



Vaasan yliopisto  
UNIVERSITY OF VAASA

Atte Leino

**Socially Responsible Investing: Profitability of  
socially responsible funds during different market  
conditions**

Evidence from European stock markets

School of Accounting and Finance  
Master's thesis in Finance  
Master's Degree Program in Finance

Vaasa 2022

---

**UNIVERSITY OF VAASA****School of Accounting and Finance****Author:** Atte Leino**Title of the Thesis:** Socially Responsible Investing: Profitability of socially responsible funds during different market conditions: Evidence from European stock markets**Degree:** Master of Science in Economics and Business Administration**Programme:** Master's Degree Program in Finance**Supervisor:** Janne Äijö**Year:** 2022 **Pages:** 105

---

**ABSTRACT:**

The popularity of socially responsible investing has grown significantly among investors and academics. For decades, academic literature has studied responsible investing in different contexts, creating theories about different strategies, performance, as well as the behavior of responsible investors. Nonetheless, over the past decades academic literature has shifted to study the performance of responsible funds in various market situations. The academic research has found conflicting results regarding the performance of responsible and conventional funds during market conditions. This thesis examines the performance of European socially responsible and conventional funds in various market conditions. Additionally, this study seeks to examine differences between funds in investment style and whether investment styles change under different market conditions.

The data for the study consists of returns of European responsible and conventional funds from 2005 to 2019. A matched-pair approach has been utilized in the selection of funds, where funds are selected according to similar characteristics. This research utilizes reward-to-volatility ratios and multiple factor models including CAPM, Fama-French three-factor and Carhart four-factor as various empirical methods. To study the performance of responsible funds in different market conditions, factor models have been expanded to cover different market conditions with dummy variables.

The results of this study on fund performance under various market conditions show that responsible funds significantly outperform conventional funds during periods of expansion. Moreover, during a recession, responsible funds perform less than traditional funds and markets, but insignificantly. However, in the transition to periods of slowdown, responsible funds are clearly performing better than normal funds with significant differences.

In addition to performance, the thesis looks for differences in the investment style of funds and whether they differ in different market situations. Based on empirical research, I find small evidence of lower exposure of responsible funds to small-caps and greater exposure to growth-stocks. In addition, socially responsible funds seem to have more exposure to momentum strategies. Furthermore, the results show that funds' exposure to small-cap stocks increase when moving from normal times to recession or slowdown. Similarly, both funds increase their exposure on value stocks during this transition. Furthermore, I find small evidence of higher exposure of conventional funds to momentum strategies during slowdown periods. However, these results vary between different models and benchmarks, indicating that this issue still requires further research.

---

**KEYWORDS:** Socially responsible investing, market conditions, investment style, Performance evaluation, matched-pair approach

---

**VAASAN YLIOPISTO****Laskentatoimen ja rahoituksen akateeminen yksikkö**

<b>Tekijä:</b>	Atte Leino
<b>Tutkielman nimi:</b>	Socially Responsible Investing: Profitability of socially responsible funds during different market conditions : Evidence from European stock markets
<b>Tutkinto:</b>	Kauppätieteiden maisteri
<b>Oppiaine:</b>	Rahoituksen maisteriohjelma
<b>Työn ohjaaja:</b>	Janne Äijö
<b>Valmistumisvuosi:</b>	2022 <b>Sivumäärä:</b> 105

---

**ABSTRACT:**

Vastuullisen sijoittamisen suosio on kasvanut merkittävästi sijoittajien ja tutkijoiden keskuudessa. Vuosikymmenten ajan akateemisessa kirjallisuudessa on tutkittu vastuullista sijoittamista eri konteksteissa, luoden teorioita erilaisista strategioista, suorituskyvystä sekä vastuullisten sijoittajien käyttäytymisestä. Kuitenkin viime vuosikymmenien aikana akateeminen kirjallisuus on siirtynyt tutkimaan vastuullisten rahastojen suorituskykyä erilaisissa markkinatilanteissa. Akateemisessa kirjallisuudessa on löydetty ristiriitaisia tuloksia vastuullisten ja tavanomaisten rahastojen suorituskyvystä eri markkinatilanteissa. Tässä opinnäytetyössä tarkastellaan Euroopan sosiaalisesti vastuullisten ja perinteisten rahastojen suorituskykyä erilaisissa markkinaolosuhteissa. Lisäksi tämä tutkimus tarkastelee rahastojen sijoitustyylien eroja ja sitä muuttuvatko sijoitustyyli eri markkinatilanteissa.

Tutkimuksen aineisto koostuu eurooppalaisten vastuullisten ja perinteisten rahastojen tuotoista vuosina 2005—2019. Rahastojen valinnoissa on käytetty sovitettua parin lähestymistapaa, jossa rahastojen valinta kohdistuu samankaltaisten ominaisuuksien mukaan. Tässä tutkimuksessa hyödynnetään useita erilaisia empiirisiä menetelmiä rahastojen suorituskyvyn mittaamiseen kuten Sharpen and Sortinon lukuja sekä erilaisia faktorimalleja kuten Capital Asset Pricing -malli, Faman ja Frenchin kolmen faktorin ja Carhartin neljän faktorin malli. Vastuullisten rahastojen suorituskyvyn mittaamiseksi eri markkinaolosuhteissa on faktorimalleja laajennettu kattamaan eri tekemuuttujia.

Tämän tutkimuksen tulokset osoittavat, että vastuulliset rahastot suoriutuvat merkittävästi tavanomaisia rahastoja paremmin markkinoiden laajentumisen aikana. Taantumien aikana vastuulliset rahastot suoriutuvat keskimäärin tavanomaisia rahastoja ja markkinoita huonommin, mutta tilastollisesti merkityksettömästi. Kun siirrytään markkinoiden hidastumiseen, vastuulliset rahastot suoriutuvat merkittävästi tavanomaisia rahastoja paremmin.

Tässä opinnäytetyössä pyrittiin suorituskyvyn lisäksi myös tarkastelemaan rahastojen sijoitustyylien eroja ja sitä, muuttuvatko ne eri markkinaolosuhteissa. Empiiristen tulosten perusteella voidaan havaita pieniä todisteita vastuullisten rahastojen alhaisemmasta kallistumisesta pieniin yhtiöihin sekä suuremmasta kallistumisesta kasvuosakkeille. Tulokset myös osoittavat vastuullisten rahastojen suuremmasta osallisuudesta momentum-strategioille. Tämän lisäksi molemmat rahastot lisäävät omistuksiaan pieniin yhtiöihin ja arvo-osakkeisiin kun siirrytään markkinoiden laajentumisesta kohti markkinoiden taantumaa ja hidastumista. Myös pienet havainnot osoittavat, että markkinoiden hidastumisen aikana, tavanomaiset rahastot lisäävät sijoituksia momentum-strategian mukaisesti. Tutkimuksen tulokset kuitenkin vaihtelevat eri mallien ja vertailuarvojen välillä mikä osoittaa aihe-alueen lisätutkimuksen tarvetta.

---

**Avainsanat:** Vastuullinen sijoittaminen, markkinaolosuhteet, sijoitustyyli, suorituskyvyn mittaaminen, sovitettua parin lähestymistapa

## Contents

1	Introduction	7
1.1	Purpose of the study	9
1.2	Hypothesis development	9
1.3	Contribution	11
1.4	Structure of the study	12
2	Socially responsible investing	13
2.1	Definition of socially responsible investing	13
2.2	Development of socially responsible investing	14
2.2.1	Socially responsible investing strategies	16
2.3	Socially responsible markets today	18
3	Previous studies	20
3.1	Performance of socially responsible investing	20
3.2	Performance of different socially responsible strategies	24
3.3	Performance of socially responsible during different market conditions	27
3.4	Summary of previous studies	33
4	Theoretical framework	37
4.1	Efficient market theory	37
4.2	Portfolio Theory	39
4.3	Stakeholder theory	40
4.4	Utility theory	41
5	Data and methodology	43
5.1	Data description	43
5.1.1	Data selection	46
5.1.2	Portfolio construction	47
5.1.3	Survivorship bias	48
5.2	Definition of market conditions	49
5.3	Performance measurements	50

