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How Sustainable Mutual Funds Have Performed against Financial Markets

Evidence from the Equity Mutual Funds in the United States

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ABSTRACT:

The popularity of sustainability and socially responsible investing has gained considerable market attention in recent years. However, both theories and previous research have conflicting findings on the profitability of the trend. Depending on the study, the performance of ESG-funds results in negative, neutral, or positive returns. Therefore, this thesis hypothesizes that ESG implementation has a neutral effect on mutual fund performance on a risk-adjusted basis.

The sample for this study consists of 150 equity funds in the United States. The funds are divided into three portfolios based on their sustainability, and all the formed portfolios are comprised of 50 equity mutual funds. This thesis investigates how sustainable funds have performed against their conventional counterparts. Sustainability ratings for the thesis are collected from the MSCI website. Monthly returns are collected for the period 2015-2024. The study uses the Capital Asset Pricing model, Fama and French's three-, five-, and six-factor models.

The results of this thesis indicate that incorporating ESG into mutual fund selection results in lower returns. All three formed portfolios lost risk-adjusted return for the selected S&P 500 benchmark index. All the portfolios have statistically significant negative alphas and insignificant relative differences. The average portfolio produced the highest return from the formed portfolios, which supports the hypothesis that ESG results in neutral performance. Conventional funds have been found to have lower fees, which increases their popularity among investors. However, incorporating ESG into an investor's portfolio can lower volatility and risk level, and some investors are ready to accept lower returns.

KEYWORDS: Environmental, Social and Governance (ESG), Corporate Social Responsibility (CSR), Socially Responsible Investment (SRI), ESG rating, mutual fund

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TIIVISTELMÄ:

Kestävän kehityksen ja sosiaalisesti vastuullisen sijoittamisen suosio on saanut viime vuosina markkinoilla paljon huomiota. Sekä teorioilla että aikaisemmillä tutkimuksilla on kuitenkin ristiriitaisia tuloksia koskien trendin kannattavuutta. Riippuen tutkimuksesta, ESG-rahastot voivat näyttäytyä negatiivisena, neutraalina tai positiivisena tuottona. Tämän opinnäytetyön hypoteesi on, että ESG:n käyttöönnotolla on neutraali vaikutus sijoitusrahastojen riskikorjattuun tuottoon.

Tämän tutkimuksen otos sisältää 150 osakerahastoa Yhdysvalloissa. Rahastot on jaettu kolmeen salkkuun niiden kestävyysperusteella, ja kaikki muodostuvat salkut sisältävät 50 osakerahastoa. Tässä opinnäytetyössä tarkastellaan, kuinka vastuulliset rahastot ovat pärjänneet perinteisiä rahastoja vastaan. Opinnäytetyön kestävän kehityksen luokitukset on kerätty MSCI:n verkkosivuilta. Kuukausittaiset tuotot on kerätty aikaväliltä 2015–2024. Tutkimuksessa käytetään Capital Asset Pricing -mallia sekä Faman ja Frenchin kolmi-, viisi- ja kuusifaktorimalleja.

Tämän opinnäytetyön tulokset osoittavat, että ESG:n sisällyttäminen sijoitusrahastojen valintaan johtaa pienempään tuottoon. Kaikki kolme muodostettua salkkua menettivät riskikorjatun tuoton valitulle S&P 500 vertailuindeksille. Kaikissa salkuissa on tilastollisesti merkitseviä negatiivisia alfa-arvoja ja merkityksettömiä suhteellisia eroja. Keskimääräinen salkku tuotti korkeimman tuoton muodostetuista salkuista, mikä tukee olettamusta, että ESG johtaa neutraaliin tulokseen. Perinteisissä rahastoissa on havaittu alhaisemmat palkkiot, mikä lisää niiden suosiota sijoittajien keskuudessa. ESG:n sisällyttäminen sijoittajan salkkussa voi kuitenkin vähentää volatiiliteettia ja riskiä, ja jotkut sijoittajat ovat valmiita hyväksymään alhaisemman tuoton.

KEYWORDS: Environmental, Social and Governance (ESG), Corporate Social Responsibility (CSR), Socially Responsible Investment (SRI), ESG rating, mutual fund

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Abbreviations

AUM	Assets Under Management
CAPM	Capital Asset Pricing Model
CMA	Conservative Minus Aggressive
CSR	Corporate Social Responsibility
ESG	Environmental, Social, Governance
EU	European Union
FF3	Fama-French three factor model
FF5	Fama-French five factor model
FF6	Fama-French six factor model
HML	High Minus Low
MoM	Momentum
RMW	Robust Minus Weak
SMB	Small Minus Big
SRI	Socially Responsible Investing
SEC	United States Securities Exchange Commission
SFDR	Sustainable Finance Disclosure
STD	Standard Deviation
TNA	Total Net Assets Value
US	The United States

1 Introduction

Socially responsible investing as we know it today was first introduced in the 1960s. It has since attracted public attention by bringing information about how businesses consider environmental, social, and governance factors. In the investment world, this consideration happens in many ways. (Renneboog et al, 2008.) One way is to exclude companies from the investment portfolio if it is noticed that the company does not meet the conditions set for the portfolio. These conditions could include rules such as not investing in tobacco, fossil fuels, or weapons. (Hong and Kacperczyk, 2005.) On the other hand, this can be done by influencing the company's management or setting incentives. (Renneboog et al, 2008.)

Since 1990, the SRI industry has evolved worldwide. (Renneboog et al., 2008.) ESG is a popular trend nowadays, and there is a growing demand for investments considering ESG aspects. ESG factors are considered alongside traditional financial metrics when making investment decisions. ESG investments typically have long-term investment horizons, and portfolio managers try to make positive choices for society while still generating profit for the company. The most popular ESG investing strategy is integration, which considers aspects of the ESG factor in financial analysis. (Global Sustainable Investment Alliance, 2021.) For investors, SRI produces costs due to active asset management (Renneboog et al., 2008), and market timing can be difficult for fund managers. (Kreander et al., 2005.)

The popularity of mutual funds has been growing over the last twenty years. Mutual funds attract investors because they are a relatively easy way to invest, diversification lowers risk, and costs are reasonable. Since sustainability has become popular, many mutual fund managers must consider implementing more sustainability in their portfolios. Morgan Stanley, a USA-based commercial bank, reported that sustainable funds performed better than their peers in the Q1 and Q2 of 2023. (Morgan Stanley, 2023.) This indicates that investors can generate a return even in challenging market conditions.

Also, measuring ESG is challenging. One way to measure ESG performance is through ESG ratings. Various ESG score providers, such as Thomson Reuters, Morningstar, and MSCI, provide ESG scores to determine how well a company considers ESG in its operations. However, Pedersen et al. (2021) state that units and terminologies can, for example, differ among providers, which can lead to harder comparability.

Like the market, theories also have different views on ESG and how it affects performance. According to Milton Friedman's theory, profit-making is a company's main priority. Therefore, ESG is not a priority and should be considered through corporate tax; the most important thing is the return to the shareholders. In addition, regarding ESG, modern portfolio theory states that high ESG does not lead to better returns (Friedman, 1962;1970.) On the other hand, other theories, such as stakeholder theory, state that ESG can positively affect the company. Stakeholder theory considers both profit and the ESG aspects that impact the company. In this case, the working conditions of the employees are, for example, seen to influence the company and its performance. (Freeman, 1984.)

The amount of research on the subject has increased. Previous primary studies, like Pástor et al. (2021b), state that ESG effects on return can be predicted, but studies like Pederson et al. (2020) state that this is not the case. Renneboog et al. (2008) also state that it is challenging for investors to predict which sustainable funds could produce overperformance comparable to conventional funds. Therefore, the literature has a wide range of research results.

Previous studies have utilized several measures to analyse ESG performance. Renneboog et al. (2008) and Leite and Cortez (2014) have, for example, utilized multifactor models to state the relative performance of SRI mutual funds. This thesis's selected methodologies include CAPM, Fama and French three-, five-, and six-factor models. These methodologies have been selected in order to analyse portfolio performance under the factor approach and to analyse the difference among ESG leaders and laggards.

This thesis aims to contribute to previous literature on sustainable fund performance. It focuses on equity mutual funds traded in the United States and compares three levels of sustainable fund portfolios to the selected benchmark. The MSCI sustainability rating has been used to measure a fund's sustainability. Following the study done by Halbritter and Dorfleitner (2015), this thesis aims to divide funds into best-in-class and worst-in-class ESG portfolios by forming portfolios based on their sustainability rating. In addition to best-in-class and worst-in-class, a third portfolio was created to study the performance of funds between the two classes.

1.1 Purpose of the thesis and hypothesis construction

The main idea of this study is to investigate how sustainable funds have been performing compared to traditional funds. Research by Kahn & Sharples (2012), conducted on more than 100 scientific papers, found that most SRI fund performance results show unclear connections or neutrality. Less often, the connection was clear and positive. Additionally, Friede et al. (2015) find that in almost half of the cases, considering 2200 studies, the results were neutral. Nevertheless, the popularity of sustainable investing and the number of new sustainable funds entering the market is growing. In the thesis, three different fund levels were developed to understand the results of these sustainable funds. Therefore, the thesis aims to explore and gain a better understanding of sustainable fund performance over the latest 10-year period, during which there has been significant growth among investors. Since previous studies have used different measures to illustrate performance, as Revellini and Viviani (2015) state, it is predicted that employing a consistent methodology is essential and can highlight the conflicting findings from prior research.

Similar to a study by Nofsinger and Varma (2014), this thesis seeks to determine how sustainable mutual funds have performed during market downturns since the COVID-19 pandemic occurred during the study period. Kim, Li, and Li (2014) find that incorporating corporate social responsibility lowers the risk of sudden stock price collapse. Nofsinger

and Varma utilized the Carhart four-factor and the Fama-French three-factor models, but their study was conducted over 10 years ago. The research focus of this thesis is to perform a study that utilizes new data, concentrating on significant US-based equity mutual funds and incorporating the Fama and French five and six-factor models to analyze the effects of profitability and investment. This is done to predict if producing statistically significant alphas and positive risk-adjusted returns is possible. The hypothesis of this thesis will be the following:

H1: ESG implementation has a neutral effect on mutual fund performance on a risk-adjusted basis

Due to previous studies, the hypothesis is selected from a neutral perspective. This is based on both the findings and the challenges of measurement. Additionally, most studies yield mixed and neutral results, which supports the decision to establish a neutral hypothesis presented above. For example, Hamilton, Jo, and Statman (1993) find that SRI results in a statistically significant outcome, indicating neither clear overperformance nor underperformance. Although Hartzmark & Sussman (2019) state that investors value sustainability and are willing to accept even lower returns, many investors still prefer higher returns and therefore do not invest in sustainable investments.

In the thesis, investing in USA-based sustainable funds is expected to be rational regarding risk and return compared to index and conventional funds. The S&P 500 index, consisting of the biggest companies in the USA, has been selected as the benchmark index due to its versatility and performance. SRI investment performance varies among countries, and studies have found that, for example, in the United States and the United Kingdom, SRI underperforms compared to their conventional peers. Still, in France, for example, the difference among return differences is considerably smaller. (Renneboog et al., 2008.)

1.2 Structure of the thesis

This study starts with an introduction, purpose, contributions, and hypothesis construction. The second chapter presents the central concept used in this thesis. The third chapter consists of the theories used in this thesis. The fourth chapter is the literature review, which presents the different views on SRI performance. The fifth chapter introduces the data and methodology used. The sixth chapter presents empirical results and analysis. The seventh and final part is the conclusions, limitations, and ideas regarding future studies.

2 History of socially responsible investing

Before SRI, different religious groups, such as Jews, had some practices or rules connected to ethical investing. These included how to spend money and what kind of loans were allowed. According to the founder of Methodism, humans should not take advantage of others or spend their money immorally. Following that, in the 1920s, the Methodist church announced that it would not invest in immoral companies, including weapons. (Renneboog et al., 2008.)

