 (A)	misaligned	low (43,4)	9,4%	0,4%	0,0%	0,0%	0,0%	0,0%
MGK	44,61%	12,43%	6,48 (A)	misaligned	low (34)	11,0%	0,2%	0,0%	0,0%	0,0%	0,0%
VONG	44,95%	13,32%	6,61 (A)	misaligned	low (28,6)	9,4%	0,1%	0,0%	0,4%	0,0%	0,0%
QQQM	45,14%	13,35%	6,6 (A)	misaligned	low (43,3)	9,4%	0,4%	0,0%	0,0%	0,0%	0,0%
SCHG	48,93%	14,04%	6,55 (A)	misaligned	low (34,8)	10,4%	0,7%	0,0%	0,2%	0,0%	0,0%

Source: Own processing based on data from [finance.yahoo.com](https://finance.yahoo.com) and [msci.com](https://www.msci.com)

### 3.5.11. Regression model

To explain the relationship between fund performance and individual ESG criteria, we also conducted a regression model. The dependent variable in our regression model comprises the annual returns of funds for the previous year, sourced from the ETF database ([etfdb.com](https://etfdb.com)) at the end of March 2024. These returns represent the annualized performance over a single trading period. The independent variables, representing the ESG factors of individual funds, were obtained from the MSCI rating agency website [msci.com](https://www.msci.com) also at the end of March 2024. These data include the most current information on the ESG criteria of individual funds.

Based on the regression model, we can conclude that three ESG factors are statistically significant and demonstrate a potential relationship with fund performance. These factors are Carbon Intensity (CI), Green Revenues (GR), and Fossil-fuel revenues (FR). They exhibit p-values less than 0.05, indicating statistical significance at the 95% confidence level. Nevertheless, it is crucial to note that the p-value for the variable Fossil-fuel revenues is close to 0.05 ( $p = 0.036$ ), suggesting that this variable may have less significance in explaining returns compared to the variables Carbon intensity and Green revenues.

Picture 7: OLS Regression Model

Source	SS	df	MS	Number of obs	=	93
Model	.400771585	8	.050096448	F(8, 84)	=	5.31
Residual	.793030942	84	.009440845	Prob > F	=	0.0000
				R-squared	=	0.3357
				Adj R-squared	=	0.2724
Total	1.19380253	92	.012976114	Root MSE	=	.09716

return	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
score	-.0144511	.0176135	-0.82	0.414	-.0494774	.0205753
ITR	-.0119736	.0365561	-0.33	0.744	-.0846693	.0607222
CI	-.0003436	.000105	-3.27	0.002	-.0005524	-.0001347
GR	.8180576	.3308459	2.47	0.015	.1601342	1.475981
FR	1.643901	.770557	2.13	0.036	.1115635	3.176238
tabacco	-1.707702	1.136402	-1.50	0.137	-3.967561	.5521579
weapons	4.164262	2.129862	1.96	0.054	-.0712022	8.399726
redflag	-3.677908	1.928268	-1.91	0.060	-7.512482	.1566649
_cons	.2894533	.1567551	1.85	0.068	-.0222713	.601178

Source: Own processing in Stata

Picture 8: Shapiro-Wilk W test for normal data

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
return	93	0.95949	3.149	2.534	0.00563

Picture 9: Variance Inflation Factor (VIF) test

Variable	VIF	1/VIF
FR	3.83	0.260848
CI	3.73	0.268394
score	2.12	0.472630
ITR	1.67	0.597286
redflag	1.62	0.616706
GR	1.34	0.743792
tabacco	1.10	0.906753
weapons	1.08	0.926897
Mean VIF	2.06	

Picture 10: Breusch-Pagan/Cook- Weisberg test for heteroskedasticity

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity  
 Assumption: Normal error terms  
 Variable: res

H0: Constant variance

chi2(1) = 0.27  
 Prob > chi2 = 0.6061

For the accuracy and reliability of the model, we conducted statistical tests, which confirmed normal data distributions, homoscedasticity, and the absence of multicollinearity among the explanatory variables. The Shapiro-Wilk W test for normality confirmed normal data distributions at a significance level of 99%. To avoid higher multicollinearity in the model, firstly, we excluded the ESG factor "UNGC Violations" from the regression since this factor strongly correlates with "Red-flag controversies." Both these ESG factors encompass companies associated with violations of human rights, labour rights, corruption, or other inappropriate practices. After removing the variable "UNGC Violations," we conducted a multicollinearity test. To assess multicollinearity among the explanatory variables in the regression model, we performed the Variance Inflation Factor (VIF) test, which confirmed that there were no explanatory variables strongly correlated with each other in the model. To confirm homoscedasticity in our model, we conducted the Cook-Weisberg/Breusch-Pagan test. The p-value of this test confirmed homoscedasticity in our model, and thus, at a significance level of 95%, we accept the null hypothesis of constant error variance.