5.3.1	Jensen's alpha	51
5.3.2	Reward-to-Volatility ratios	51
5.3.3	CAPM	52
5.3.4	Three-Factor model	53
5.3.5	Carhart 4-Factor model	54
5.4	Limitations of the study	55
6	Result of the Empirical study	57
6.1	Descriptive statistics	57
6.2	Reward-to-volatility ratios	58
6.3	Factor models	60
6.3.1	Single factor	60
6.3.2	Three-factor	66
6.3.3	Carhart four-factor	74
6.4	Robustness tests	81
6.4.1	Sub-periods	82
6.4.2	Alternative benchmarks	84
7	Conclusions	87
	References	91
	Appendices	102
	Appendix 1. Summary of literature review	102

## Figures

Figure 1. Summary of SRI and conventional funds.....	45
Figure 2. Summary of investment styles .....	46
Figure 3. Business cycles in Europe during period of 2005 to 2019 (Eurostat, 2022; EABCN, 2022).....	50

## Tables

Table 1. Descriptive statistics.....	57
Table 2. Sharpe ratio results .....	58
Table 3. Sortino Ratio results.....	59
Table 4. CAPM results .....	61
Table 5. CAPM differences between SRI and conventional funds.....	64
Table 6. Three-factor model results with the MSCI Europe benchmark .....	67
Table 7. Three-factor results with the FTSE4GOOD benchmark .....	69
Table 8. Three-factor difference results between SRI and conventional funds.....	72
Table 9. Four-factor model results with the MSCI Europe benchmark .....	75
Table 10. Four-factor results with the FTSE4GOOD benchmark.....	77
Table 11. Four-factor difference results between SRI and conventional funds.....	79
Table 12. Four-factor sub-period results .....	83
Table 13. Four-factor results with alternative benchmarks.....	85

## 1 Introduction

In recent years, the growth of socially responsible investing has grown strongly among investors around the world. As a consequence, interest in the performance of responsible investment has grown among academics. Over the past decades, the literature on responsible investing has tried to answer the question “does it pay to be good” with varying results. Previous literature from Hamilton et al. (1993) and Bauer et al. (2005) find that socially responsible funds do not differ in terms of returns from conventional funds but conclude that investors do not lose anything by investing according to socially responsible. Moreover, Renneboog et al. (2008b) argues that investors pay a price for ethics in terms of lower performance compared with conventional investors.

Today, literature has moved away from this topic to the question of “when does pay to be good.” For the past decade, academic literature has sought to answer this question based on a number of theories and studies. Literature by Nofsinger and Varma (2014) and Matallin-Saez et al. (2018), among others, has studied the functioning of socially responsible funds under different market conditions and found evidence of differing performance of socially responsible and traditional funds. In addition, previous literature provides arguments in favour of the activities of responsible funds during market crises. In fact, it is argued that the better reputation of socially responsible funds protects against market downturns and thus helps responsible funds perform better during market crises (Areal et al. 2013; Nofsinger and Varma, 2014). These results have led to a general consensus that traditional funds do better on average during normal times and that an investor may be able to benefit from responsible funds through the downside protection they offer during market crises.

While previous literature advocates underperformance and overperformance of socially responsible funds, the main problem with responsible investing is its conflict with modern portfolio theory. Markowitz's modern portfolio theory of 1952 suggests that a well-diversified portfolio can reduce investor risk without sacrificing expected returns. However, socially responsible funds represent a less diversified portfolio because of rigorous

screening strategies. As a result, excluding unethical stocks from responsible funds reduces the potential investment universe. Due to the limitations of the investment universe, socially responsible funds are unable to form optimally diversified portfolios and thus suffer lower risk-averse returns than conventional funds. However, another view suggests that socially responsible funds benefit from investment constraints. A rigorous screening process allows funds to exclude companies that have recently performed less well or suffer from poor management. As a result, a smaller investment universe and weaker diversification can be offset by more knowledgeable stock picking and lead to better financial performance (Barnett and Salomon, 2006).

Although the purpose of investing is to generate profit for the investor, socially responsible investors are considered to have two kinds of goals: economically reasonable wealth maximization and social responsibility (Renneboog, 2008b). Utility theory suggest that responsible investors are socially conscious and derive non-financial utility by investing socially responsible. Instead of donating their money to charity, this approach enhances their financial benefits while investing based on their social and ethical values. In addition, Benson et al. (2007) suggest that, as a result, socially responsible investors may not care about financial performance and remain more loyal to responsible funds than conventional investors. The persistence of the mutual fund's performance and ability to create positive alpha has been a subject of academic interest for decades. Studies from various decades (Jensen, 1968; Carhart, 1997; Wermers, 2000, and Blake et al. 2017) have yielded similar results on poor performance of active funds and the inability of fund managers to produce positive alpha supporting Fama's theory of efficient markets. Moving into a discussion of the performance of socially responsible funds, literature has shown responsible investors to be less interested in a fund's performance and more in its ability to satisfy social values and preferences. As responsible investing becomes more common, this lower performance may not satisfy any broader investment sets, putting their performance under broader scrutiny. This issue also has important theoretical and practical implications in the area of responsible investing. If responsible funds are able to keep performance going over time, this challenges EMH qualification. On a practical



level, if responsible funds are capable of sustained performance, it also acts as a driver of investors' future investment decisions, increasing the inflow into responsible investing (Lean et al. 2015).

### **1.1 Purpose of the study**

As interest in responsible themed topics has grown significantly in academic literature and among investors, the key question remains whether responsible investing is more profitable than conventional investing. The purpose of this master's thesis is to determine whether socially responsible funds perform differently from conventional funds under different market conditions. As previous literature has found conflicting evidence on the performance of responsible funds, as a rule, the results of times of crisis have been insignificant. The purpose of this master's thesis is to fill this gap and to find new evidence of funds' performance in a variety of market conditions. In addition, previous literature mainly focuses on the US and UK markets and left less attention to the European market. The main contribution to the literature is to analyse less researched European markets with more recent data to determine whether socially responsible funds perform differently than conventional funds under different market conditions. In addition, the study seeks to determine whether the investment strategies of responsible and conventional funds differ and whether investment styles change between different market conditions.

### **1.2 Hypothesis development**

This Master's thesis examines the performance differences between socially responsible and traditional funds under different market conditions. The aim is to see if performance varies not only between different market conditions, but also between regions. In addition, this study explores differences in investment styles between funds and different market situations. Hypotheses of this study are formed as follows:

H1: Socially responsible funds underperform conventional funds during normal market times

The hypothesis is based on most of the earlier literature, which have found evidence of responsible funds underperforming compared to conventional funds during normal market times. Nofsinger and Varma (2014) and Matallin-Saez (2018) find underperformance of socially responsible funds in US markets, Leite and Cortez (2015) in France stock markets and Lean and Pizzutilo (2021) across worldwide.

H2: Socially responsible funds outperform conventional funds during crisis periods

The second hypothesis is based on previous literature which has found evidence of better performance of responsible funds during market crises, but the results have been mostly insignificant (Nofsinger and Varma, 2014; Badía, Ferruz and Cortez, 2020; Lean and Pizzutilo 2021). This study seeks to find new evidence for funds' performance during market crises.

H3: Socially responsible outperform conventional funds during intermediate market periods

The third hypothesis has not been directly explored in the earlier literature, and therefore there is no prior evidence for the problem. Paper from Belghitar, Clark and Deshmukh (2017) studied a similar problem by dividing time period into pre-crisis, crisis and post-crisis periods. This intermediate stage of market cycle can be considered to have started before or after the crisis, which is why research by Belghitar et al. (2017) can be seen as a suitable perspective on this issue. The authors find evidence that socially responsible funds outperform conventional funds during pre-crisis and post-crisis periods.

H4: Socially responsible and conventional funds have different investment styles

The fourth hypothesis is based on earlier literature that has found varying results between responsible and conventional fund investment styles. Studies by Bauer et al. (2005), Rudd, (1981), Cortez et al. (2012), among others, have reported responsible funds bias from small cap and more tilted towards growth. Bauer et al. (2006) and Renneboog et al. (2008b) report opposite results and argue that socially responsible funds are more value-oriented than growth-oriented. In addition, the data in this study consist of funds with an investment universe of large and medium-sized stocks, which gives an interesting perspective on the small cap bias hypothesis of responsible funds.