The earliest fund considered sustainable as we know it today was introduced to the market in 1928. It was the Pioneer Fund, where ethical screening was utilized to exclude companies. Starting in the 1960s, people became more interested in social issues such as anti-racism. SRI history can be traced to the United States, where during the 1970s, people started paying more attention to companies' prohibitive actions. The first actual socially responsible investment fund was established in 1971. The Pax World fund originated in the United States and was published during the Vietnam War in Asia, and it took a stand on the war by avoiding investments related to war. Following that, during the 1980s, popularity grew as segregation problems were raised in South Africa. Also, the Chernobyl nuclear accident and the Exxon Valdez oil spill reflected the problems of the 1980s, which increased investors' attention. A subsequent 1995 survey of US investments classified as responsible by the U.S. Social Investment Forum reported an increase in the number of responsible investments. (Statman, 2000.) Originally driven by environmental concerns, the Global Reporting Initiative was created in 1997, and it later expanded to include other ESG factors. Consumers have also been willing to pay more for sustainable products since the 1990s. After 1995, only in the USA, the amount of SRI funds quadrupled in the next 10 years. (Renneboog et al., 2008.)

SRI concerns various groups such as universities, governments, and asset managers. (Renneboog et al., 2008.) Asset managers invest many trillions in targets that consider sustainability aspects. (Landier & Nair, 2008.) SRI is closely related to people's values and how to consider these in the decision-making process when selecting investments.

(Renneboog et al., 2008.) Value investing also gained popularity before the 2000s, in addition to shareholder activism. For example, voting to invest is expressing an opinion (Landier & Nair, 2008.) Due to this, investors in the market are willing to receive lower returns if SRI is integrated into the investment process. (Derwall et al., 2011.) Socially responsible investing has other names, such as ethical investing, responsible investing, and sustainable investing. These are often used as synonyms, but have slight differences and cannot be defined as synonyms.

SRI investing seeks to screen out companies from the portfolio if they do not satisfy selected criteria. (Renneboog et al., 2008.) Companies considered “sins” earn money by often engaging in unethical activities, such as investing in tobacco companies. (Landier & B. Nair, 2008.) Sustainable investors try to avoid investing in these types of companies based on their investment principles.

2.1 SRI principles

Socially responsible investing, or SRI, involves financial motives and ethical concerns. (Renneboog et al., 2008.) Based on research in 1972, Moskowitz showed that investing in responsible stocks is a way to generate profits. Before that, studies did not focus on that aspect. After that, more studies started to show similar results.

In 2006, the UN Principles for Responsible Investment, commonly known as PRI, established recommendations to help stockholders in investment practices. The guidelines, which consist of six voluntary principles that summarize the main idea of responsible investing, were founded by global institutional investors. Over a couple of thousand institutions have signed up in many countries. (PRI Association, n.d.)

The first principle is that ESG issues should be included in decisions and investment analysis. This can be done in various ways, such as promoting the development of ESG metrics. Another way is to motivate more research on the topic and train current executives to support their knowledge. (PRI Association, n.d.)

The second principal concern is limiting ESG matters to practices, policies, and active ownership functions. These include participating in social decision-making, such as incorporating new regulations and increasing investment managers' participation in ESG activities, such as reporting. (PRI Association, n.d.)

The third practice concerns disclosing ESG issues and information on invested organizations. This can be promoted through sustainability reporting and collecting information on how companies follow instructions such as global norms and by supporting ESG-promoting initiatives among shareholders. (PRI Association, n.d.)

The fourth practice concerns implementing and promoting undertakings in the investment business. Monitor the implementation of the principles in the companies and especially consider follow-up measures for those companies that do not meet expectations. Support companies in developing sustainability tools and clearly express ESG expectations. (PRI Association, n.d.)

The fifth practice is promoting effectiveness and working together. This includes addressing issues and developing initiatives. Part of it also involves actions related to how it is crucial to assist in investor learning and growth. (PRI Association, n.d.)

The sixth and final principle is about reporting progress and activities. Concerns are such as ESG integration and disclosing ownership activities. In addition, principal actions include utilizing the consciousness of reporting among shareholders. (PRI Association, n.d.)

In addition to these principles, the United Nations Global Compact has created 17 goals to consider when implementing sustainability into companies' operations. These goals include different objectives, such as promoting gender equality, strengthening quality education, and targeting zero hunger worldwide. These goals have other guidelines to support companies' achievement of them. Affordable and clean energy, for example,

suggests that sustainable energy belongs to everyone and can be achieved by taking care of the climate. The idea is to achieve these goals in the next 15 years, starting in 2015. (UN Global Compact, 2018.)



Figure 1. Sustainable development goals (UN Global Compact, 2018).

2.2 CSR

Corporate social responsibility (CSR) is considered for promoting sustainable development in the company. These actions are voluntary and, therefore, beyond legal requirements. CSR is a management concept that incorporates environmental and social aspects in company operations and considers stakeholders. In addition to environmental and social aspects, the financial side has not been forgotten. These three form a triple-bottom line, which describes the balance between the factors. (United Nations Industrial Development Organization, n.d.)

Implementing CSR can help companies, for instance, engage stakeholders, confirm corporate governance, and improve equality. In addition, CSR can bring many competitive advantages, such as higher sales or reduced operational costs. Intangible benefits, including customer loyalty, can also rise. (United Nations Industrial Development Organization, n.d.)

2.3 ESG

Sustainable investing introduced ESG. ESG stands for responsibility reporting; the three letters mean environment, social responsibility, and good governance. Environmental ESG factors can be embedded into portfolio decision-making to promote sustainable development. Sustainable investing concerns short and long-term effects. (Global Sustainable Investment Alliance, 2021.) The term ESG was initially introduced by the United Nations in 2004. (United Nations, 2004.) The report consists of guidelines for financial market participants.

Environmental factors concern various aspects that affect nature. These include more significant problems such as climate change, pollution, and toxic waste. Issues also concern increasing transparency. Social factors are all about humans and society. These factors include increasing inclusion, improving community relations, and promoting workplace safety. In addition, improving transparency is part of the issue. Governance factors are practices that affect corporate governance, particularly engaging shareholder rights, improving board structure, and assisting executive compensation. Furthermore, reducing bribery is a concern. (United Nations, 2004.)

2.4 Sustainability ratings

An ESG rating was created to measure sustainability. Several sustainability rating providers aim to provide information on how companies consider sustainability in their practices and can also help by raising awareness and knowledge. This thesis concentrates on Thomson Reuters, Morningstar, Sustainalytics, and MSCI ESG ratings. With these ratings, sustainable investments can be compared more easily.

The first one is Thomson Reuters, founded in 2008 when Reuters and Thomson Corporation merged. Thomson Reuters issues ESG scores and other relevant information to help investors, such as the controversy score, which is broader than the ESG score.

Thomson Reuters has a large amount of data available, considering many companies worldwide. Thomson Reuters data is of high quality and is constantly being improved. Thomson To measure ESG performance, ten themes are considered, all weighted. In the model, there are four social themes, one more factor than in governance and environmental aspects, which have three. Social themes consist of human rights and the environment, while having emissions in scope and governance, in turn, shareholders. The principal ESG rating level is A+, and in descending order all the way to D-. Evaluation is also given both in numerals and percentages. (Thomson Reuters, 2017.)

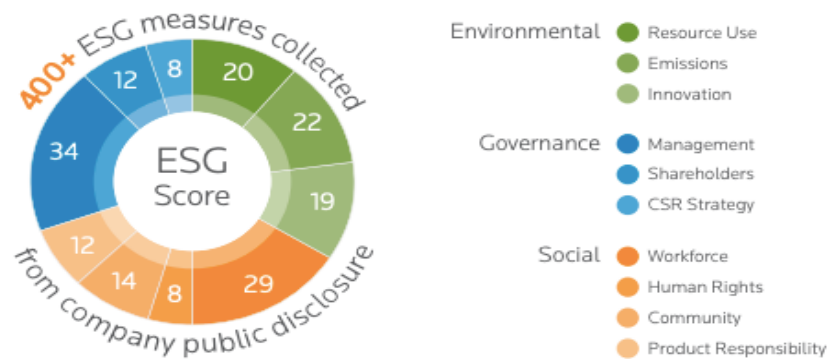


Figure 2. ESG score (Thomson Reuters, 2017).

Morningstar is a USA-based financial sector company founded in 1984. It introduced its sustainability rating in 2016. The main idea of the Morningstar sustainability rating is to help investors understand ESG risks and guide them in managing them. Morningstar sustainability rating categories are identified as globes. The ranking of globes is from the highest 5 to the lowest 1. (Morningstar 2021.)

Sustainalytics is owned by Morningstar, a well-known company that focuses on providing analytics and research on ESG. Sustainalytics provides data, knowledge, and grading for investors and other market participants. With these details, it is easier to identify numerous ESG risks. To measure ESG risks, material ESG issues, corporate governance, and idiosyncratic ESG issues are considered based on industry-specific ESG information. Also,

the company's management is assessed, and risks related to ESG are considered. Based on how well the company is doing, the company can get five types of results. The best one is negligible, and from then on, in ascending order, low, medium, high, and the worst, which is severe. (Sustainalytics, 2023.)

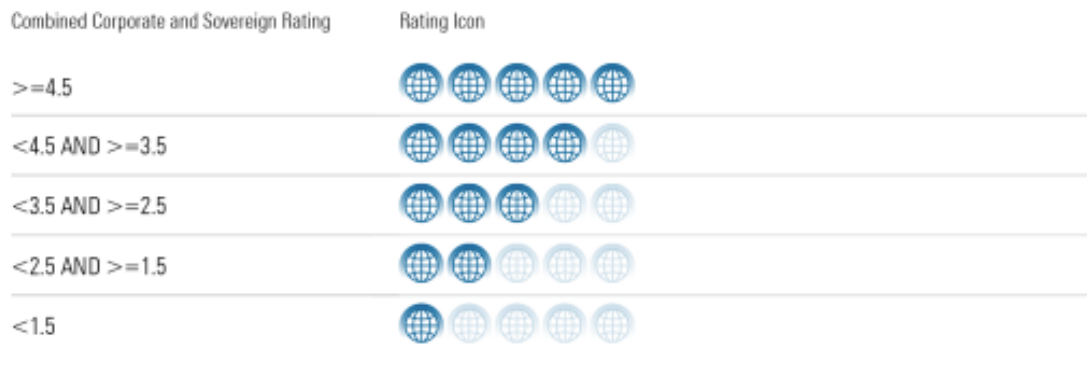


Figure 3. Morningstar sustainability rating (Morningstar, 2021).

Morgan Stanley Capital International, shortly referred to as MSCI, is a more than fifty-year-old investment research company that provides ESG and traditional data for different investors. Data used in the evaluation is collected from publicly available sources to increase transparency and guide financial market participants in making sustainable investment decisions. The MSCI ESG rating aims to determine how soundly companies consider ESG standards and evaluate companies' risk exposure. In addition, ESG opportunities are identified. ESG rating evaluation can be done for different objects such as bonds, countries, and mutual funds. However, the ESG rating is industry-specific, so other issues are identified based on the industry. When calculating, both industry leaders and laggards are taken into consideration, and they are compared with each other. Critical problems focus on the long term. The ESG score is based on three pillars: environment, social, and governance. Each of these is split into smaller subgroups to get a broader view. MSCI has a category to classify the performance. The leader is the highest of this category and, therefore, the most sustainable, which gives either AA or AAA. The medium is average, either BB, BBB, or A. The worst of these is the laggard, either CCC or B. (MSCI, 2023.)