#### *3.5.12. Results of relationship between ESG factors and fund performance*

In the case of Carbon Intensity (CI), there is a negative relationship with fund performance. Its standard error (0.0001) also indicating relatively high precision in estimating its relationship with fund returns. Carbon intensity decreases with increasing fund performance. This relationship was also evident by funds that outperformed the benchmark SPY. All these funds consistently exhibited lower levels of carbon intensity, all falling within the "low" range. However, it is crucial to consider several factors that may distort this relationship. Market conditions fluctuate over time, impacting fund performance independently of its carbon intensity. Additionally, funds with varying sector exposure may exhibit differing impacts on both performance and carbon intensity, as some industries are inherently more carbon-intensive than others. Therefore, while lowering carbon intensity can be a valuable component of investment strategy, it is essential to evaluate performance within the context of broader market dynamics and sector-specific considerations.

Based on our regression model, the ESG factors green revenues and fossil-fuel revenues show a positive relationship with fund performance. However, it is worth noting that both variables exhibit larger standard errors (GR at 0.3308 and FR at 0.7706) compared to Carbon intensity, indicating less precision in estimating their effects. In the case of green revenues, we observe this positive relationship also among funds that outperformed the benchmark. On

average, they achieve a higher percentage of green revenues, indicating that funds focused on green activities may also yield higher returns.

The relationship between fossil-fuel revenues and fund performance observed in the regression model differs from the analysis based on outperforming and underperforming funds. Table 12 illustrates that funds outperforming the SPY benchmark tend to have, on average, lower fossil fuel revenues compared to the benchmark itself. This discrepancy prompts us to consider additional factors that may have influenced these results. It is important to note that fossil fuel revenues indicate the level of exposure to companies involved in fossil fuel extraction and processing. Therefore, during periods of high fuel prices, funds with higher exposure are expected to perform better. Conversely, when fuel prices are low, these funds may underperform. Another potential explanation for this difference is that funds surpassing the benchmark may have diversified their portfolios effectively, concentrating on sectors with reduced exposure to fossil fuels. Consequently, their performance might have been influenced by alternative factors, including investments in renewable energy sources or other ESG factors. These findings imply that the outcomes related to green revenues and fossil fuel revenues could be markedly affected by the funds' exposure to fossil fuels and the diversification strategies within their portfolios.

While other ESG factors may not show statistical significance based on our regression model, insights from the analysis of outperforming and underperforming funds reveal the following trends. Funds exhibiting superior performance demonstrate limited exposure to industries associated with tobacco production, human rights violations, and controversial weapons manufacturing. Outperforming funds typically boast higher average ESG scores compared to the benchmark, whereas underperforming funds tend to display lower average ESG scores in comparison to the benchmark. These ESG criteria may increase investor confidence and improve long-term sustainable performance. Nevertheless, it is crucial to evaluate these ESG criteria alongside other factors, as their individual relationship with fund performance is relatively insignificant.

After conducting an extensive analysis of the performance of selected funds alongside their ESG criteria, it becomes evident that carbon intensity emerges as one of the crucial ESG factors. Green revenues and fossil-fuel revenues are two additional significant ESG factors that show relationship with fund performance. Nonetheless, other ESG criteria, such as, the exclusion of certain non-sustainable companies, and overall ESG scores, also demonstrated a

potential relationship with fund performance. This was particularly evident among funds that surpassed the benchmark (SPY). Findings of our analysis support the importance of ESG factors for investment decision-making and demonstrate that environmental, social, and responsible corporate governance can have a significant relationship with financial outcomes. Nevertheless, it is important to acknowledge that fund performance is also influenced by other factors, including shifts in market conditions, fund diversification, sector composition, political situations, and other risk factors.