H5: Investment styles of socially responsible and conventional funds differ during different market conditions

The fifth hypothesis is related to the fourth hypothesis and is based on earlier literature that has found evidence of changes in investment style in various market conditions. Leite and Cortez (2015) find that when moving from non-crisis times to crisis times, both funds increase exposure on size stocks and move from growth to value stocks. Furthermore, conventional funds exhibit higher exposure on momentum strategies across different market conditions.

### **1.3 Contribution**

This thesis complements the existing literature in many different ways. First, it participates in the ongoing debate on the performance of socially responsible funds under different market conditions. It also provides new evidence on how socially responsible funds perform under different market conditions by looking at three different market cycles: expansion, recession and slowdown. This approach differs from previous literature by, among others, Nofsinger and Varma (2014), Leite and Cortez (2015), and Ferruz and Cortez (2020), which determine market conditions for crisis and non-crisis periods. Furthermore, most of the previous literature has found evidence of outperformance of conventional funds in during normal times, but insignificant results in times of crisis

(Nofsinger and Varma, 2014; Wu et al., 2017; Soler-Dominguez et al., 2015, Matallin-Saez, 2018 and Badía, Ferruz and Cortez 2020). There is some studies in the literature that are in contradict with these results (Belghitar, Clark and Deshmukh 2017 and Lean and Pizzutilo 2021) which creates a gap in the literature on how the performance of responsible and conventional funds differs in different market situations. Additionally, this study examines differences between funds in investment style. Previous literature has suggested responsible funds to be biased to small-cap and growth stocks or shown to be less value-oriented and more growth-oriented compared to conventional funds (Bauer et al., 2005; Leite and Cortez, 2015; Cortez et al., 2012; Becchetti et al., 2015) while other studies have reported a higher value-driven investment style in responsible funds (Renneboog et al. 2008b; Bauer et al. 2006). The highlighting of this problem is justified because arguments have been made in the literature about the similarities in Investment universe between conventional and responsible funds. Furtherly, this study shed light on changes in investment styles as transition to different market conditions. Lastly, this study contributes the existing literature by investigating less-explored European markets and fund performance differences between different countries and market situations.

#### **1.4 Structure of the study**

The thesis is structured as follows: the second chapter defines the socially responsible concept of investing, history, strategies and current state. Chapter 3 covers a review of previous literature on socially responsible investing performance, strategies and performance in a variety of market conditions. Chapter 4 describes the theoretical framework of investing and its relationship to responsible investing. Chapter 5 describes the data and methods used in this thesis. Chapter 6 presents the empirical results and robustness of the study. Finally, Chapter 7 presents a general conclusion on the results. Detailed information on funds used and summary of the literature review are presented in the appendix section.

## **2 Socially responsible investing**

This chapter describes an overview of responsible investing. The first part defines the concept of socially responsible investing. The second part discusses the development of responsible investing over the years to this day and presents the strategies. Finally, the third chapter sets out the current state of socially responsible investing.

### **2.1 Definition of socially responsible investing**

Over the past decade, socially responsible investing has grown considerably worldwide and increased academic interest in the subject. In the concept of socially responsible investing, an investor takes ethical and social considerations into account when making an investment decision. When responsible investing is compared with the traditional investment process, responsible investing uses a variety of investment selection criteria that allow either to include or exclude certain assets based on ecological, social and corporate governance or ethical criteria (Renneboog et al., 2008a). Schueth (2003) defines socially responsible investing as integrating societal issues and personal values into decision-making without compromising on earnings expectations. The original ethical investing was intended to avoid investing in so-called “sin shares”, that is, companies operating in the tobacco, alcohol, arms and gambling industries (Renneboog et al., 2008a).

In recent years, the concept of ethical investing has expanded in the scientific literature and several different names have emerged alongside it to describe responsible investment practice. Eccles and Viviers (2011) conducted a study in which they reviewed 190 scientific articles from 1975-2009. Their goal was to study in academic literature on investments that consider issues related to the environment, society, and government. The most commonly used synonyms for ethical and responsible investment in academic literature are socially responsible investing, responsible investing, ESG, responsible investing, social investing, and green investing. The authors found that the term ethical investing occurs more frequently in academic literature dealing with business ethics and philosophy than finance and economics. Of responsible investment strategies, positive

screening and best-in-class were generally associated with the term responsible investing. These results indicate that ethical investments are often associated with a deontological ethical position, while responsible investments are associated with an egotistical ethical position. Therefore, the authors propose the term responsible investing to be considered as generalization term in this field and define it as an investment activity that, in addition to taking into account ESG matters, aims to achieve higher risk-adjusted returns.

The motivations of socially responsible investors are usually divided into two distinct categories. One of the groups feels a desire to put their invested money to work in a way that is closest to their personal values and preferences. Investors like this are portrayed in contemporary media as “feel good” investors, investors who feel better about themselves when investing socially responsibly. The motivation for the other group is to invest money in a way that supports and motivates improving the quality of life. The group aims to focus more on positive social changes that could benefit society (Schueth, 2003). According to Renneboog et al. (2011), investors who derive non-economic benefits by investing socially responsibly tend to be less concerned about financial performance than traditional investors. Furthermore, Riedl et al. (2017) argues that the majority of socially responsible investors expect the performance of responsible funds to be lower than that of traditional funds, but are willing to sacrifice on earnings expectations when investing according to their own social preferences. Bollen (2007) describes this as a multi-attribute utility function that investors may have, which is why they are less interested in optimizing risk rewards and prefer to invest according to social and personal values

## **2.2 Development of socially responsible investing**

The roots of ethical investing date back to Jewish, Christian, and Islamic religious traditions, where teachings about the ethical use of money abound among Jews and where Christians imposed restrictions on loans and investments in accordance with the Old Testament. John Wesley, founder of the Methodist revival movement, urged people not to engage in a sinful trade or profit from exploitation by other people. In the twentieth

century, Methodist churches avoided investing in companies deemed to be involved in the production of alcohol, weapons, tobacco and gambling in so-called 'sinful' industries (Renneboog et al., 2008a). The avoidance of sin stocks can still be regarded as one of today's key criteria in the field of responsible investing (Schueth, 2003).

Unlike ethical investing, which has roots dating back to the religious tradition, modern responsible investing relies more on the different ethical and social beliefs and preferences of investors. Social campaigns against war and racism in the 1960s made investors aware of the societal impact of their investments; in the 1980s, the Chernobyl nuclear accident, the worst environmental disaster in the United States, the Exxon Valdez oil disaster and other environmental disasters added to the significantly raising investor awareness of the negative environmental impact of industrial development (Renneboog et al. 2008a). In the mid-1980s, there was a significant increase in the number of socially concerned investors as millions of people, institutions, cities and states focused their investment strategies on South Africa. The pressure was intended to persuade South Africa's minority government to abandon the racist apartheid system (Schueth, 2003). In summary, the initial responsible investing was based more on negative evidence, i.e., the exclusion of so-called "sin shares", whereas today's responsible investing is more proactive in positive screening and shareholder engagement (Scholtens and Sievänen, 2013).

Responsible investing has grown rapidly across the globe since the early 1990s. The most significant contributor to the growth has been a growing awareness of ethical consumption, where consumers are willing to pay for products that match their personal values and preferences. Criteria for responsible investing include common responsibility issues such as environmental protection, human rights and labour conditions. In addition, various corporate scandals have also raised questions about corporate governance and responsibility among SRI investors. (Renneboog et al., 2008a). The financial crisis of 2007/2009 also increased investor interest in factors affecting democracy and responsibility in the stock market (Scholtens and Sievänen, 2013). According to the Global Sus-

tainable Investment Alliance (GSIA) report, assets under management (AUM) at the beginning of 2020 totalled 35.3 trillion worldwide. That amount has increased 15 percent in two years from \$30.6 trillion to \$35.3 trillion. The most significant growth has been in Canada, where AUM for sustainable investing has increased by 48 per cent and in the United States, where growth has been 42 per cent in the last two years (2020).