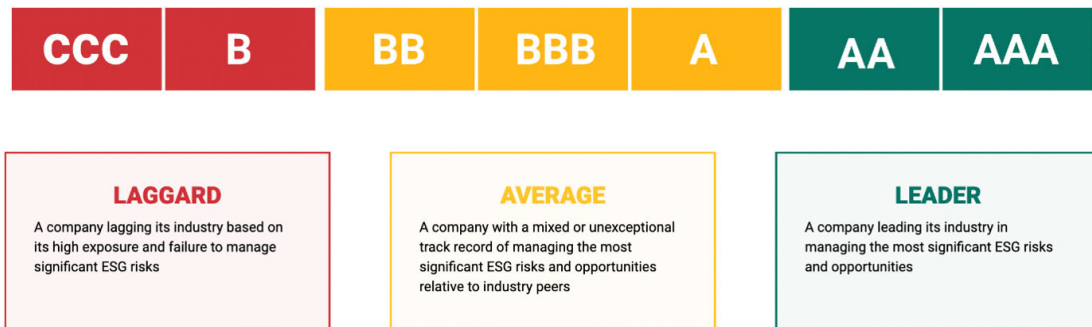


Figure 4. MSCI sustainability rating (MSCI, 2023).

Around 60% of MSCI ratings fall under average, with ratings of either BB, BBB, or A, indicating that risk and opportunities are considered but not widely prioritized in companies. A minority of ESG ratings have received a laggard, so either CCC or B. Best-rated companies construct around 20%, either AA or AAA. (MSCI, 2023.)

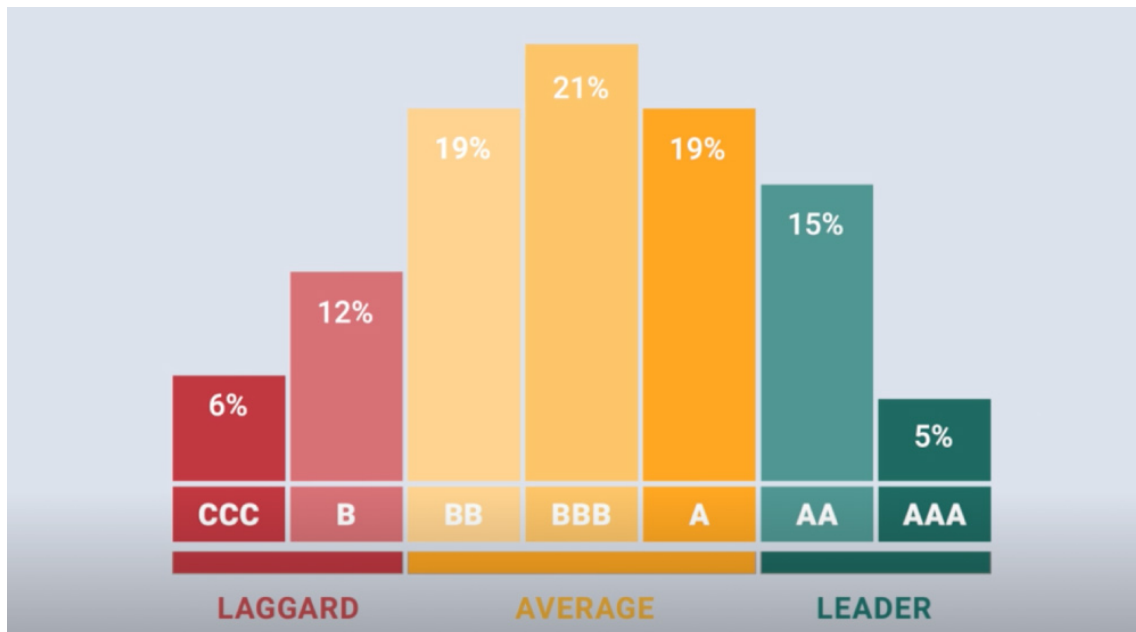


Figure 5. MSCI sustainability rating chart (MSCI, 2023).

There are also problems related to measuring ESG scores. First, different ESG score providers can give different ESG scores for the same companies. Berg et al. (2022) find that

the correlation between ESG rating providers differs significantly. In their study, Berg et al. compare six different ESG score providers and conclude that this makes it difficult to evaluate the performance of investment instruments. They also state that this confuses companies and makes it harder to improve their ESG score. Their findings state that the average pairwise correlation among the rating agencies is between 38% and 71%. This study shows how important it is to be critical and emphasizes the importance of comparison.

2.5 SRI investment strategies

There are several ways to invest based on SRI. In 2021, the Global Sustainable Investment Alliance published a review that discusses seven strategies. These include negative/exclusionary screening, positive screening/best-in-class selection, norms-based screening, ESG integration, sustainability-themed investing/thematic investing, impact and community investing, corporate engagement & shareholder action. Of these strategies, negative/exclusionary screening was the most used. Another popular one was ESG integration. The popularity of the system depends on the geographical location. Canada was the fastest-growing country based on location from 2018 to 2020. (Global Sustainable Investment Alliance, 2021.)

The negative/exclusionary screening idea is to screen companies from portfolios that are considered unsatisfactory based on ESG factors. ESG criteria are set for companies, and if a company is involved in controversial product categories such as doing business in fossil fuels, tobacco, or weapon fields, it will be negatively screened from the portfolio. This also applies to corruption, which is considered an unwanted company practice. (Global Sustainable Investment Alliance, 2021.)

On the other hand, the best-in-class/positive screening idea is to select investments with high ESG performance. Therefore, a cornerstone is investing in companies with high ESG performance compared to competitors. Also, an attempt is made to investigate which

companies could benefit from the changes or development brought by sustainability. (Global Sustainable Investment Alliance, 2021.)

In norms-based screening, investments are screened for conformity with rules and international standards. In addition, combinations of standards addressing ESG issues are considered. (Eurosif, n.d.) These are relative to norms made by the United Nations. (Global Sustainable Investment Alliance, 2021.)

ESG integration means that in financial analysis, all three ESG areas are incorporated by asset managers. (Global Sustainable Investment Alliance, 2021.) This operation concerns opportunities and risks. Possible negative and positive effects of integration on firms' financial performance are also taken into account. All this is based on adequate research and viable sources. (Eurosif, n.d.)

Sustainability-themed/thematic investing involves selecting investments in targeted social and environmental sustainability areas. These include diversity and sustainable agriculture. (Global Sustainable Investment Alliance, 2021.) Investors can also select investments focusing on specific themes or sustainability assets. (Eurosif, n.d.)

The impact investing idea is to initiate a positive impact on environmental and social aspects while generating a return. Hence, this implies the need to report and gauge the effect. In turn, community investing aims to provide capital for financing purposes that have environmental or social benefits. (Global Sustainable Investment Alliance, 2021.) These two can include entrepreneurship funds and microfinance. (Eurosif, n.d.)

Corporate engagement and shareholder action denote how shareholders can act so that the company's management considers ESG. This can be done by, for example, voting, which usually takes a longer period to generate a change inside the company. Engagement also intends to increase transparency. (Eurosif, n.d.)

2.6 Sustainable funds

Sustainable funds differ in their investment decisions and sustainability factors. Several financial service participants offer sustainable fund options. Many funds have also changed their previous conventional benchmark to follow a benchmark according to the definition of ESG. ESG funds are also often more actively managed since stock selection takes time (Barnett & Salomon, 2006.) This is due to the screening criteria. These companies are also better prepared for future risks, and their economies can be more stable.

SRI-wise, sustainable mutual funds are the simplest way for retail investors to invest. Investing in SRI funds is particularly popular among middle-aged investors. On average, middle-aged investors are wealthier, take on more risk, and have more education. (Christen et al., 2023.)

Figure 6 below illustrates sustainable fund AUM development in the United States. Sustainable fund AUM increased clearly during 2018-2023, with an especially rapid increase in 2020-2021. The reason for this is the increase in the general level of interest related to sustainable investments worldwide. The trend slowed down in 2022 due to the market downturn but increased again in 2023 (Morgan Stanley, 2023.)

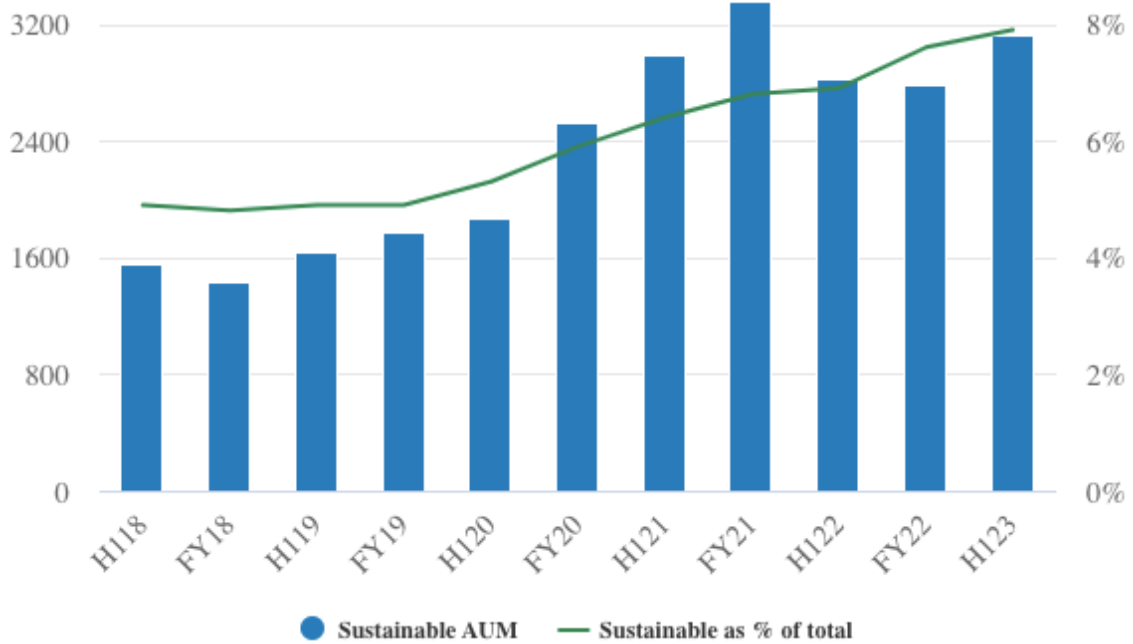


Figure 6. Sustainable Funds' AUM In U.S. Dollar Billions (Morgan Stanley, 2023).

Worldwide, the majority of sustainable funds are located in Europe (Morgan Stanley 2023.) Figure 7 illustrates that 85% of sustainable funds are located in Europe, 3% in the Asia and Pacific region, and 11% in North America. (European Sustainable Investment Study, 2024.) Based on EU regulations, sustainable funds are divided into three categories. (Eur-Lex, 2020.) The most responsible of these are the dark green funds, which are based on Article 9. Article 9 concerns making sustainable investments. Then there are light green funds, which are based on Article 8. Article 8 concerns promoting specific sustainability factors. In addition, the responsible funds that do meet the conditions of the previous Articles fall under Article 6. Article 6 concerns other investment funds that are not as responsible as the previous ones. (Eur-Lex, 2020.)