## CONCLUSION

Our thesis has delved into the increasingly expanded topic of sustainability and corporate social responsibility, particularly in the context of ESG (Environmental, Social, and Governance) investing. As investors shift their focus towards opportunities that not only yield financial returns but also align with ESG principles, our research aimed to enrich this discourse.

We have observed a notable growth in ESG investments, especially evident in the rise of ESG ETF funds in last years, accompanied by the significant challenges in ESG investing. Crucially, our investigation discovered a noticeable relationship between fund performance and ESG criteria, confirming the positive outlook on ESG investing. These findings support existing studies and literature, indicating a positive correlation between financial performance and sustainability efforts.

Through our comparative analysis across different market segments, we found varying performances of ESG funds compared to traditional funds, highlighting both strengths and weaknesses. Initially, we analysed the US Total Market. We discovered that ESG ETF funds surpassed the set benchmark, represented by traditional ETF fund, in both performance and ESG ratings. This occurred despite their higher costs and increased volatility. Within the Emerging Market category, the iShares ESG Aware MSCI EM ETF demonstrated the strongest performance, outshining other ESG funds. None of the other ESG funds managed to surpass the benchmark. We also noted significantly better sustainability results for ESG funds, indicating potential advantages of ESG investing in Emerging Market economies. On Developed markets, we observed similar results to those of the US Total Market segment. ESG funds surpassed traditional funds not only in performance but also in ESG criteria. Although they are associated with higher costs, their volatility is comparable to that of traditional funds. Moreover, our study identified specific ESG factors, notably carbon intensity, which can have a significant connection with fund performance. Overall, our findings highlight the positive relationship between ESG factors and fund performance across different market segments. These results confirm the potential of ESG investing as a suitable and sustainable strategy in today's investment environment.

It is important to note that our research was limited primarily by data availability, as ESG investing is a relatively new trend. Many ESG funds have emerged only in recent years, making it impossible to examine a longer-term horizon. Additionally, historical data on ESG criteria are not available. The ability to study the relationship between ESG criteria and fund



performance over a longer period could yield further interesting results in this area and delve deeper into the issues surrounding ESG investing. It would be interesting to examine how ESG criteria of funds have changed over the years alongside fund performance. Another limitation of our study is the absence of a database focused solely on ESG funds. Therefore, when we examined the association of specific ESG factors with fund performance, we focused on traditional funds rather than those labelled as ESG.

Despite these limitations, our research underscores ESG investing as a viable opportunity, particularly among growing pressure for overall corporate sustainability. While ESG funds may entail higher costs and slightly increased risks, their potential to outperform traditional investments in the long term deserves attention. In essence, our thesis not only validates the viability of ESG investing but also emphasizes its growing importance in the investment landscape. As we navigate towards a more sustainable future, ESG principles are poised to play a pivotal role in shaping investment decisions and driving positive societal impact.

## REFERENCES

1. ALEXANDER, Gordon J.- BUCHHOLZ, Rogene A. *Corporate social responsibility and stock market performance*. Academy of Management journal. [online]. 1978, Vol. 21, No. 3, pp. 479-486. [cit. 24-11-2023]. Available at: [https://www.researchgate.net/publication/236273106\\_Corporate\\_Social\\_Responsibility\\_and\\_Stock\\_Market\\_Performance](https://www.researchgate.net/publication/236273106_Corporate_Social_Responsibility_and_Stock_Market_Performance)
2. AUPPERLE, Kenneth et al. *An empirical examination of the relationship between corporate social responsibility and profitability*. [online]. Academy of management Journal. 1985, pp. 446-463. [cit. 25-11-2023]. Available at: [https://www.researchgate.net/publication/325001131\\_An\\_Empirical\\_Examination\\_of\\_the\\_Relationship\\_between\\_Corporate\\_Social\\_Responsibility\\_and\\_Profitability](https://www.researchgate.net/publication/325001131_An_Empirical_Examination_of_the_Relationship_between_Corporate_Social_Responsibility_and_Profitability)
3. Bank for International Settlements. *Evolving Practices in Public Investment Management: Proceedings of the Seventh Public Investors Conference*. [online]. 2020. 229p. ISBN 978-92-9259-354-4. [cit. 09-02-2024]. Available at: <https://documents1.worldbank.org/curated/en/299711588231669550/pdf/Evolving-Practices-in-Public-Investment-Management-Proceedings-of-the-Seventh-Public-Investors-Conference.pdf>
4. BELCHER, A. *Four motivations that drive ESG data use*. [online]. 2021. [cit. 01-12-2023]. Available at: <https://www.ice.com/insights/market-pulse/four-motivations-that-drive-esg-data-use>
5. BlackRock. [online]. 2024. [cit. 09-03-2024]. Available at: <https://www.blackrock.com/>
6. BLOOMBERG. *Global ESG assets predicted to hit \$40 trillion by 2030, despite challenging environment, forecasts Bloomberg Intelligence*. [online]. 2024. [cit. 23-04-2024]. Available at: <https://www.bloomberg.com/company/press/global-esg-assets-predicted-to-hit-40-trillion-by-2030-despite-challenging-environment-forecasts-bloomberg-intelligence/>
7. BOFFO, R.- PATALANO, R. *ESG Investing: Practices, Progress and Challenges*. [online]. OECD Paris. 2020. 88 p. [cit. 25-11-2023]. Available at: <https://www.oecd.org/finance/ESG-Investing-Practices-Progress-Challenges.pdf>
8. BRIAND, R et al. *Integrating ESG into the Investment Process*. [online]. MSCI ESG Research. 2011, 17 p. [cit. 30-11-2023]. Available at: <https://www.top1000funds.com/wp->