### **2.2.1 Socially responsible investing strategies**

Schueth (2003) divides responsible investment strategies into three distinct sections; screening, shareholder advocacy, and community investing. Amel-Zadeh and Serafeim (2018) supplement this list with thematic investing, risk factor investing, and ESG integrations, and divide screening into three distinct sections; positive, negative and best-in-class screening (2018). The oldest responsible investing strategy is negative screening, which dates back to ethical investing, but is still considered to be one of key strategies in today's responsible investing (Renneboog et al., 2008a). According to Amel-Zadeh et al. (2018), ESG integration and shareholder engagement are considered the most advantageous in terms of investment performance while screening negative the least beneficial. Negative screening, however, is still seen as one of the most essential strategies in the area of responsible investing (Schueth, 2003).

*Negative screening* is a strategy designed to exclude certain undesirable industries or companies from a fund or portfolio based on social, environmental or ethical criteria (Renneboog et al., 2008a). This requires the investment manager to have qualitative analysis of corporate policies and attitudes. On the basis of the analyses, companies with good employee relations, those investing in environmental friendliness, innovating responsible products and respecting human rights are often selected as investment targets. Companies whose business is harmful at some levels are often on the list of companies to avoid (Schueth, 2003). *Positive screening* is supposed to be the opposite of negative screening. The purpose of positive screening is to include certain industries or companies in a fund or portfolio based on environmental, social or governance criteria. The *best-in-class* screening method is widely considered to be alongside positive screening.



Companies are ranked according to sustainability themes and the best performing companies are selected as investments (Amel-Zadeh and Serafeim, 2018; Renneboog et al., 2008).

*Shareholder advocacy* or *active ownership* is the exercise of shareholder voting power to influence and promote the activities of a company. This can be seen in a direct conversation with the company's senior management, sending and voting for proxy resolutions (Amel-Zadeh et al., 2018). The purpose of traditional active ownership is to positively influence the company's activities that support shareholders' objectives, while ESG active ownership also seeks to focus on issues related to the various stakeholders of the company, such as employees, customers and creditors. (Renneboog et al., 2008a; Dimson et al., 2015).

*Impact investing* aims to achieve positive, measurable social and environmental impact without reducing financial return expectations. Impact investing challenges today's view that social and environmental issues can also be influenced other than through charitable donations (GIIN, 2021). A form of impact investing is *community investing* that provides capital to disadvantaged communities who would otherwise have difficulty accessing finance through conventional channels. Some social investors allocate part of their investment wealth to the Community Development Finance Institute (CDFI) to support the development of small businesses and provide funding for low-income housing (Schueth, 2003).

*Thematic or sustainability-themed investing* relies on investments based on ESG factors in a specific theme, trend or asset. Investments may include various sustainable development solutions such as clean energy, environmentally friendly technology, sustainable agriculture or some other sustainable development solution (Amel-Zadeh et al., 2018). Sustainability themed investing can provide an opportunity to invest in assets that are difficult to invest directly in. Such an asset can be, for example, a commodity such as water (Lelasi and Rossolini, 2019).

*Risk-Factor investing* is an investment strategy based on the incorporation of ESG information into systematic risk analysis. For example, in factor investment strategies such as Fama and French (1993) the 3-factorial model or the five-factor model (2015), where the factors are size, value, quality, momentum and volatility, or smart beta (Amel-Zadeh et al., 2018). According to Tax and Jacobs (2014) and Malkiel (2014), smart beta is often described as a passive strategy that seeks to outperform a weighted market benchmark using alternative weighting methods that emphasize various factors such as size, value, momentum or volatility.

*ESG-integration* is a strategy that includes various ESG risks and opportunities for traditional economic analysis and investment decision (Eurosif, 2014). Eurosif divides ESG integration activities into three categories: non-systematic, systematic and mandatory investment constraints. In non-systematic ESG integration, investors and fund managers can utilize available ESG research and analysis in their own investment process. In a systematic approach, investors and fund managers systematically utilize and incorporate various ESG research and analysis into their own investment processes. Finally, mandatory investment restrictions based on various ESG studies and analyses used in conjunction with various socially responsible strategies such as the exclusion approach. According to Eurosif, only classes two and three can be considered as a definition of ESG integration (2014).

### **2.3 Socially responsible markets today**

According to GSIA sustainable investment review, the total amount of assets under management (AUM) worldwide is \$98.4 trillion, of which sustainable investment accounts for 35.3 trillion. Growth from two years ago is about 7 percent, representing an increase of about \$7 trillion in total AUM. Across all geographies, growth has occurred in the past two years in the US, Australia, Japan and Canada, with the exception of Europe, where responsible investing has declined by 13 per cent. The decrease is mainly due to a change in the method of measurement (2020).

The United States and Europe account for about 80% of socially responsible investments in the world, with the remainder split between Canada, Japan, Australia and New Zealand. The most popular socially responsible strategies include ESG integration, based on which an estimated 70% of funds are invested, negative screening at 40%, and shareholder activism with a 30% share of sustainable investments. However, these figures do not provide a reliable picture of the exploitation of strategies across geographical regions. For example, in Australia positive, negative and norm-based screenings are thought of as one strategy, and they do not track shareholder activism strategy as an individual strategy. In addition, the United States does not follow a norm-based screening strategy, which is why its share is small even though it is very popular in Europe. In addition, the European Union's Sustainable Finance Disclosure Regulation has required portfolio managers to include sustainability risks in their investments, which is why exclusionary, norm-based and ESG integration has become part of common investment practice in Europe (GSIA, 2020).

### **3 Previous studies**

This chapter describes previous literature on socially responsible investing and is divided into three different chapters. The first chapter provides an overview of key literature in the field of socially responsible investing. The second chapter presents some of the most popular strategies for responsible investing and their performance. The third chapter presents literature on the performance of socially responsible investing across market conditions. Finally, the fourth chapter summarizes the previous literature presented. The literature is presented in chronological order based on the year of publication. The purpose of this chapter is to create an overview of responsible investing, its strategies as well as performance in various market conditions. In addition, it provides insight into what findings previous literature has found to date and how they have been distributed among funds, between markets and strategies.

#### **3.1 Performance of socially responsible investing**

This chapter provides an overview of the key literature on field of socially responsible investing. These studies have laid the foundation for responsible investment research and also serve as the basis for responsible investment research today. The presented literature deals with literature from both ethical and responsible perspectives.

A paper from Sally Hamilton, Hoje Jo and Meir Statman (1993) investigate performance of 32 socially responsible mutual funds during period of 1991 to 1990. The authors divide mutual funds into two distinct categories: funds established in 1985 or earlier, and other funds established after 1985. To study fund performance, the authors use Jensen's alpha model to measure the excess returns of each fund. Based on results, excess returns of 15 funds established 1985 or earlier are not statistically significant from zero. Two mutual funds have statistically significant excess returns, one negative and the other positive. The average excess return for 17 responsible mutual funds was about 6 basis points per month and annualized rate of about 0.76 per cent. Funds established after 1985 have

similar results. The authors also examine the performance of responsible funds compared with conventional funds. The authors collect data on the funds using the Lipper database. Based on the data collected, responsible funds were eliminated and divided into two groups, using the same reasoning as those established earlier, in 1985 or earlier, and funds established after 1985. The authors note that the performance of socially responsible funds is not statistically different compared to traditional funds. Based on the results, investors lose nothing when investing responsibly, yet social responsibility does not guarantee higher expected returns or lower corporate capital costs.

Statman focuses his research on analysing the results of the Domini Social Index (DSI), which tracks socially responsible companies and funds, from 1990 to 1998. The DIS index is a capital-weighted index modelled after the S&P 500 index. A total of 400 shares are included in the DIS Index, of which approximately 250 are also listed on the SP500 Index. The remaining 150 shares are selected from outside the S&P 500 index, bringing industry representation as well as companies with strong social characteristics. To measure the performance of these indices, Statman calculates the raw returns of indices, risk-adjusted returns, betas, alphas and modified versions of the Sharpe ratio, the so-called Excess Standard-Deviation-Adjusted returns. Statman compares the raw returns of the DIS index to the raw returns of the S&P 500 and find that the DIS outperforms the S&P 500 by a small margin. However, when comparing the risk-adjusted returns of these indices, the S&P 500 outperforms the DIS by a small margin. Based on beta, the DIS index is slightly riskier than the S&P 500 index, but the DIS produces more positive alpha when comparing to the S&P 500. Statman also examine how these indices perform when comparing to socially responsible and conventional mutual funds. According to the results, the DIS index perform as well as the S&P 500 index during the study period. Socially responsible funds underperform the S&P 500 index, but outperform conventional funds.