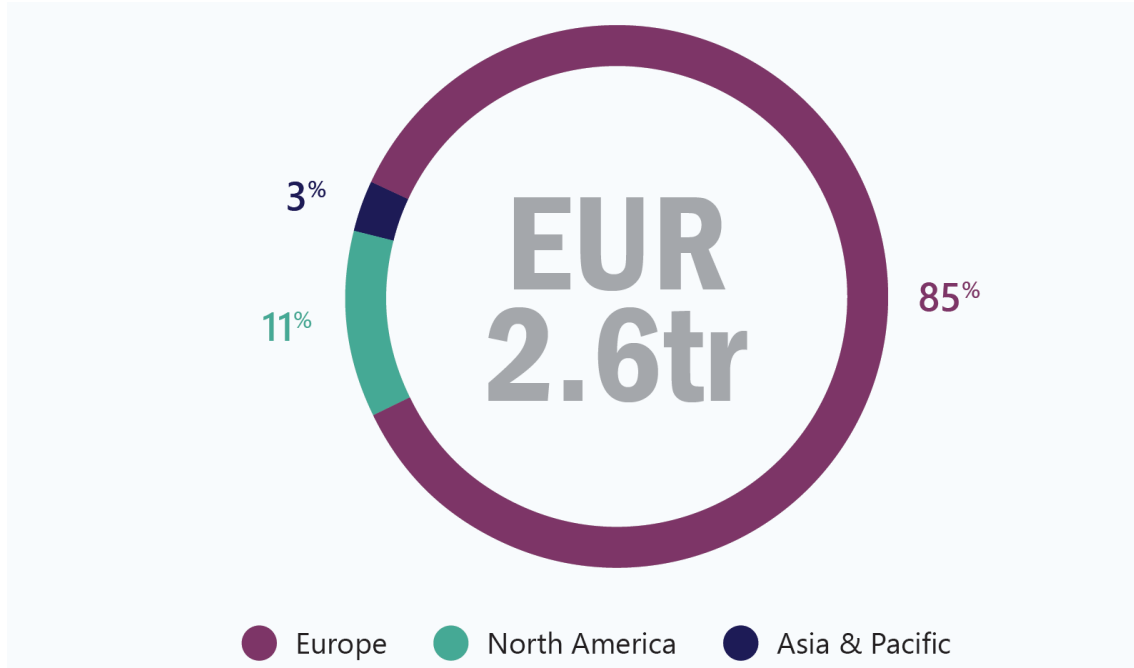


Figure 7. Breakdown of sustainable funds by region at the end of 2023 (European Sustainable Investment Funds Study, 2024).

The use of restriction screening has grown rapidly in recent years. Figure 7 below illustrates annual growth, which has accelerated since 2019. The core of the screening is that, due to prerequisites such as avoiding investments in controversial weapons, growth has been accelerated by the Sustainable Finance Disclosure Regulation (SFDR). SFDR is established by the European Union and has concerned asset managers in Europe since 2021. As a result, more than half of the funds in Europe utilize screening, whereas the equivalent in the United States is only about a couple of percent. (Morgan Stanley, 2023.)

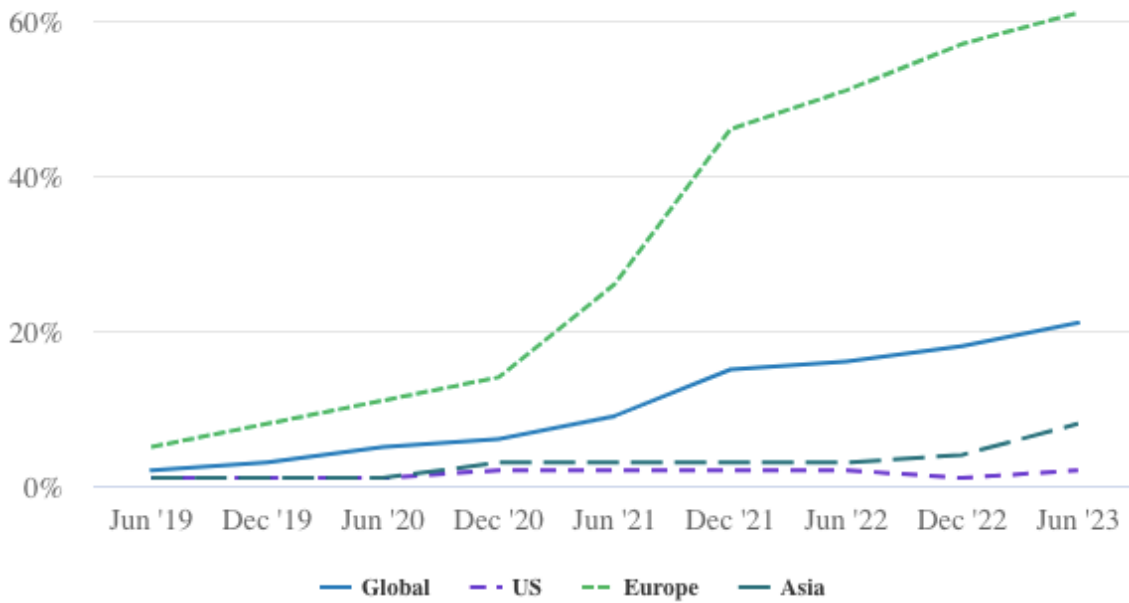


Figure 8. Rates of Restriction Screening Rose in Europe After SFDR (Morgan Stanley, 2023).

2.7 Greenwashing

Greenwashing means actions that a company takes to show to the public that it considers nature, even when it does not. These actions can be either completely unfounded or exaggerated. Neither way does this attract attention based on false claims. The Sustainable Finance Disclosure Regulation by the EU 2019/2088 concerns increasing transparency and preventing greenwashing (Europa EU, 2022.)

Problems regarding greenwashing are that it is hard to measure and is a relatively new phenomenon. There is also not a lot of research on the subject yet, and it can be difficult to verify in practice. To tackle this problem, the United States Securities and Exchange Commission, shortly referred to as the SEC, accepted a new investment requirement to reduce ESG abuse in the market (Gillison et al., 2023.)

Greenwashing also affects mutual funds. Mutual funds must report their category, as this influences the sustainability of the fund. However, challenges arise because the

classification is not conducted by an external party, which creates the possibility that the fund may not be as responsible as reported. SFDR has still increased investor confidence related to sustainability. (Birindelli et al., 2023.)

One way for investors to find ESG investments is by the instrument's name. The European Securities and Markets Authority (ESMA) published new guidelines in 2024 regarding the requirements that investments need to fulfil to have a fund name that implies sustainability. Under the new regulation, investments must follow Paris Aligned Benchmark criteria (PAB), and almost all assets in the fund must meet the conditions of responsibility. Paris Alignment Benchmark criteria concern exclusions that the fund must follow, such as the maximum amount of revenue that can come from coal. Guidelines also included transition category-related requirements when the name implies that the fund is improving its ESG enhancements. One of the world's largest asset managers, BlackRock, has announced that some of its funds will either change the name, add a transition-related term, or reclassify the fund under Article regulation. The new regulation will enter into force in May 2025. (Segal, 2025.)

3 Theoretical framework

The theoretical background provides information to better understand the topic of sustainable funds. ESG and its consideration cause differing opinions among researchers. Some theories argue over a positive impact, while others argue over a neutral or negative impact. Therefore, it is useful to understand the background of different theories to form a basis before going deeper into the topic.

3.1 Shareholder theory

Nobel Prize winner in economics Milton Friedman (1962;1970) created the shareholder theory, which suggests that a company's major objective should be to provide as much profit as possible to the people who own the company, i.e., shareholders. Therefore, operations that do not bring revenue are unwanted. In decisions, companies should prioritize shareholders and provide value for them.

According to Friedman (1962;1970), it is not the firm's responsibility to consider environmental factors since it provides a financial benefit for the company. Friedman argues that when a company is doing well financially, it has a positive impact on society. The theory's main concern is the shareholders' needs, and incorporating ESG is not part of that. In addition, agency problems have been brought up since they, too, can cause conflicts. Friedman also claims that if investors want to consider SRI, they should invest in conventional funds and, with the proceeds they get, use the money to achieve sustainable targets. Therefore, he mainly provides a critique of sustainability. On the contrary, Porter and Kramer (2011) propose that shared value should be emphasized over earnings only. In addition, by incorporating CSR, companies can create more returns in the future.

3.2 Stakeholder theory

R. Edward Freeman (1984) established stakeholder theory that stresses the importance of stakeholders and how to provide value to them. Stakeholders include those interested in the company's decisions, such as owners, customers, and management. Freeman emphasizes that in the modern world, it is not enough to generate just share value. Indeed, much more is needed. With this, Freeman points out that people from different parts of the company and society should be considered. Also, positive effects within companies should be targeted.

Freeman states that in the company, ESG factors should be considered. All three ESG factors should be emphasized. By doing that, every counterparty, like customers and employees, is included. Also, by attempting to evaluate these aspects equally, the entire company's operations should improve. (Freeman, 1984.)

3.3 Institutional theory

The institutional theory was founded originally by Brian Rowan and John Meyer in 1977. The idea behind the theory is how different organizations contest norms and rules in society so that they survive, but also seem to be legitimate. At the center of the theory are organizations and institutions, and their role in society. (Rowan & Meyer, 1977.)

With rising interest in corporate social responsibility, institutional theory is often used as a framework. Theory helps to understand the role of CSR. CSR is seen as voluntary, but theory proposes that it would consider more areas deeper such as state regulation and market, regarding economic governance. Theory refers to which type of forces that affect the operations and way of behaving in firms. Theory expects that if something changes in society, then the company will try to change accordingly. Institutional theory helps to understand the requirements of companies in society. (Brammer et al, 2012.)

3.4 Legitimacy theory

To understand the connection between sustainability disclosure and sustainability performance theories, such as legitimacy, was identified. Legitimacy theory is widely used in mandatory sustainability reporting and covers the legitimacy aspect. Legislation helps companies to report on sustainable matters and motivates firms to ensure their legitimacy. (Chelli et al, 2014.) According to legitimacy theory, companies that are not performing well based on sustainability try to avoid a bad reputation. Therefore, these companies are not as transparent as more sustainable companies. Hummel & Schlick (2016) find in their study that the connection is robust and negative among sustainable companies. On the contrary, voluntary theory finds relationships to be positive and sustainable companies also inform about their high performance. Legitimacy theory is used to encourage companies to embrace ESG factors in their operations.

3.5 The Efficient Market Hypothesis

An efficient market means that information in the market is reflected in each of the asset prices. An efficient market provides, therefore, prices that are valued correctly. The Efficient Market Hypothesis, which was introduced by Eugene Fama (1970) states that it is not possible to beat the market unless you are considered lucky. According to Fama, there are three options for the financial market to be considered an efficient market. First of this is that there should be no cost regarding transactions. Then all needed information should be openly available for financial participants, and lastly, transaction participants should concur on how available information influences the prices on the market. When all of these are satisfied, then the market is considered efficient.

The efficient market hypothesis has three different dimensions. Weak efficiency, semi-strong efficiency, and strong efficiency. Starting from weak efficiency, which means that security prices are constructed using all available past data. Therefore, historical returns, volumes, and prices form the base for pricing. This causes an inability to adjust to new

information from the financial market. Due to this old information, beating the market is hard. (Fama, 1970.)

Compared to the previous one, semi-strong efficiency adds on yearly reports, stock split announcements, and other publicly available information. Therefore, assets are appropriately valued. However, is it impossible for a single investor to profit from released news since financial markets respond immediately to new information. Furthermore, relying just on publicly available data is insufficient. (Fama, 1970.)

Adding on to the two previous ones' strong form presupposes that all information is available to every investor. All information consists of both public and private, which influences the asset values. Due to these, excessive returns based on mispricing and private knowledge are not feasible. However, this is an almost impossible situation on the market, but it is possible in an ideal world. (Fama, 1970.)

3.6 Modern portfolio theory

In the year 1952, Henry Markowitz published an article regarding portfolio selection. In the paper, Markowitz explains how modern portfolio theory advises investors on how to create efficient investment portfolios with diversification to create returns with appropriate levels of risk. According to Markowitz, diversification is a way to minimize unsystematic, unwanted risk. Risk in theory is defined as variance, and a small variance is ideal.

Portfolio selection is also a major factor in the theory and it should be formed by minimizing risk and at the same time by maximizing return. Assets in the portfolio should have a low correlation. The ideal situation would create a portfolio that is not overly risky due to investor preferences. In terms of covariance, it is not ideal to have too high covariance. All modern portfolio theory-based portfolios are diversified to prevent a crash when a specific asset underperforms. (Markowitz, 1952.)