- content/uploads/2011/08/Integrating\_ESG\_into\_the\_Investment\_Process\_Aug\_2011.pdf
9. CAPITAL GROUP. *ESG Global Study 2023*. [online]. 2023. [cit. 09-03-2024]. Available at: <https://www.capitalgroup.com/advisor/pdf/shareholder/ITGEOT-073-1043294.pdf>
  10. COCHRAN, Philip L.- WOOD, Robert A. *Corporate social responsibility and financial performance*. [online]. Academy of management Journal. 1984, Vol. 27, No. 1, pp. 42-56. [cit. 25-11-2023] Available at: <https://scholarworks.iupui.edu/server/api/core/bitstreams/c05180e9-c820-4ed4-b913-4faa24cfd528/content>
  11. CRUZ, P. *ESG investing statistics*. [online]. Finder. 2023. [cit. 03-03-2024]. Available at: <https://www.finder.com/ca/stock-trading/esg-investing-statistics#global-esg-investing>
  12. DERWALL, Jeroen, et al. *The eco-efficiency premium puzzle*. [online]. Financial Analysts Journal. CFA Institute. 2005, Vol. 61, No. pp.251-63. [cit. 25-11-2023]. Available at: [https://www.researchgate.net/publication/4864625\\_The\\_Eco-Efficiency\\_Premium\\_Puzzle](https://www.researchgate.net/publication/4864625_The_Eco-Efficiency_Premium_Puzzle)
  13. DERWALL, Jeroen-VERWIJMEREN, Patrick. *Corporate governance and the cost of equity capital: Evidence from GMI's governance rating*. [online]. European Centre for Corporate Engagement. 2007, pp.1-11. [cit. 30-11-2023]. Available at: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2533957](https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=7fce3d637420e68c8ed2c84c575a660f6b119ca0DORFLEITNER, Gregor et al. <i>Patience Pays Off- Financial Long-Term Benefits of Sustainable Management Decisions</i>. [online]. 2014, 57 p. [cit. 30-11-2023]. Available at: <a href=)
  15. ECCLES, Robert G. et al. *The impact of corporate sustainability on organizational processes and performance*. [online]. Management science. 2014, Vol. 60, No. 11, pp. 2835-2857. [cit. 25-11-2023]. Available at: <https://www.jstor.org/stable/24550546>
  16. EDMANS, Alex. *Does the stock market fully value intangibles? Employee satisfaction and equity prices*. [online]. Journal of Financial economics. 2011, Vol. 101, Iss. 3, pp. 621-640. [cit. 26-11-2023]. Available at: <https://www.sciencedirect.com/science/article/abs/pii/S0304405X11000869>