Bauer, Koedijk and Otten (2005) study the performance of ethical investment funds in Germany, the UK and the United States. Their sample includes data on the returns of 103

ethical mutual funds and 4384 conventional mutual funds between 1990 and 2001. A key question in the study is to determine whether these ethical mutual funds produce different risk-adjusted returns than their conventional peers. For performance measurement, the authors apply the CAPM model and Carhart (1997) four-factor model. The authors find quite different results when comparing the performance of ethical and conventional funds. Between 1990 and 1993, ethical funds produce lower risk-adjusted returns when comparing to traditional funds. The results are also statistically significant. In subsequent years, however, this gap increases, and between 1998 and 2001 ethical funds offer better risk-adjusted returns, although only two of the results are statistically significant. The reason for the discrepancy in finding is that ethical funds may have experienced some learning in the catch-up phase before being able to generate returns similar to traditional funds. However, the authors find no statistically significant differences between ethical and conventional funds.

Renneboog, Ten Horst and Zhang (2008b) study the performance of socially responsible funds comparing with traditional funds in the US, Europe and Asia. The authors use CAPM, Fama French Carhart (FFC) 4-factor models. The authors collect data from socially responsible funds from various sources, including Standard & Poor's fund service, databases from Bloomberg and CRSP. To see how socially responsive funds perform in different countries, the authors examine the risk and return characteristics of socially responsible funds and compared them to each country's reference group. Authors find that socially responsible funds underperform their domestic benchmark portfolios. Risk-adjusted returns for socially responsible funds range from about -2.2% to -6.5% comparing with conventional funds. However, the authors note that socially responsible funds do not significantly underperform their conventional peers when comparing fund alphas.

To investigate whether there is a price for responsible investors to pay for ethics when the investment universe is reduced by various strategies of responsible investing. Belghitar et al. (2014) apply four different indices related to responsible investing, which are FTSE4GOOD US, UK, EU and global indices. Companies selected for the indices have been

identified as responsible under a variety of criteria including CSR, fair workforce and stakeholder policies, and environmental sustainability. For each FTSE4GOOD index, there is a similar conventional peer that is compared to each other as well as with a market index representing the benchmark index. Indices performance is measured by Sharpe ratio, Treynor ratio, Jensen alpha, CAPM, and Carhart-4 factor models. Based on the results, traditional indices outperform socially responsible indices in the UK, US and globally. In Europe, conventional and socially responsible indices perform similarly. The authors also examine performance in the context of marginal conditional stochastic dominance (MCSD). MCSD describes probability conditions in which all risk-avoiding investors prefer one risky asset over another, and provides tools to determine the dominance of one particular asset over another.

The results show that socially responsible investors won't win or lose anything when investing according to responsible, but lead to higher moments in the yield distribution. Based on skewness and kurtosis, socially responsible investors can increase their skewness and reduce kurtosis by investing traditional indices instead of responsible ones. The author also argue that these actions increase the expected utility of socially responsible investors. The authors test the proposal by forming a zero-cost portfolio in which responsible indices are shorted and returns are used to buy conventional indices. This zero-cost portfolio produces a higher average return, lower variance, and higher skew, which is higher than any of the indices individually. The zero-cost portfolio also dominates socially responsible and conventional indices, confirming the assumption that risk-averse investors can increase their expected utility by reducing the number of responsible investments and buying more conventional investments.

Previously presented and academic literature generally has mainly focused on comparing socially responsible and conventional funds. Ghoul et al. (2016) argues that this approach does not take into account differences in characteristics between funds. To reduce the impact of these factors, Ghoul et al. (2016) focus on comparing mutual funds based on socially responsible (CSR) ratings of companies. The authors collect data from

CRSP and KLD databases to form a sample of mutual fund CSR scores. The CRSP database provides information on fund-specific characteristics such as net worth, income and holdings in certain stocks, while the KLD database provides a CSR rating for individual companies based on their social and environmental performance. The authors construct a CSR score at the fund level by matching fund holdings to characteristics of individual shares. Fund performances are measured using the four-Factor model of Carhart (1997). Based on the results, CSR negatively affects the fund's risk adjusted return. Furthermore, negative risk adjusted returns are influenced by CSR strengths rather than concerns. This means that high CSR score funds tend to underperform lower CSR funds. The authors also argue that the increase in CSR attracts social investors who are not sensitive to fund performance, and higher CSR funds repel investors who are performance seekers. These social investors derive non-economic benefits by investing in high-CSR-score funds.

### **3.2 Performance of different socially responsible strategies**

This chapter presents a description of the performance of various responsible strategies. The first part discusses various screening strategies, which are one of the most popular strategies for responsible investing. In addition, the second part presents literature on active ownership and finally impact investing, the popularity of which is not yet very high in the field of socially responsible investing (GSIA, 2020).

Kempf and Osthoff (2007) show how responsibility-based screening affects the stock portfolio. More specifically, whether a higher socially responsible rating leads to higher abnormal returns. The authors use three different forms of screening; negative, positive and best-in-class approach. The authors collect socially responsible ratings from KLD's database and selected companies from the S&P 500 and DS 400 indices from 1992 to 2004. Based on KLD ratings, the authors divide the companies into two different portfolios; one with high socially responsible ratings and the other with low ratings. To investigate whether these ratings have an effect on returns, the authors employ the Carhart 4-Factor model to measure the performance of these portfolios. Based on the results, a higher socially responsible rating portfolio performs better than a lower one and by



simply following a long-short strategy, the investor can earn high abnormal returns. The long-short strategy includes a long position in a portfolio with higher socially responsible ratings and a short position in a lower rating portfolio. Implementing best-in-class or positive screening for an investment strategy can yield a higher abnormal return than a negative screening method.

A study by Becht et al. (2010) examines the returns generated by shareholder activism in the UK Target Fund (HUKFF). The authors collect data from the Hermes database, which provides information on the amount invested in the fund, net worth values, management fees and all internal and external documents. The share price data is collected from a datastream and the London Share Price Database, which also contain information such as board changes, acquisitions and payment practices. The authors develop a methodology for determining the results of shareholder activism and the impact was measured in a 3- to 11- day window around the announcement date. Active advocacy is defined as commitment to the management of the company, cooperation with other shareholders, public meetings and other activities. These interventions are defined as either collaboration or confrontation, or a combination of the two, depending on the target company.

Contrary to previous literature, Becht et al. state that shareholder activism usually takes the form of private intervention. For example, the HUFKK fund intervenes in a poorly managed company where it believes that intervention will improve the company's performance and lead to a significant increase in the share price. HUFKK seeks to influence companies through meetings, collaborations with other institutional owners, and through press campaigns. These actions commonly lead to structural reforms, government changes, and changes in corporate policy, such as fiscal policy. Based on the results, HUFKK interventions increase abnormal returns on underlying shares by 3.9%. Moreover, when the authors exclude the impact of earnings announcements and profit warnings, with stock returns rising to 5.3 per cent, those results are also statistically significant. In

addition to the impact of the share price, the intervention also has an impact on companies' operating results. Interventions increase returns on assets, the average headcount in the company decreases, and the market value of companies' increases. However, these results are not statistically significant. Overall, the HUFKK fund outperformed the FTSE All-Share index by 4.9 per cent a year between 1998 and 2004. The authors conclude that shareholder activism can have a significant impact on the company and benefit both active and outside shareholders (2010).

Lesser et al. (2016) study the screening activities of 213 sustainable screened stock funds. According to the authors, in previous literature, all fund screenings have referred to funds for responsible investing and analysed as a homogeneous group, and previous evidence from Renneboog et al. (2008a) suggests that these funds, on average, do not perform significantly different from the market. The authors argue that screened funds should be viewed as separate approaches such as socially responsible, greens and faith-based screens. Socially responsible funds use screens based on environmental, social and governance factors. Green funds invest in companies that operate in the alternative fuels and renewables and clean technology sectors. Faith-based funds screen based on religious laws and values such as Islamic and Catholic. The sampling period consists of performance of funds between January 2000 and December 2012. The methodology follows previous research (2014) by Nofsinger and Varma to examine the performance of different screens in crisis and non-crisis periods. The authors use the matched pairs approach to compare the performance of sustainable funds. For each sustainable fund, three conventional funds are matched with similar fund goals, age and net worth combined. To measure performance, the authors follow previous socially responsible literature and use the standard Carhart four-factor model and two extended versions of it. The results show that socially responsible, green and faith-based approaches perform similarly to conventional funds and markets in uncertain times. In non-crisis times, socially responsible and green funds show underperformance, while faith-based funds perform the same way in all market conditions. The authors argue that screening efforts

have a significant impact on the performance of sustainable funds. Social screens in particular seem to drive the lower performance of socially responsible funds, while energy screens the better performance of green funds.