The efficient frontier illustrates portfolios that provide the highest expected return for a given amount of risk, or the lowest risk for a given predicted return. (Markowitz, 1952). Pederson et al. (2021) state that the ESG-efficient frontier helps investors find the desired portfolio. This can be done by computing the Sharpe ratio at every level of ESG. The ESG-adjusted capital asset model was used in the research to set equilibrium prices of assets. According to the study, there are three different categories of ESG investors which are unaware, aware, and motivated. The last one values ESG the most about ESG and selects investments based on excessive ESG scores. The results of the ESG-CAPM model depend on what type of investors are the most. If most of the investors are ESG-motivated, then high ESG stocks end up with lower returns, since, due to a high level of sustainability, investors do not expect as great returns since it is not their highest priority. On the contrary, if a majority of investors are ESG-unaware, then high-ESG stocks provide elevated anticipated returns.

3.7 Methods of Financial Evaluation of Mutual Fund

Mutual funds aim to develop an efficient portfolio by combining maximum return with risk diversification. Mutual fund managers make the decisions regarding asset allocation. They manage fund performance and choose stocks. They aim to create excess returns and outperform the market. (Kumar & Singh, 2022.)

Investing in mutual funds is a simple way for investors to invest. Benefits include lower risk, higher diversification, no responsibility for individual stock selections, tax benefits, and reasonably low costs. Also, investors themselves do not have to be concerned about market timing. This allows for more effective security selection, resulting in more significant returns. (Kumar & Singh, 2022.)

3.7.1 Sharpe ratio

A well-known economist, William Sharpe (1966), found the Sharpe ratio to measure investment return with risk. The model's longer name is reward-to-volatility. The Sharpe

ratio reflects risk-adjusted return and can be used to evaluate investments. This helps investors assess a mutual fund's performance. Sharpe's ratio is calculated by dividing the average excess return of an asset over a specific time frame by its standard deviation. (Bodie et al., 2014:840.) The equation will be presented in the following:

$$\text{Sharpe Ratio} = \frac{R_p - R_f}{\sigma_p} \quad (1)$$

where:

R_p = portfolio return

R_f = risk-free rate

σ_p = portfolio standard deviation

3.7.2 Treynor ratio

Jack Treynor (1973) created the Treynor ratio to compute the reward-to-volatility ratio. The Treynor ratio and the Sharpe ratio are closely related since they start in the same way with excess portfolio return. The key difference is that instead of using portfolio volatility, the Treynor ratio uses the portfolio's beta. In the Treynor Ratio formula, instead of using total risk like in the Sharpe ratio, systematic risk is used to measure each risk unit. (Bodie et al., 2014:840.) The equation will be presented in the following:

$$\text{Treynor Ratio} = \frac{R_p - R_f}{\beta_p} \quad (2)$$

where:

R_p = portfolio return

R_f = risk-free rate

β_p = portfolio beta

3.7.3 Jensen's alpha

Michael C. Jensen (1968) invented Jensen's alpha, and this equation is used when measuring portfolio performance. Jensen's alpha values individual return against the whole market return. Compared to CAPM, alpha is added as a factor for excess return and is referred to as a single-factor model. In other words, Jensen's alpha refers to the average return on a portfolio that exceeds the CAPM's prediction based on the portfolio's beta and average market return. (Bodie et al., 2014:840.) The equation will be presented in the following:

$$\alpha = E(R_i) - R_f + \beta[E(R_m) - R_f] \quad (3)$$

where:

R_m = market return

R_f = risk-free rate

β = beta

$E(R_i)$ = expected return of an asset

3.7.4 Capital asset pricing model

In the 60s, the capital asset pricing model (CAPM) was introduced by Moss in 1966, Litterer in 1965, and Sharpe in 1964. CAPM, the capital asset pricing model, is a single-index model widely used when measuring mutual fund returns. The CAPM consists of Jensen's alpha mentioned earlier, and it estimates performance under and out comparative to the market. (Bauer et al., 2005.) The equation will be presented in the following:

$$R_{it} - R_{ft} = \alpha + \beta_i(R_{mt} - R_{ft}) + \varepsilon_{it} \quad (4)$$

where:

R_{mt} = market return at time t

R_{ft} = risk-free rate at time t

β_i = beta

R_{it} = Return of an asset at time t

α = alpha

ϵ_{it} = error term

According to Fama and French (2004), there are two criticisms of CAPM. Firstly, CAPM states that returns can be explained by factor beta. In reality, value stocks actually outperform growth stocks, and CAPM does not suggest this point of view. Secondly, CAPM faces different assumptions that are not realistic, such as that the only risk is market variance, even if investors face different risks, such as labor income and possibilities to invest in the future. In conclusion, beta alone is not a reliable way to measure risk.

3.7.5 The Fama and French three-factor model

In 1993, Fama and French generated the three-factor model. The three factors in the model are CAPM, small minus big (SMB), and high minus low (HML). SMB is related to risk compared to company size. HML provides information related to value and indicates that low-to-book-to-market stocks underperform relative to high-to-book-to-market value stocks. (Fama & French, 1993.) The equation will be presented in the following:

$$R_{it} - R_{ft} = \alpha + \beta_1(RM_t - R_{ft}) - \beta_2SMB_t + \beta_3HML_t + \epsilon_{it} \quad (5)$$

where:

R_{it} = total return of a stock or portfolio I at time t

R_{ft} = risk-free rate of return at time t

RM_t = total market portfolio's return at time t

$R_{it} - R_{ft}$ = total market portfolio's return at time t

$RM_t - R_{ft}$ = excess return on the market portfolio

SMB_t = size premium (small minus big)

HML_t = value premium (high minus low)

$\beta_{1,2,3}$ = factor efficiencies

ϵ_{it} = error term

The Fama and French three-factor model is the extension that tries to tackle the issues that are presented towards the CAPM, since it considers the size effect and value effect, which are the factors that have an impact on investors' expected return. (Fama & French, 2004.) (Fama & French, 1993.)

3.7.6 Carhart four-factor model

Carhart introduced the four-factor model in 1997. It consists of four different risk factors, which are market risk, size, book-to-market value, and momentum. The Fama and French three-factor models drive it, in addition to the momentum anomaly of one year introduced by Jegadeesh and Titman. The equation will be presented in the following:

$$R_{it} - R_{ft} = \alpha + \beta_1(R_{mt} - R_{ft}) - \beta_2SMB_t + \beta_3HML_t + \beta_4MOM_t + \epsilon_{it} \quad (6)$$

where:

R_{it} = total return of a stock or portfolio I at the time t

R_{ft} = risk free rate of return at time t

RM_t = total market portfolio's return at time t

$R_{it} - R_{ft}$ = total market portfolio's return at time t

$RM_t - R_{ft}$ = excess return on the market portfolio

SMB_t = size premium

HML_t = value premium

MOM_t = momentum

$\beta_{1,2,3,4}$ = factor efficiencies

ϵ_{it} = error term

The formula is the extension of the Fama and French three-factor model presented earlier, since the MoM factor is added to the equation. The MoM is equivalent to the deduction of the average of high-yield portfolios and low-yield portfolios. (Carhart, 1997.)

3.7.7 Fama and French five-factor model

In addition to the three-factor model, Fama and French introduced the five-factor model in 2015, which added robust minus weak (RMW) and conservative minus aggressive (CMA). RMW means robustness factor and compares low portfolio companies to high portfolio companies. CMA is an investment factor related to the difference between low- and high-investment-rate companies. The equation will be presented in the following:

$$R_{it} - R_{ft} = \alpha + \beta_1(RM_t - R_{ft}) - \beta_2SMB_t + \beta_3HML_t + \beta_4RMW_t + \beta_5CMA_t + \epsilon_{it} \quad (7)$$

where:

R_{it} = total return of a stock or portfolio I at time t

R_{ft} = risk-free rate of return at time t

RM_t = total market portfolio's return at time t

$R_{it} - R_{ft}$ = total market portfolio's return at time t

$RM_t - R_{ft}$ = excess return on the market portfolio

SMB_t = size premium (small minus big)

HML_t = value premium (high minus low)

RMW_t = robust premium

CMA_t = investment premium

$\beta_{1,2,3,4,5}$ = factor efficiencies

ϵ_{it} = error term

3.7.8 Fama-French six-factor model

In 2018, Fama and French included the last factor in their model, which is up-minus down. (UMD) describing momentum. The momentum factor states that recent past downside momentum stocks underperform relative to upside momentum stocks. The equation will be presented in the following:

$$R_{it} - R_{ft} = \alpha + \beta_1(RM_t - R_{ft}) - \beta_2SMB_t + \beta_3HML_t + \beta_4RMW_t + \beta_5CMA_t + \beta_6UMD_t + \epsilon_{it} \quad (8)$$

where:

R_{it} = total return of a stock or portfolio I at time t

R_{ft} = risk-free rate of return at time t

RM_t = total market portfolio's return at time t

$R_{it}-R_{ft}$ = total market portfolio's return at time t

RM_t-R_{ft} = excess return on the market portfolio

SMB_t = size premium (small minus big)

HML_t = value premium (high minus low)

RMW_t = robust premium

CMA_t = investment premium

UMD_t = momentum premium

$\beta_{1,2,3,4,5,6}$ = factor efficiencies

ϵ_{it} = error term

This thesis utilizes CAPM, the Fama-French three-factor model, the Fama-French five-factor model, and the Fama-French six-factor model. Even if the Carhart four-factor model is used to test the adjusted return of SRI portfolios, the Fama-French six-factor model tackles the MoM factor, so it is not relevant to use both to test the performance.

4 Literature review

In this chapter, relevant previous literature will be reviewed. There have been several studies researching the connection between ESG and performance. According to Friede et al. (2015), there are three types of results on ESG performance. Their article consists of 2200 research studies, and they found that the connection between ESG and performance is positive in 48% of cases, neutral in 41% of cases, and harmful in 11%. To better understand the connection literature review goes through these three types of possibilities. Moreover, many studies also focus on whenever a specific time return changes, like during the COVID-19 pandemic. Since 2015, the Paris Agreement has also been affected since more and more countries started to consider their environmental acts, and this has also gained more interest among investors. (Agoraki et al., 2023.)

4.1 Positive SRI performance

One of the earliest supporters of ethical investing was Mallin et al. (1995), who investigated ethical funds in the UK from 1986 to 1993. According to their study, it is possible to outperform conventional peers in the United Kingdom. The findings include returns on a raw and risk-adjusted basis, concluding that ethical and non-ethical funds are generating underperformance when compared to the market index. However, the findings suggest that ethical funds are performing better than non-ethical funds, which could be because of the growing premium.

The following study suggests a similar approach in terms of results. According to Derwal et al. (2011), it is proven possible to get a positive return, even if investors invest responsibly. They studied the performance of stocks between 1992 and 2008 and found that both controversial stocks and sustainable stocks were able to generate positive returns. They used, for example, the Carhart four-factor model and showed that portfolio performance can be upgraded with SRI.

Nofsinger and Varma (2014) discovered that SRI funds achieved higher risk-adjusted returns during the economic crisis than conventional funds during 2000-2012. The study concerns the United States and uses the Carhart four-factor and Fama-French three-factor models. They state that SRI reduces risk and leads to higher returns during the financial crisis than conventional funds, although conventional funds produced higher returns during the regular market.

Verheyden et al. (2016) state that risk-adjusted stock returns and ESG factors are positively correlated in their study period, 2000-2015. Their research uses best-in-class ESG screening to get the best 10% performing stocks, and they construct six equity stock portfolios. The result of these portfolios is compared to each other. In addition, they investigate the relations of stocks in two universes; the first consists of mid-cap stocks of developed and emerging markets, and the second is both mid-cap stocks and large-cap stocks from developed markets. They also find that stock downside risk lowers at the daily stock level due to ESG screening.

According to Lins et al. (2017), SRI stocks can generate higher returns during a financial crisis than their conventional peers. These findings support the previous views of Nofsinger and Varma in 2014. In turn, they also find that whether the financial crisis was over, the sample's performance returned to the same level. The study states investors trust SRI companies more during market downturns, which can explain their performance.