17. FERNANDO, J. *Sharpe Ratio: Definition, Formula, and Examples*. [online]. Investopedia. 2024. [cit. 28-03-2024]. Available at: <https://www.investopedia.com/terms/s/sharperatio.asp>
18. FRIEDBERG, B. *The Best ESG Funds Of December 2023*. [online]. Forbes. 2023. [cit. 03-12-2023]. Available at: <https://www.forbes.com/advisor/investing/best-esg-funds/>
19. FRIEDE, Gunnar et al. *ESG and financial performance: aggregated evidence from more than 2000 empirical studies*. [online]. Journal of sustainable finance & investment. 2015, Vol. 5, Iss. 4, pp. 210-233. [cit. 26-11-2023]. Available at: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2699610](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2699610)
20. GALEMA, Rients et al. *The stocks at stake: Return and risk in socially responsible investment*. [online]. Journal of Banking & Finance. 2008, Vol. 32, Iss. 12, pp.2646-2654. [cit. 26-11-2023]. Available at: <https://www.sciencedirect.com/science/article/abs/pii/S0378426608001325>
21. HALBRITTER, Gerhard; DORFLEITNER, Gregor. *The wages of social responsibility—where are they? A critical review of ESG investing*. [online]. Review of Financial Economics. 2015, Vol. 26, Iss. 1, pp.25-35. [cit. 26-11-2023]. Available at: <https://onlinelibrary.wiley.com/doi/full/10.1016/j.rfe.2015.03.004>
22. HARGRAVE, M. *Standard Deviation Formula and Uses vs. Variance*. [online]. 2023. [cit. 09-02-2024]. Available at: <https://www.investopedia.com/terms/s/standarddeviation.asp>
23. HAYES, A. *Expense Ratio: Definition, Formula, Components, Example*. [online]. 2023b. [cit. 09-02-2024]. Available at: <https://www.investopedia.com/terms/e/expenseratio.asp>
24. HAYES, A. *How to Tell If a Company Has High ESG Scores*. [online]. 2023. [cit. 03-12-2023]. Available at: <https://www.investopedia.com/company-esg-score-7480372>
25. HILL, John. *Environmental, Social, and Governance (ESG) Investing*. 2020. Academic Press, 357 pages. ISBN: 978-0-12-818692-3.
26. KEMPF, Alexander- OSTHOFF, Peer. *The effect of socially responsible investing on portfolio performance*. [online]. European financial management. 2007, Vol. 13, Iss. 5, pp. 908-922. [cit.26-11-2023]. Available at: <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1468-036X.2007.00402.x>
27. LARSEN, S. Giver bæredygtighedsanalyser værdi i forvaltning af aktier?. *Finans/Invest*, 2017, pp. 6-12.

28. LEE, Darren D. et al. *Do high and low-ranked sustainability stocks perform differently?*. [online]. International Journal of Accounting & Information Management. 2013, Vol. 21, Iss. 2, pp. 116-132. [cit. 25-11-2023]. ISSN: 1834-7649. Available at: <https://www.emerald.com/insight/content/doi/10.1108/18347641311312267/full/html>
29. LIBERTO, D. *What Beta Means When Considering a Stock's Risk*. [online]. 2024. [cit. 09-02-2024]. Available at: <https://www.investopedia.com/investing/beta-know-risk/>
30. LOVAS, Gabi. *Top ESG Rating Providers*. [online]. 2022. [cit. 01-12-2023] Available at: <https://brokerchooser.com/education/investing/top-esg-rating-providers>
31. MĂNESCU, Cristiana. *Stock returns in relation to environmental, social and governance performance: Mispricing or compensation for risk?*. [online]. Sustainable development. 2011, Vol. 19, Iss. 2, pp. 95-118. [cit.26-11-2023]. Available at: <https://onlinelibrary.wiley.com/doi/full/10.1002/sd.510>
32. MATOS, Pedro. *ESG and responsible institutional investing around the world: A critical review*. [online]. CFA Institute Research Foundation, 2020. 82p. ISBN 978-1-944960-97-1. [cit. 09-02-2024]. Available at: <https://www.cfainstitute.org/-/media/documents/book/rf-lit-review/2020/rflr-esg-and-responsible-institutional-investing.pdf>
33. MEZIANI SEDDIK, A. *Investing with Environmental, Social, and Governance Issues in Mind: From the Back to the Fore of Style Investing*. [online]. The Journal of Investing. 2014. 10 p. [cit. 26-11-2023]. Available at: [https://www.researchgate.net/publication/272702517\\_Investing\\_with\\_Environmental\\_Social\\_and\\_Governance\\_Issuesin\\_Mind\\_From\\_the\\_Back\\_to\\_the\\_Fore\\_of\\_Style\\_Investing](https://www.researchgate.net/publication/272702517_Investing_with_Environmental_Social_and_Governance_Issuesin_Mind_From_the_Back_to_the_Fore_of_Style_Investing)
34. MILLER, N. *ESG Fund*. [online]. Corporate Finance Institute, 2023. [cit. 03-12-2023]. Available at: <https://corporatefinanceinstitute.com/resources/esg/esg-fund/>
35. MORNINGSTAR. *Differentiation: MSCI is your most important competitor on a global scale. Could you walk through in what ways is your offering different from MSCI's offering? Why would a client choose Sustainalytics vs. MSCI?*. [online]. 2021. [cit.01-12-2023]. Available at: <https://shareholders.morningstar.com/investor-relations/investor-qa/investor-qa-details/2021/11.-Differentiation-MSCI-is-your-most-important-competitor-on-a-global-scale.-Could-you-walk-through-in-what-ways-is-your-offering-is-differentiation-from-MSCIs-offering-Why-would-a-client-choose-Sustainalytics-vs.-MSCI-/default.aspx>