A study by Barber et al. (2021) attempts to examine in this recently published study, investors' willingness to impact investing where non-economic benefits may outweigh economic benefits. These impact funds invest in a range of investment destinations such as the environment, minorities and women, poverty, SME finance, social infrastructure and regional development. To investigate this effect, the authors collect data from the Preqin database, which includes fund, investor and performance information. The final sample includes 159 venture capital funds and growth impact funds and 4500 traditional funds between 1995 and 2004. The authors form a regression to measure fund performance by adding an IRR dummy variable and adjustment variables. Based on these results, the authors note that impact funds underperform traditional funds based on IRR returns by 7.89 percentage points. After adding control variables for size, sequence number and vintage years, the performance of impact funds is weaker than traditional funds by 9.94 percentage points. By adding industrial and geography control variables, underperformance drops to 4.70 percentage points, but remains negative. These results are all statistically significant at three levels of significance. The authors also explore investors' investment decisions in impact funds. Based on their willingness to pay framework, impact investors are willing to accept a lower IRR in expected returns by investing in impact funds. This IRR is about 2.5 to 3.7 percentage points lower than investing in traditional funds.

### **3.3 Performance of socially responsible during different market conditions**

This chapter represents previous studies related to the performance of socially responsible funds and indices under different market conditions. The literature focuses mainly on the US, UK and European markets, but also provides results from emerging markets. In the literature presented, market conditions have been defined in different terms, such

as expansion, recession, crisis and crisis or bull and bear markets, but still their meaning remains the same.

Nofsinger and Varma (2014) examine the performance of socially responsible funds during market crises. Their data includes 240 US socially responsible equity funds from 2000 to 2011. For every socially responsible fund, they correspond to three conventional peers with similar Lipper fund objectives, years of existence and net worth. Nofsinger and Varma's approach to measuring performance is similar to previous studies using the Fama & French factor model and Carhart 4-factor model. According to the study, alphas in both funds were negative and insignificant in the selected study period. In non-crisis times, conventional funds performed about 0.67 to 0.95 percent better than socially responsible funds, depending on which factor model was used to measure performance. On the contrary, in times of crisis, socially responsible funds outperformed traditional funds by about 1.61 to 1.70 percent. The most important factor in the return of responsible funds during the crisis is the focus on shareholder activism and ESG issues. In addition to this, positive screening yields a better return than negative screening in different market situations. This is also reflected in results showing that funds based on the exclusion of sin shares or religious principles do not exceed conventional funds during a crisis. In addition, the authors suggest that investors may seek downside protection from socially responsible funds during market crises.

Leite and Cortez (2015) conduct a similar study to Nofsinger and Varma (2014), but on European markets and, more specifically, French stock markets. Their final sample consists of 40 French actively managed socially responsible funds and 120 traditional funds. Responsible funds have been identified through Vigeon, one of Europe's leading providers of ESG rating services. To find a similar conventional fund, the authors first identify all traditional funds that are available to retail investors. From the identified funds, three standard fund peers are selected for each responsible fund, which are classified according to Morningstar in the same category based on investment universe and style. To measure fund activity, the authors use the same approach as Nofsinger and Varma

(2014), which includes three-factor and Carhart four-factor models. The results of the Leite and Cortez study are similar to those of the Nofsinger and Varma study (2014), where conventional funds perform better outside the crisis. On the contrary, during crises, socially responsible funds tend to perform slightly better than conventional funds. However, these findings are not statistically significant. The authors also note that positive screening produces a better return than negative screening, consistent with the findings of Nofsinger and Varma (2014).

In addition, authors Soler-Dominguez and Matallin-Saez (2015) examine the financial performance of the VICEX fund by comparing with responsible funds. The VICEX fund is the exact opposite of a responsible and ethical fund because it invests in so-called sin stocks, namely tobacco, alcohol, gambling and the arms industry. The performance of the VICEX fund and responsible funds are compared in different market situations, such as during expansion and recession. Overall VICEX fund performance is compared with a total of 217 socially responsible funds. The sample data consists of a total of 2913 daily return observations from August 2020 to June 2013. Business cycles are collected from the National Bureau of Economic Research website, and as in previous studies, the authors apply the three- and four-factor models from Fama and French (1993) and Carhart (1997). The results of the study yield similar results to previous studies by Nofsinger et al. (2014) and Leite et al. (2015) when the VICEX fund outperforms socially responsible funds during expansion periods. In recessionary periods, however, socially responsible funds perform better than the VICEX fund, but negatively. Over the two expansion periods, the VICEX fund outperforms responsible funds by about 7 to 8 percent. Over the entire sample period, the VICEX fund exceeds responsible funds by 6.51%. These results are consistent with previous literature showing responsible funds performing better during market crises, but weaker in normal times.

Since previous studies have mainly discussed socially responsible mutual fund outcomes in a different context, Henke study (2016) explore the impact of socially responsible bond mutual funds on social screening. In social screening, investment subjects are screened

based on ESG questions. This study focuses on the U.S. and European corporate bond mutual fund markets between 2001 and 2014. The final sample includes 38 socially responsible funds from the United States and 66 from Europe. For each socially responsible fund, the authors match 3 conventional fund peers with the same yield objectives and comparable age. Overall, the final sample comprises 38 social responsible funds and 114 conventional funds from the United States, the European sample includes 66 social responsible funds and 198 conventional funds. The authors apply a five-factor model that includes aggregate, default, equity, option and term factors to measure the financial performance of bond funds. Overall, socially responsible bond funds outperform their conventional peers between 2001 and 2014 by about 0.5 percent in both the US and European markets. This dominance mostly arises through the use of the exclusion method to exclude bond issuers with the lowest ESG rating. More specifically, bond mutual fund managers seem to use the “worst in class” approach than “best in class,” meaning managers use a social screening approach to support their decision making. This also provides a new perspective on responsible investment strategies, where “best-in-class” or “positive” screening are popular strategies among equity funds. In addition, the authors also examine the performance of socially responsible bond funds during times of crisis and non-crisis. The results suggest that the screening method is a successful choice during market crises such as recession or bear markets. The socially responsible bond fund outperforms conventional peers in the period by 0.65 per cent in the U.S. and 0.92 per cent in Europe. During non-crisis periods, socially responsible bond funds fared better than conventional ones

A study by Belghitar, Clark and Deshmukh (2017) examines the performance of UK socially responsible and conventional funds across three different sub-samples, pre-crisis, crisis and post-crisis periods. In addition to the traditional performance analyst, with factor models, authors use marginal conditional stochastic dominance (MCSD). Since general assumptions about investor behavior depend on risk avoidance, this approach allows authors to test whether investors prefer a single type of fund from a risk avoidance and usefulness-maximizing investor perspective. In MCSD terminology, a fund that has

outperformed another fund is preferred among investors or a so-called “dominant” fund. The results of Carhart four-factor model show that in pre-crisis times, SRI funds and traditional funds outperforms the market, and in addition, SRI funds outperforms conventional funds. Based on MCSD, SRI funds tend to be more dominant among investors. Moreover, periods of crisis show that traditional funds perform better than market and SRI funds. Investors also rely more on conventional funds, which may indicate the sensitivity of SRI funds during market crises. Pre-crisis periods show similar results to post-crisis periods because SRI funds perform better than markets and traditional peers. These evidence suggests that in good economic times, SRI funds tend to perform better than conventional peers funds, and investors trust them more. This evidence is different from what earlier literature has observed by Nofsinger and Varma (2014) and Leite and Cortez (2015). Finally, the authors point out that the key driver of the fund's success is the management company which appears more significantly in socially responsible than in conventional funds.