After the observations of Lins et al. (2017) and Albuquerque et al. (2019) state that one benefit of sustainability is to be able to deviate from competitors. This view increases the number of benefits that sustainability can create. Sustainability can also increase the commitment of investors and be shown as higher returns. They also state that systematic risk can be lowered with CSR.

According to Matallin-Sáez et al. (2019), it is possible to generate a greater return if investors select to invest in top-performing ethical sustainable funds globally. This can be done by selecting to invest funds that have been performing well in the past. Within the fund, this required the portfolio manager to skillfully pick shares to invest. The authors used Carhart's four-factor model to model the performance of the funds, and they did not use a conventional benchmark.

Abate et al. (2021) examined how the level of ESG affects mutual fund performance in Europe. They chose to compare two levels of ESG, which are high and low. Their results state that funds with higher ESG scores performed better. This supports the idea that a high sustainability score also leads to good returns.

Supporting the previous views of Nofsinger and Varma (2014) and Lins et al. (2017), Agoraki et al. (2023) found in their study that COVID-19 had a positive effect on green asset performance. They used quantile regression and collected data from three major sustainable investment funds. They discovered that the strongest effect was from the sustainable funds that started from negative returns. They point out that sustainable investments do not suffer as much from crisis periods.

Christen et al. (2023) discovered that SRI investing is more popular among the younger generation. Instead, among the older generation, it was more common to invest based on charitable reasons. They found that conventional investors lose to SRI investors when generating higher returns.

4.2 Neutral SRI performance

In 1972, Moskowitz created a study to determine whether financial performance is related to corporate sustainability. The study was especially important because it was one of the earliest studies. Even though the results indicated that excess return was not found, Moskowitz was hopeful that a positive connection could be established.

According to a study by Bauer et al. (2005), there was no difference in return between traditional and sustainable mutual funds. However, the differences between the portfolio managers and the funds' expenses make the comparison harder. The authors used both the Carhart four-factor model and CAPM to measure the performance. Statman & Glushkov (2016) agreed that there were no differences in sustainable fund index returns compared to the S&P index. They, in turn, used a six-factor model to better understand the effect of sustainability. Therefore, they added two factors in addition to the four-factor model. The findings of the study state that some sustainable funds do not exclude all investment targets, which, based on sustainability, should not be invested in. So, the model helps to identify these weaknesses of funds.

Regarding international mutual funds, Leite and Cortez (2014) found no apparent connection when using multifactor models, indicating that ethical investing could lead to higher returns. In the study, socially responsible funds were compared to their conventional peers in Europe. An important finding was that it is more reasonable to use conventional funds as a benchmark than to use sustainable indices due to comparability.

Due to the methodology used, Revelli & Vivini (2015) state that many studies have either neutral or mixed results. Therefore, it is essential to select the correct methodology. They also found that fund managers are in a key position since it is their responsibility to create returns for the portfolio. Their international study also paid attention to aspects that sustainability has gained. They also claim that SRI possible already been considered and therefore not beneficial to point it out that much.

Leite et al. (2017) performed a study on socially responsible funds in Sweden. Their findings conclude that funds that had holdings in Europe were performing the same as conventional funds. They found that the reason for this can be explained by the fund manager's abilities. If fund managers had picked better-performing stocks instead of poor then the results could be different. They used in their study the CAPM and the Carhart four-factor model.

Ibikunle & Steffen (2017) conducted a study on mutual funds considered black, conventional, and green. Mutual funds were European-based, and the study period was from 1991 to 2014. Most of the funds in the sample were conventional, and the least amount consisted of green funds. They found that conventional funds achieved the best returns among the three alternatives. When comparing green and black funds to each other, they discovered that risk-adjusted returns were almost the same. However, it is worth noting that the green funds improved their return over time. Green funds also exceeded their black competitors at the end of the period when using the CAPM and Carhart four-factor model.

According to Hartzmark & Sussman (2019) majority of investors value sustainability, and many investors would prefer to select high-ranked sustainable funds. They conduct research that uses data collected from the Morningstar database to rank sustainable funds. They find that funds that have high sustainability ratings also get remarkable inflows on a yearly basis. However, the study does not find evidence that, in terms of return that sustainable funds would generate more return.

Plagge & Grim (2020) found in their study that there is no clear connection between fund performance and considering ESG factors. Their study focuses on US equity funds. They state that the return differences can be explained by fund characteristics since some funds performed significantly better than others. Another component that caused changes was differences in risk levels.

The research that was published in 2024 suggests that the performance of socially responsible investing (SRI) remains neutral. The evaluation is made using a lot of earlier studies about the SRI. Nonetheless, the study discovered that worldwide SRI portfolios perform better than regional subportfolios, which is consistent with contemporary portfolio theory. (Hornuf & Yüksel, 2024.)

4.3 Negative SRI performance

Selecting between income and sustainability remains a dilemma for investors. According to Berk and Green (2004), investors choose gain over sustainability. This can be evaluated by using standard models. If investors decide to invest in sustainability, it generates zero net flows. Conversely, the net flows will be positive if the majority select to invest in sustainability.

Renneboog et al. (2008) find that SRI funds underperform their competitors in selected Asian Pacific countries, continental Europe, and across the United Kingdom and the United States. They state that investors who value SRI do not value return as much since they value both ethical and social aspects more. In their study, they find that mutual fund performance varies, and during some periods, risk-adjusted return is almost the same as conventional funds. Their study focuses globally on many countries and provides information that in some countries, such as Japan and France, the performance among conventional funds does not differ notably from sustainable funds.

A study done by Hong & Kacperczyk (2009) found that investing in a sin stock such as tobacco generated more return than investing in sustainable stocks. They also state that the reason why investors want to be compensated for keeping sin stocks is in society, and what is expected in terms of norms. Also, Fabozzi et al. (2008) findings show the same, that sin stocks generate higher returns. They also state that since considering sustainability produces cost, institutional investors should consider whether the investment is profitable. In addition, Statman and Gluskov's (2009) study continues to state similar results. They use three and four-factor models and CAPM when forming ESG portfolios. The negative effect on the association partly explains the higher return. In that sense, investors select their wealth over the positive good for society.

According to the study released in 2014, which investigated French SRI mutual funds' performance in terms of a screening process. Diversification is a crucial component of choosing a portfolio, and modern portfolio theory states that all reasonable investors

ought to own a market portfolio, which is a value-weighted collection of all assets. According to the study, the greater screening concentration decreases the return adjusted to risk. However, the majority of SRI articles do not discover substantial differences between SRI and conventional funds in terms of risk-adjusted returns. In conclusion, results suggest that increased screening concentration somewhat lowers financial performance. (Capelle-Blancard & Monjon, 2014.)

Similarly, negative screening is a widely used technique to exclude conventional stocks. According to Trinks and Scholtens (2017), in the international stock environment, screening results in lower profits, losing to compared companies, and fewer investment possibilities. This indicates in the international investing environment screening results in low returns.

Pástor et al. (2021) state that companies considered brown have higher alphas than green. This indicates that green companies get a lower return. Pástor et al. state that these investments protect against climate risk. According to them, investors also like them as investment targets. These reasons result in lower returns, which they say investors will accept since they invest based on their preferences, and this has affected asset pricing models in terms of benefits. Also, in terms of beta, green assets have positive and brown assets have negative. Due to that, brown assets perform worse when weather conditions get poorer. Brown assets provide higher returns since they are way riskier.

In 2025, the published study used data from China and observed that hot SR integration affected mutual fund returns. The study tested 1145 Chinese mutual funds, and results suggest that greater levels of SRI integration result in underperformance compared to the benchmark index. However, whereas a high level of SRI integration generates lower returns, a moderate level of SRI has a higher performance. (Li & Li, 2025.)

5 Data and methodology

This chapter examines the empirical part of the thesis. The chapter introduces the chosen data and how empirical methods are intended to be used. The intended study period is 2015-2024 to research how sustainable funds have performed through the 21st century. The year 2015 was not considered to be either a bull or bear market. The biggest contributors to the success of the S&P 500 return in 2015 were the decline of China's economic growth and the decrease in the price of commodities. (Macrotrends, n.d) (Caplinger, 2016.)

From the end of 2016 to the end of 2021, the annual returns of the S&P 500 market were positive (except the year 2018), even if the COVID period took place in early 2020 (Macrotrends, n.d). Studies such as Nofsinger & Varma (2014) state that sustainable funds perform better during a market crisis. Therefore, the COVID-19 pandemic is an interesting period in which many previous studies have focused. Therefore, the expected possible outcome is that it is possible to achieve an excess return during the COVID-19 period.

In 2022, the S&P 500 dropped 19.4% annually, which was a significant decline that ended a long period of growth, and the main reasons were the increase in the Fed rates and Russia's invasion of Ukraine. (Gillison et al., 2022.) The last two years of the data period were a bull market, following the rapid growth in the S&P 500.

5.1 Data

The data used in this thesis comes from Datastream, Refinitiv Workspace. It consists of active equity mutual funds traded in the U.S. market, which may also invest outside the United States. The original dataset included 9,030 equity mutual funds, but the sample of 150 funds was selected from the largest ones, filtering by total net asset value (TNA) as a criterion. Because most of the largest funds are A rated, the data was limited to create equal-sized portfolios. Approximately 10% of globally responsible funds are located in the United States (Morgan Stanley, 2023), which supports the selected universe.

The relatively small sample size aligns with previous studies, whose sizes have varied. For instance, Hamilton, Jo, and Statman (1993) examined the performance of 32 ESG funds and 320 traditional funds. In comparison, Renneboog et al. (2008) conducted their analysis using 440 SRI funds.

Table 1 below shows the three portfolios formed. Each portfolio comprises an equal amount of funds. Due to the period (2015-2024), 120 months per fund are included in total.

Portfolio	Number of Funds	Number of Months
(1) AA	50	120
(2) A	50	120
(3) BBB	50	120

Table 1. Portfolio fundamentals.

MSCI was selected from the ESG score providers introduced earlier in the thesis since it has a wide range of mutual fund scores. ESG score information is therefore sourced from the MSCI website. Sustainable funds were sorted based on their level of sustainability, which is scored between AAA and CCC. The fund rating is each fund's weighted average score of holdings. To measure sustainability and to compare funds, three different portfolios were created. Each portfolio consists of 50 equity mutual funds, so 150 equity mutual funds were selected. Each formed portfolio consists of only one type of rating to compare portfolios with one another. Therefore, the selection methodology follows studies such as Abate et al. (2021), who have compared the performance of funds that have scored high ESG scores to those with low ESG scores. This thesis holds the same mutual funds for the whole period, so no changes have occurred in the portfolio holding period.

As stated at the beginning of this chapter, the funds were selected based on total net assets value (TNA). TNA value was checked based on the last trading day of 2014 (31.12.2014). The first formed portfolio is the leader portfolio, which consists of funds

rated AA. The second portfolio consists of high-average funds that are rated A. The third and final portfolio is a medium-average portfolio comprising funds rated BBB. Due to most of the largest funds being rated either AA, A, or BBB, funds rated AAA (leader), BB (average), B (laggard), and CCC (laggard) were left out. The amount of funds rated in each category is shown in Figure 8 below. In Figure 8, it can be observed that a minority of funds are rated either CCC or AAA. Since portfolios are constructed for AAA, A, and B, it also follows MSCI's decision to enhance the requirements of funds rated AA and AAA, which has decreased the amount of AAA funds (MSCI, 2023.)