36. MSCI. *How does MSCI ESG Fund Ratings work?*. [online].2023. [cit. 30-11-2023]. Available at: <https://www.msci.com/our-solutions/esg-investing/esg-fund-ratings-climate-search-tool>
37. MSCI. ESG Fund Ratings and Climate Search Tool. [online].2024. [cit. 02-02-2024]. Available at: <https://www.msci.com/our-solutions/esg-investing/esg-fund-ratings-climate-search-tool/funds>
38. PETERDY, K. *ESG Disclosure*. [online]. Corporate Finance Institute. 2023. [cit. 01-12-2023]. Available at: <https://corporatefinanceinstitute.com/resources/esg/esg-disclosure/>
39. SETH, Ritika et al. *ESG investing: a critical overview*. [online]. Hans Shodh Sudha. 2021, Vol. 2, Iss. 2, 69-80 p. [cit. 26-11-2023] ISSN 2582-9777. Available at: [https://www.hansshodhsudha.com/volume2-issue2/October\\_December%202021\\_%20article%207.pdf](https://www.hansshodhsudha.com/volume2-issue2/October_December%202021_%20article%207.pdf)
40. STATISTA. [online]. 2024. [cit. 09-03-2024]. Available at: <https://www.statista.com/>
41. STATMAN, Meir - GLUSHKOV, Denys. *The wages of social responsibility*. [online]. Financial Analysts Journal. 2009, pp. 33-46. [cit.26-11-2023]. Available at: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1372848](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1372848)
42. SUSTAINALYTICS. *ESG Risk ratings*. [online]. 2023. [cit. 01-12-2023]. Available at: <https://www.sustainalytics.com/esg-data>
43. VAN DE VELDE, Eveline et al. *Corporate social responsibility and financial performance*. [online]. Corporate Governance. 2005, Vol. 5, Iss. 3, pp. 129 – 138. [cit.24-11-2023]. ISSN: 1472-0701. Available at: <http://dx.doi.org/10.1108/14720700510604760>
44. VettaFi.[online]. 2024. [cit. 04-02-2024]. Available at: <https://etfdb.com/>
45. VITALI, T. *ESG Investing Statistics, Data & Trends (2024)*. [online]. Investing in the web. 2024. [cit. 03-03-2024]. Available at: <https://investingintheweb.com/education/esg-investing-statistics/>
46. WHELAN, Tensie, et al. *ESG and financial performance: Uncovering the relationship by aggregating evidence from 1,000 plus studies published between 2015–2020*. [online]. New York: NYU STERN Centre for sustainable business, 2021. [cit. 30-11-2023]. Available at: [https://www.stern.nyu.edu/sites/default/files/assets/documents/NYU-RAM\\_ESG-Paper\\_2021%20Rev\\_0.pdf](https://www.stern.nyu.edu/sites/default/files/assets/documents/NYU-RAM_ESG-Paper_2021%20Rev_0.pdf)

47. ZHOU, Michelle. *ESG, SRI, and Impact Investing: What's the Difference?*. [online]. 2022. [cit. 01-12-2023]. Available at: <https://www.investopedia.com/financial-advisor/esg-sri-impact-investing-explaining-difference-clients/>