Paper Wu et al. (2017) to examine the performance of socially responsible and conventional indices across different economics cycles in Great Britain. Authors choose FTSE4GOOD as a proxy for SRI portfolios, FTSE350 for traditional portfolios and FTSE100 as the benchmark. The sampling period consists of monthly data from 2004 to 2011, which the authors divide into pre-crisis, pre-crisis and post-crisis periods. The risk-adjusted performance of the indices is measured by the Jensen alpha (1968) to Sharpe ratio (1966). The authors find similar results to Nofsinger and Varma (2014) and Leite and Cortez (2015) when socially responsible funds perform better in times of crisis than pre-crisis and post-crisis periods. In addition, SRI portfolios recovered faster from the crisis than traditional funds, supporting the view of Nofsinger and Varma (2014) that SRI funds can provide protection in times of uncertainty.

In addition, Matallin-Saez et al. (2018) explore a similar issue in the United States as Nofsinger and Varma (2014) and following the same methodology. The sample includes daily returns from U.S. SRI and conventional mutual funds for the period 2000-2017. The

authors examine the performance of SRI and traditional funds based on investment style across different economic cycles. Based on Carhart four-factor model results, SRI funds show predominantly negative performance during expansion periods, while conventional funds show mixed performance. Overall, conventional funds outperform socially responsible funds during expansion periods. However, differences between performances are statistically significant only in rare cases, and the most significant results can be observed in value investment styles. During a recession, socially responsible funds improve performance considerably but insignificantly. The results of this study support the general findings of previous literature that responsible funds perform better than conventional funds during market crises (Nofsinger et al. 2014 and Leite et al. 2015).

A paper from Badía, Ferruz and Cortez (2020) study the performance of socially responsible and conventional portfolios worldwide. The authors look at the performance of six portfolios under different market conditions. The difference from previous literature lies in the authors utilizing the Fama and French (2018) six-factor model instead of the traditional Fama and French (1993) three-factor model and Carhart (1997) four-factor model. The sample consists of six different indices from Global, North America, Europe UK, Pacific and emerging markets representing regional portfolios. In examining the full sample period from 2005 to 2014, the authors note that the global SRI portfolio exceeds the traditional portfolio significantly. For other regional portfolios, the results are positive for the US and European portfolios, but insignificant. The UK, Pacific and Emerging portfolios show negative, although statistically significant results only in the Pacific portfolio. Under different market conditions, both global SRI and traditional portfolios show negative and significant performance. However, the differences are not statistically significant in either market situation. Furthermore, the results support previous literature as SRI portfolios perform better than normal compared to conventional funds (Nofsinger and Varma, 2014). Results from other regional portfolios show negative and statistically significant results for UK, Pacific and emerging markets portfolios during bull markets. Developments in the United States and Europe are positive, but not statistically significant. During a bear market, the performance of all portfolios is negative and statistically



insignificant. Overall, the authors argue that an investor loses nothing by investing in SRI portfolios and suggest that regional portfolio differences can be explained by country factors or cultural aspects of the country.

A more recent study by Lean and Pizzutilo (2021) examine the performance of socially responsible indices during times of crisis in different regions. The authors follow a similar approach to previous literature by utilizing the models of Fama and French (1993) and Carhart (1997). Furthermore, in deviation from previous literature, the authors also use the Fama and French five-factor model, which has been suggested to be better at describing average returns than the three-factor model (Fama and French 2015). The data consists of conventional and SRI indices from the United States, Europe, Asia-Pacific and Japan. Overall, the results show that responsible funds perform better than normal throughout the survey period and times of crisis, but also in some cases during non-crisis periods. The results also suggest geographic dependence, as performance during periods of crisis varies between different regional indices. In fact, it seems that Pacific SRI Indices perform better during normal times than in times of crisis while European responsible Indices perform better in all market conditions. However, these results are mostly insignificant, but show the evidence of geographic dependence, which Badía, Ferruz, and Cortez (2020) reported in their study. The authors find little evidence of potential downside risk protection for SRI funds during crises, which Nofsinger and Varma (2014) proposed. However, this evidence is only visible in North America. In addition, the authors conclude that the potential performance of socially responsible funds is due to an optimal screening strategy, timing and fund managers' stock-picking ability rather than the actual responsibility of the portfolio.

### **3.4 Summary of previous studies**

The performance of responsible funds has been studied a lot in earlier literature, but studies have yielded mixed results. Studies have compared both responsible fund and ethical funds, but neither of these have produced statistically significant returns compared to traditional funds. However, these studies have focused mainly on comparing

traditional funds to responsible or ethical funds. Belghitar et al. (2014) and El Ghouli et al. (2016) argue that comparing traditional and socially responsible funds without considering the characteristics of individual funds, such as fund size, age, and investment universe, can influence the results of the study. In order to reduce the impact of fund characteristics Statman (2000) and Belghitar et al. (2014) studied the performance of socially responsible indices and compared with conventional indices. Statman finds that socially responsible indexes outperform the S&P500 index when comparing raw returns, but weaker based on risk-adjusted returns. Belghitar et al. (2014) note that traditional indices outperform socially responsible peers in the US, UK, and global categories, while yielding similar results in Europe. In addition, El Ghouli (2016) collected data on mutual funds and compared them based on CSR ratings. This approach allowed him to compare all funds based on their CSR rating without dividing funds into responsible and conventional groups.

While responsible investing has not produced statistically significant returns, studies argue that investors lose nothing by investing in responsible funds, nor do they earn significantly higher returns than investors in ordinary funds. Based on Bollen (2007) and Riedl et al. (2017), responsible investors are willing to haggle over financial performance if they are allowed to invest according to their own social preferences. Socially responsible investing consumes the utility function of responsible investors, which controls asset allocation to responsible investees.

The roots of responsible investing date back to ethical investing, which aimed to avoid investing in so-called sin stocks, namely gambling, tobacco, alcohol and guns. This strategy is known as exclusion, which today covers certain sectors such as tobacco, alcohol, weapons and polluting energy sources such as coal and nuclear power. For example, in Hamilton et al. (1993), mutual funds exclude companies based on a variety of criteria, including the manufacture of weapons, tobacco, alcohol, and nuclear power. In previous studies, different screening methods are strongly highlighted when looking at the performance of responsible funds. Of the screening options, positive screening and “best-

in-class” screening have been studied to be the most effective strategies compared to negative screening. Based on Nofsinger et al. (2014) and Leite et al. (2015), during market crises, a positive approach tends to be preferable to a negative approach. On the contrary, Henke (2016) believes that negative screening or the so-called “worst in class” approach was driving performance in European and US bond markets, where bond issuers were excluded based on the worst ESG rating.

In addition to various screening strategies, active ownership also has significant implications in responsible investing. Nofsinger notes that one of the most important performance factors during market crises was active ownership and consideration of ESG issues. During the crisis, active ownership and consideration of ESG issues were the main drivers to outperform traditional funds by about 2-3 percent. Furthermore, Becht et al. (2010) found that active ownership affects both active and outside shareholders. The effect of active ownership boosted abnormal returns by 3.9 per cent and pushed stock prices up about 5.9 per cent. The interventions also raised the company's rate of return on capital, streamlined the business and increased market capitalization.

Previous studies have, as a rule, produced similar results on the performance of responsible funds under different market conditions (Nofsinger and Varma, 2014; Leite and Cortez, 2015; Soler-Dominguez and Matallin-Saez, 2015; Matallin-Saez et al., 2018 and Badía et al., 2020). In these studies, responsible funds have performed worse than normal funds in normal times and performed better in times of crisis. However, these studies have found clear limitations that need to be considered. For example, both Nofsinger and Varma (2014) and Leite and Cortez (2015) utilized a similar study period in which results might be limited to time period. In addition, both examined the funds' performance in two individual countries in the United States and France, which can lead to sample-specific results rather than offer a description of the state's dependence on different markets, similar reported by Lean and Pizzutilo (2021). In addition, Soler-Dominguez and Matallin-Saez (2015) conducted a similar study between one VICEX fund

and 217 responsible funds in the United States. A limitation of this study can be considered the data used, since the performance of one standard fund is compared against several different responsible funds. Although the purpose of the study was to examine the performance of the VICEX fund, which invests in sin shares, against responsible funds, the results may not be in the best way to compare. A study by Matallin-Saez et al. (2018) approached the problem in a slightly larger time frame where investment style and universe were used as criteria to compare conventional and responsible funds. Unlike previous literature, this approach does not take into account the age of funds that have been found to have large effects on performance (Renneboog et al., 2008b). In addition, Badía, Ferruz and Cortez (2020) conducted a study comparing the performance of six different portfolios worldwide. While the authors tried to view performance as broadly as possible, the study nevertheless analyzed performance differences between responsible and conventional portfolios only from a global perspective. Countries' responsible portfolios were compared only to each other, which showed the performance of responsible portfolios to be state-dependent.