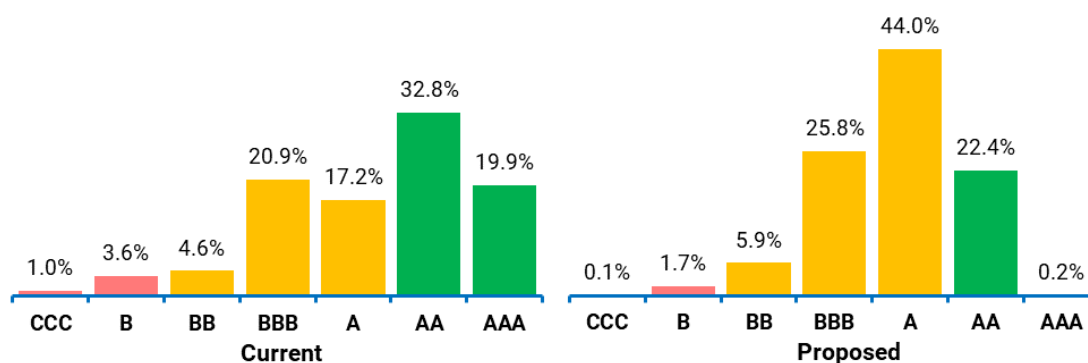


Figure 9. MSCI rating change (MSCI, 2023).

Figure 10 below shows cumulative annual raw returns. The data starts at the end of 2014. A data point is highlighted by having the whole data point illustrated in the chart below. The figure highlights how portfolio raw returns have closely followed movements of the benchmark index. Since its start, the AA-portfolio has been lagging the others.

On the other hand, the raw returns of AA-portfolio did not decrease as much compared to other portfolios when the COVID-19 epidemic started. Until 2020, the A- and AA-portfolios had been close to the index, but the difference began to increase during 2020. The highest differential point was in late 2024 when the stock market in the US was booming. The A-portfolio generated the highest raw returns from the constructed portfolios, and the BBB-portfolio was close to the same performance.

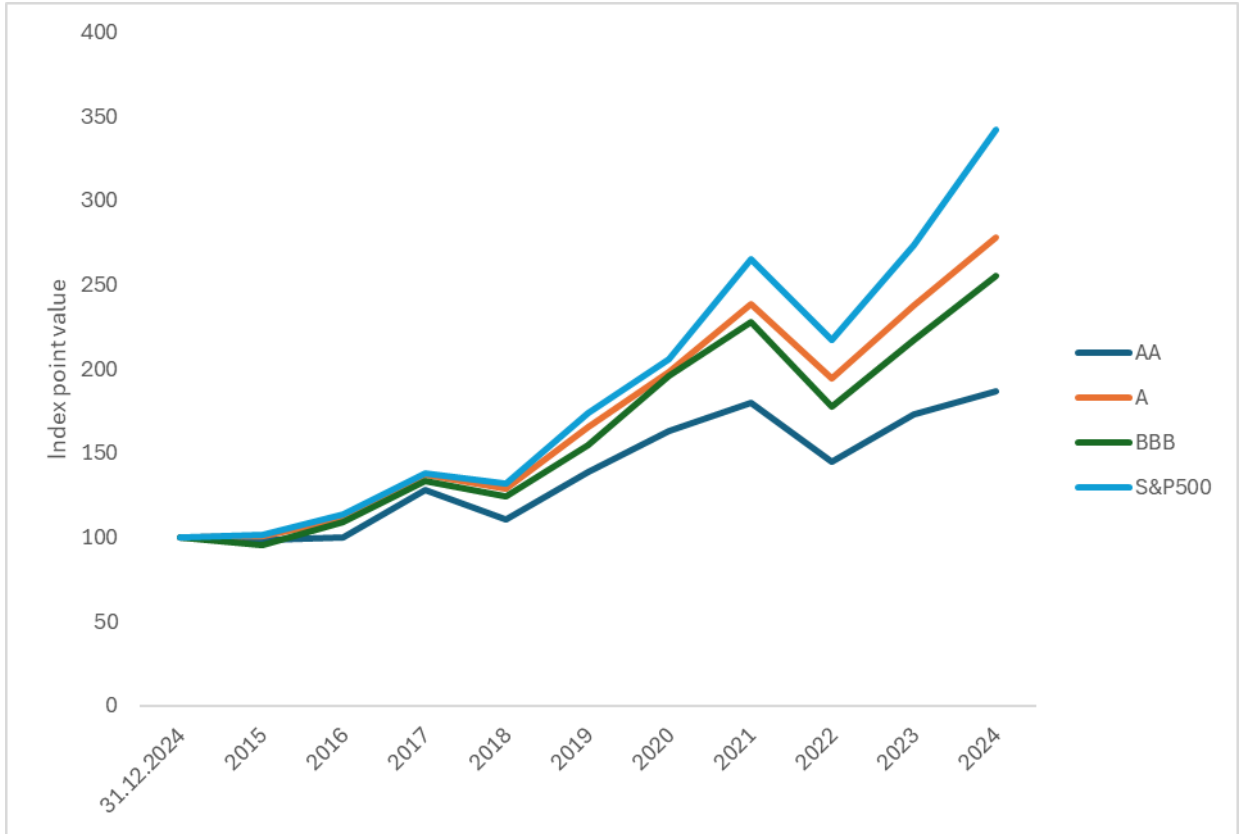


Figure 10. Cumulative raw returns 31.12.2014-31.12.2024.

In addition to measuring portfolios' performance against one another, they are also measured against the well-known USA-based S&P 500 index to see how these portfolios have performed. Statman (2006) discovered that the SRI index performed better during some market periods when comparing socially responsible indexes with the S&P 500 index. The study states that the correlation between the SRI index and the S&P 500 index is still evident. Mallin et al (1995) found that even if ethical investment can outperform its conventional peers, it still loses to the market.

In 2019, the S&P 500 ESG Index was introduced as an alternative to the original S&P 500 index. (Beyhan, 2024.) The S&P 500 ESG Index utilizes S&P 500 Global ESG scores to remove assets that do not achieve ESG criteria. Interestingly, the ESG index has outperformed the original S&P 500 index, which has generated an average of 15,96 % during 2015-2024.

Figure 11 below illustrates performance among the S&P 500 index and the S&P 500 ESG Index. Although the S&P 500 index and the S&P 500 ESG Index have closely followed each other, the S&P 500 ESG Index has outperformed the S&P 500. This supports findings of previous research that ESG screening can result in outperformance.

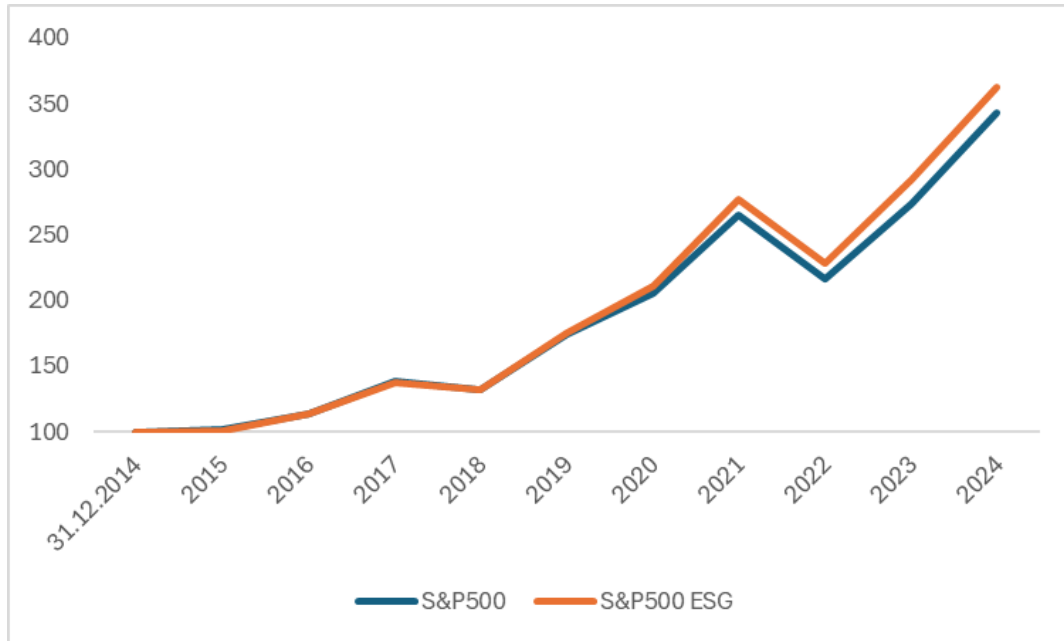


Figure 11. Cumulative raw index returns 31.12.2014-31.12.2024.

To calculate mutual fund performance, it was necessary to choose a risk-free rate, which measures the interest rate that can be expected on an investment without any risk. The chosen risk-free rate is the U.S. 10-year treasury note due to the 10-year investment period, the fact that most companies are in the United States, and the fact that a 10-year note is commonly known to be one of the safest possible investments. Figure 12 below shows how the 10-year Treasury note has fluctuated. Due to the COVID-19 epidemic risk-free rate dropped in 2020.



Figure 12. U.S. 10-year Treasury note.

5.2 Empirical Methods

Many previous studies have used the CAPM, Fama and French factor models, as well as Carhart's four-factor model, to examine mutual fund returns. For example, Renneboog et al (2008), Leite and Cortez (2014), Leite et al. (2017), Ibinkunle and Steffen (2017), and Matallín et al (2019) utilized CAPM and the Carhart four-factor model in their research. This thesis also uses factor models and CAPM, which were established in the theoretical part. The CAPM and Fama-French models help identify how much external factors or other variables influence the performance of fund portfolios. These models measure a number of variables, including market, firm size, value, profitability, and momentum to quantify systematic risk. As a result, whereas the alpha cannot be determined without recognizing risk, these models extract it to identify the excess return of a fund's portfolio. These models are helpful for measuring the SRI funds' performance since they show whether the fund's success is attributable to its exposure to, for example, small or high-quality companies or to its ESG strategy.

Other studies have measured fund performance with the Sharpe ratio, the Treynor ratio, and Jensen's alpha, which were introduced in the theoretical part to conclude how the performance of equity mutual funds has evolved. For example, Mallin et al. (1995) found that it is possible to outperform conventional peers when using CAPM, Sharpe, and Treynor. The results of the time series data will be presented in the next chapter, and the methodology presented in this chapter will be applied. However, Sharpe and Treynor measurements will be excluded from the scope because the CAPM and Fama and French models already take into account the total risk. In the next chapter, the OLS-regression results of the time series data will be presented, applying the methodology presented in this chapter.

6 Empirical Results and Analysis

In this chapter, the thesis presents empirical results regarding risk-adjusted returns using CAPM, and the Fama and French three-, five-, and six-factor models. At the beginning of this chapter, descriptive statistics are investigated. Portfolio results are divided into three subheadings containing factor model tables. The factor model table includes data for the entire period from 2015 to 2024. The expected outcome is that sustainable funds will not outperform traditional funds. However, investing in sustainable funds can be justified on the grounds of hedging climate risk, reduced risk exposure, investor preferences, long-term potential, strategies for influencing companies, and their positive societal impact. These factors represent significant ways to generate returns, diversify investments, or incorporate an ESG aspect into one's portfolio.

6.1 Descriptive statistics

The main findings of the descriptive statistics are included in Table 3 below. The three portfolios' mean returns are below the S&P 500 index, so the constructed portfolios underperformed the index return. The leader AA- and laggard BBB-portfolios fluctuate more than the benchmark index, and in other words, have higher maximum and minimum monthly returns compared to the S&P 500 index. For riskiness, the average A-portfolio has the lowest standard deviation and, therefore, the lowest risk. Previous literature also supports the idea of lower riskiness of sustainable investments.

According to Table 2, the laggard portfolio's kurtosis is remarkably higher than that of the index and other portfolios. In general, higher kurtosis implies more fluctuation between losses and gains. The higher the kurtosis, the more extreme outcomes investors will expect. Skewness illustrates the asymmetry of the distribution, and the distribution's left tail is longer or wider than its right when the skewness is negative. Overall, the descriptive statistics meet expectations, considering the results presented in the literature review.

Table 2 illustrates descriptive statistics of raw monthly returns. When comparing the maximum and minimum monthly raw returns, it can be concluded that the BBB-portfolio is the most volatile, as it produces both the highest and lowest raw returns. Consequently, it also carries the highest risk. The AA-portfolio generates the second-highest raw returns and also has the second-highest minimum returns, following the BBB-portfolio. The S&P 500 index displays the lowest variation between its maximum and minimum raw returns, indicating that this index produces more stable returns. This can be attributed to greater diversification compared to the three portfolios that were rated by the MSCI. Thus, it can be concluded that more sustainable funds (AA & A) have lower risk than the BBB-portfolio in terms of volatility.

	Mean	Median	STD	Kurtosis	Skewness	Min	Max
(1) AA	0.61	1.03	4.43	1.00	-0.22	-14.82	13.77
(2) A	0.93	1.39	4.33	1.01	-0.41	-14.07	12.33
(3) BBB	0.88	0.90	5.01	2.19	-0.42	-19.66	16.06
S&P 500	1.13	1.74	4.43	0.50	-0.39	-12.35	12.82

Table 2. Descriptive statistics of monthly returns for the whole period.

6.2 Factor model Leader AA-portfolio

Table 3 below illustrates the regression results of the factor model monthly time-series regression regarding the AA-portfolio from 2015 to 2024. On the left side of the table, the chosen factor models are the Fama and French six-factor model (FF6), the Fama and French five-factor model FF5, the Fama and French three-factor model FF3, and the capital asset pricing model (CAPM). The top part represents the factors alpha, mkt-rf, SMB, HML, RMW, CMA, and MoM. * (10%), ** (5%), *** (1%) indicate statistically significant t-statistic results. Since alpha is negative and significant, it indicates that the AA-portfolio underperforms relative to the risk-adjusted benchmark and that overall portfolio constructs negative abnormal returns. The alpha indicates that the AA-portfolio closely tracks market movements, as the market risk factor is both positive and significant. Additionally, the momentum factor is significant and negative, suggesting that the

momentum strategy does not influence the AA-portfolio. A high R^2 value indicates that the factor model effectively explains variance across the factor model.

	Alpha	Mkt-Rf	SMB	HML	RMW	CMA	MoM	R2
AA								
FF6	-0.359** [-2.10]	0.858*** [20.87]	-0.056 [-0.77]	0.003 [0.04]	0.046 [0.51]	0.075 [0.77]	-0.123** [-2.48]	0.846
FF5	-0.412** [-2.37]	0.885*** [21.86]	-0.008 [-0.11]	0.041 [0.61]	0.081 [0.89]	0.038 [0.38]		0.838
FF3	-0.386** [-2.26]	0.888*** [23.12]	-0.043 [-0.69]	0.071 [1.51]				0.836
CAPM	-0.385** [-2.27]	0.880*** [24.29]						0.833

Table 3. Factor Model Leader AA-Portfolio 2015-2024.

The original hypothesis suggested in the first chapter is that ESG implementation has a neutral effect on mutual fund performance on a risk-adjusted basis. The regression implicates a negative alpha according to the results using four different factor models. However, the performance of the benchmark explains the majority of the performance of the AA-portfolio, since the regression is strong, and for the CAPM, FF3, FF5, and FF6 results are strongly significant. The R-squared value is above 80%, which stands for the reliability of the results. In conclusion, the underperformance of the Leader AA-portfolio can be observed compared to the S&P 500 index in raw and risk-adjusted terms.

6.3 Average A-portfolio

Like the AA-portfolio, the A-portfolio also loses to the benchmark in terms of alpha factor. Alpha is the most significant factor in the results of the CAPM, FF3, and FF5. The HML factor is positive and significant among the FF5 and FF3, indicating that most of the stocks included in the portfolio are value stocks rather than growth stocks. R-squared is highest (more than 98%) in the A-portfolio among other portfolios, which means that the factor model effectively explains the portfolio's returns.

	Alpha	Mkt-Rf	SMB	HML	RMW	CMA	MoM	R2
A								
FF6	-0.101* [-1.83]	0.927**** [70.36]	-0.002 [-0.07]	0.035 [1.63]	0.002 [0.07]	0.029 [0.92]	-0.024 [-1.48]	0.983
FF5	-0.111** [-2.02]	0.932**** [73.04]	0.008 [0.33]	0.042** [2.02]	0.009 [0.30]	0.022 [0.69]		0.983
FF3	-0.107** [-1.98]	0.931**** [77.03]	0.002 [0.09]	0.054**** [3.62]				0.983
CAPM	-0.118** [-2.11]	0.932**** [77.57]						0.981

Table 4. Factor Model Average A-Portfolio 2015-2024.

Similarly, with the Leader AA-portfolio, the high significance in terms of Mkt-Rf is the main factor that explains the performance of the portfolio. When the p-value is less than 0.01, it refers to the factor's high significance; in other words, there is a 1% chance that the Mkt-Rf factor would be equivalent to zero. In simple terms, the A-portfolio is moving tolerably in line with the market. What is worth mentioning is that the excess return is the lowest in the A-portfolio in the FF6 adjusted terms, -0.101% respectively, among the other portfolios.

In conclusion, the A-portfolio underperforms the market on its risk-adjusted basis. However, compared to the other portfolios, the negative excess return is the smallest, which suggests the best performance among the other portfolios. Referring to Table 3, the standard deviation (STD) is even lower than the S&P 500's STD, which indicates lower risk. The average A-portfolio can be considered to be neutral in terms of ESG rating. In conclusion, the hypothesis of this study can be accepted in terms of the risk-adjusted results provided.

6.4 Laggard BBB-portfolio

Of the three portfolios, the BBB-portfolio has the second-highest excess return based on the alpha factor, but the BBB-portfolio still loses to the benchmark. The SMB factor is highly positive, showing that most of the portfolio is invested in small companies. Investing in small companies produces, in this case, more return but also increases the risk due to volatility since funds include more separate companies. According to the FF6 and FF5

factor returns, a positive and significant HML factor indicates that these funds evade growth stocks and prefer value stocks. Significant and negative CMA implies that the portfolio emphasizes investing in aggressive stocks over conservative. Investing in aggressive stocks also increases the riskiness of the portfolio. Overall portfolio highlights smaller companies, value stocks that are more aggressive.

2015-2024	Alpha	Mkt-Rf	SMB	HML	RMW	CMA	MoM	R2
BBB								
FF6	-0.108 [-1.21]	0.966*** [45.16]	0.297*** [7.77]	0.075** [2.15]	-0.089* [-1.89]	-0.124** [-2.44]	-0.012 [-0.46]	0.967
FF5	-0.113 [-1.28]	0.969*** [47.16]	0.302*** [8.22]	0.078** [2.32]	-0.086* [-1.85]	-0.128** [-2.55]		0.967
FF3	-0.147 [-1.62]	0.974*** [48.15]	0.350*** [10.67]	0.006 [0.26]				0.964
CAPM	-0.277** [-2.14]	1.048*** [37.84]						0.924

Table 5. Factor Model Laggard BBB-Portfolio 2015-2024.

Talking about the significance of the results, in fact, the alpha factor is not significant according to the FF3, FF5, and FF6 results. However, the alpha, as the CAPM-adjusted terms, generates significant results at 5% significance. R-squared is high (more than 96%) in the Laggard BBB-portfolio, which means that the factor model effectively explains the portfolio's returns.

6.5 Hypothesis implications

Based on the factor model results, incorporating ESG selection into the portfolio will result in lower returns. This contradicts the hypothesis that ESG will result in neutral effects. However, the average portfolio consisting of A-rated funds has performed the best among the three portfolios. When estimating factor model results, it can be stated that investing in the index.

7 Conclusions

According to the modern portfolio theory discussed earlier, since investors should only be compensated for the systematic risk that diversification cannot eliminate, all reasonable investors should possess a market portfolio of equities. Theoretically, socially, and environmentally conscious investors who invest their funds in SRI funds should incur a cost because, in addition to the screening procedures that SRI fund managers follow, there should be a smaller pool of potential investments, which would limit the diversification options for these funds. However, proponents of the stakeholder theory, which was discussed earlier, argue that the benefits of effective SRI, such as reduced idiosyncratic risk, improved financial performance, and lower governance expenses, would outweigh the costs of SRI investing.

This thesis investigates how socially responsible funds have performed compared to conventional funds and the benchmark index S&P 500. This was examined by determining whether ESG implementation affects mutual fund performance neutrally, as hypothesized. Three different ESG portfolios were constructed to measure the level of sustainability. The highest-rated ESG portfolio consists of AA-rated funds, the second comprises A-rated funds, and the last includes BBB-rated funds. In addition, ESG rating information comes from the MSCI data source, and the investigation period is measured from 2015 to 2024. The methodology includes the Fama and French 6-, 5-, and 3-factor models, as well as CAPM. Additionally, this thesis includes relevant theoretical backgrounds, such as shareholder and stakeholder theories, along with key findings from previous literature regarding positive, neutral, and negative performance.

The empirical results show no apparent connection between sustainability and outperformance. This was because all different levels of sustainability-rated portfolios underperformed relative to the S&P 500 benchmark index. Of the three portfolios, the A-rated portfolio's performance was the winner among the other portfolios; however, it still did not beat the S&P 500 index in the investigation period.

Factor models risk-adjusted returns for the period produce statistically significant alphas for the portfolios AA and A, from -0.385% to -0.412% and from -0.118% to -0.101%, respectively, and these alphas are significant at the 0.05 confidence level. The CAPM alpha of the BBB-portfolio generates -0.277% alpha at the 0.05 confidence level; however, Fama and French adjusted alphas are not statistically significant. The range of these alphas is from -0.108% to -0.277%, respectively.

Therefore, we accept the hypothesis of a neutral connection since an A-rated portfolio, which consists of average-rated funds, generates a neutral return compared to the market return. The empirical results show no apparent connection between sustainability and outperformance, which implies that the findings are consistent with the research chapter. This was because all different levels of sustainability-rated portfolios underperformed relative to the S&P 500 benchmark index.

7.1 Future research recommendations

For further research, it would be interesting to construct portfolios for all AAA-CCC MSCI rated fund levels. There will be even more demand for various sustainable investments in the future, so it should evolve to measure a better harmony between ESG ratings. Since new responsible investments are constantly coming into the market, it would be interesting to study their success compared to their competitors. In addition, since regulations are continually evolving, it would be fascinating to research how these affect sustainable investments. Also, since interest rates are relatively high considering the past years, it would be good to study how sustainable funds perform when rates are lower or if they are even connected. In the future, it is also possible that our investments will be marked as sustainable, at least in the more significant markets, due to investors' demands and the changing economic situation. It would be interesting to see what happens to companies that cannot follow the guidelines.

7.2 Limitations

Three portfolios especially test AA, A, and BBB-rated funds, so the data does not include either AAA (highest-rated funds) or CCC (lowest-rated funds), illustrating that outliers are not included in the sample. This can have some effect, especially since low-end rated funds have been excluded since the largest funds did not include those. The aim was to compile funds that were as comparable as possible among portfolios. This especially influenced the amount of A-rated funds since the majority of the largest funds were A-rated. In addition, since the population includes the largest funds, it highlights that these are the funds that are already most regulated and therefore follow ESG regulation more strictly than smaller funds.

In addition, since most sustainable investment funds are located in Europe, the investment universe shrinks. Also, European regulations are strict, and therefore, investments have to be disclosed more, and there is a higher possibility that investments fulfil the sustainability requirements. Also, in recent years, anti-ESG has increased popularity, especially in the United States, creating challenges such as less capital from investors towards sustainable investments, which can affect ESG mutual fund performance and therefore the ESG mutual fund universe.

Since the topic is relatively new, more research is still needed to ensure that the impact is inevitable and to obtain evidence from long-term effects. Also, the US market has evolved and is more prominent in size compared to many other markets. In addition, information about the impact of greenwashing is only at the beginning. Greenwashing might influence, especially in the future, since not all sustainable funds fulfil the requirements for sustainability, and many funds could have been rated higher than they are. Limitations also consider the sample size since the US market is quite large and has many different levels of sustainability. Also, if the period had been longer, the results of the empirical part could have changed.

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