On the other hand, studies by Belghitar et al. (2017), Henke (2016) and Lean and Pizzutilo (2021) have found opposite results in how funds perform under different market conditions. However, research by Belghitar et al. (2017) focuses on addressing UK funds with a similar time series to the previously presented literature, thus raising questions about sample and time specific outcomes. Addition, Lean and Pizzutilo strive to avoid this by examining the performance of different responsible and conventional indices across worldwide. Their results showed variation between different countries and market conditions, which can be explained by different levels of responsibility and cultural aspects in different countries (Badía, Ferruz, and Cortez, 2021; López-Arceiz et al., 2018). Finally, study by Henke (2016) shows that responsible bond funds perform better in both the United States and Europe in all market conditions, which is an interesting finding compared to previous literature.

## **4 Theoretical framework**

This chapter discusses the theoretical framework behind of socially responsible investing. First part describes the efficient market theory and how it is related to the concept of investing. Second chapter presents the concept of modern portfolio theory. Third and final chapter describes the theories of stakeholder and utility, and how they impact on responsible investor decisions.

### **4.1 Efficient market theory**

In 1970, Fama introduced effective market theory based on the assumption that markets reflect all available information. In an efficient market, all available information is included in securities prices and there would be neither overvalued nor undervalued securities. Fama divides market efficiency into three different forms; weak, semi-strong and strong form of market efficiency. The weak form assumes that current prices reflect all previous price data, so future price movements cannot be guided by past price patterns. The weak form of market efficiency is also referred to the random-walk hypothesis, in which the price of securities moves randomly and is independent of past prices and movements of other securities in the market. The semi-strong market-efficient format states that all publicly available data as well as past price data are included in securities prices. The strong form of market efficiency concludes that securities prices reflect all possible information available both publicly and privately.

Effective market theory holds that the market reflects all available information that prevents investors from earning extra returns. If effective market theory holds, actively and passively managed portfolios generate the same return before cost reduction of active portfolios, making active portfolio management unnecessary (Ippolito, 1993). While EMT considers it best for an investor to invest in a passive index fund, various strategies for responsible investing do not offer investors higher than expected returns compared to passive portfolios because sustainable information is already incorporated into prices.

Several previous studies have yielded somewhat conflicting results in relation to actively and passively managed funds. In 1968, Jensen conducted a study of mutual fund performance and found evidence that fund managers are unable to go beyond traditional buying and holding strategy. In addition, the conclusion remains the same after management fees are excluded from the fund's returns. Furthermore, Carhart (1997) states that funds in the top decile yield more than administrative costs, while most funds yield the same as administrative costs, while funds in the lowest decile underperform average double the reported administration costs. However, a research by Wermers (2000) finds that actively managed funds outperform their benchmark index by about 1.3 per cent a year in gross returns, but significantly underperform in net returns. More detailed analyses show that mutual fund managers tend to hold stocks that are able to beat the market enough to cover expenses and transaction costs. Blake et al. (2017) conducted similar research using different bootstrap models in the UK fund market. The results produce similar evidence of weaker investment funds because the average mutual fund manager is unable to deliver performance after net returns. Little evidence can be found among top fund managers capable of delivering performance above gross returns. However, no evidence can be found that fund managers are systematically capable of producing more than gross or net returns. In fact, most of the previous literature shows evidence of poor performance of active funds, where the main reasons can be seen as fund manager incentives to create an alpha. Furthermore, Blake et al. (2017) and Fama and French (2010) argue that the majority of fund managers are merely unskilled. While few managers are able to generate positive gross returns, but wither a positive result with their own fees and expenses. Generally, the results of previous literature tilt more towards the efficient market hypothesis because active portfolio management is unable to provide higher returns after fees compared to simply passive investment strategy.

## 4.2 Portfolio Theory

Harry Markowitz introduced modern portfolio theory in 1952, based on diversification, which allows investors to maximize expected returns at a given portfolio risk level. Securities are selected for a portfolio based on their expected returns and variance, Markowitz also called this the mean-variance analysis. If two securities have the same expectation of return but different variance, security with a lower variance is selected for the portfolio. However, considering for a portfolio with securities with low variance is not sufficient and it is necessary to estimate the covariance between securities. Diversification to different industries reduces portfolio covariance, as companies in different industries with different economic characteristics have lower covariance than companies in the same industry. Securities with low covariance are favourable choices for reducing the portfolio to firm-specific risk (Markowitz, 1952).

On the basis of diversification, Markowitz (1952) also introduced a concept of efficient frontier and additionally efficient portfolio measured by mean variance analysis. An efficient frontier describes a set of portfolios that offer the highest expected return at a given portfolio risk level (Bodie, Kane and Marcus, 2014). The mean-variance efficient portfolio that provides the lowest possible variance for the expected return and the highest expected return for a given variance. Markowitz notes that portfolio selection begins by finding all effective combinations of expected return and variance, known as the efficient frontier. Portfolios located at the efficient frontier are considered optimal risk-return combinations (Markowitz, 1952; 1991). However, how portfolios are drawn on the effective frontline and which investor chooses depends on the investor's own risk-performance benefits (Elton and Gruber, 1997).

As we consider modern portfolio theory in field of socially responsible investing, the key issue relates to responsible investment strategies, more specifically exclusion strategy. The fundamentals of modern portfolio theory are based on diversification, the benefits of which are based on the distribution of wealth between different companies and sectors, creating an optimally diversified portfolio. When an investor's potential investment

universe is constrained, the investor's ability to create an optimal portfolio is diminished, resulting in lower risk-adjusted returns (Cortez, Silva and Areal, 2009). However, this negative impact can be offset by more advanced stock pickings. More specifically, an un-screened portfolio may be easier to benefit from diversification, but it is also possible for an investor engaged in rigorous screening to achieve the benefits of diversification with advanced stock picking skills (Barnett and Salomon, 2006). Despite the theory, Bello's (2005) paper shows that socially responsible and traditional funds are no different in terms of investment diversification

### **4.3 Stakeholder theory**

In 1984, Freeman introduced stakeholder theory, which defines a stakeholder as an individual or group that influences, or is influenced by, the activities of a company and the achievement of its objectives. From the perspective of the company, the various stakeholders that influence operations are suppliers, employees, customers, competitors, owners and others who directly or indirectly affect the operations of the company. Therefore, stakeholder theory is based on the idea that a company should create value for all stakeholders, not just shareholders. In 1962, Milton Friedman introduced the theory of shareholder maximization. This theory is called shareholder theory and it lays the basis for Freeman's (1984) stakeholder theory. Shareholder theory is based solely on the idea that the company is considered to be its shareholders and the company's sole goal is to maximize shareholder wealth.

The impact of stakeholders on the company's performance and, in addition, on the performance of mutual funds, has been extensively studied in previous literature. According to Freeman (1984), a company's financial performance can be described as the total value that a company generates through its operational activities, which is the sum of the utility generated by all stakeholders. Renneboog et al. (2008b) argues that socially responsible investors seek to maximize their wealth and social responsibility. Socially responsible investors are vigilant on social issues and seek to gain non-economic benefit by allocating wealth according to ethical and social values. Harrison et al. (2010) argues



that knowledge of stakeholder utility functions can lead to value-generating opportunities that can create advantages over competitors. Furthermore, Barnett et al. (1997) argue that by combining modern portfolio theory and stakeholder theory, the disadvantages of a smaller investment universe can be offset by a more skillful selection of good companies with better management or other social criteria compared to others.

The results of Waddock and Graves (1997) and Barnett and Salomon (2006) show that a company's social performance and financial performance have a positive relationship based on different responsible screens, but also on different social characteristics. A limited investment universe reduces the benefits of diversification, which, according to modern portfolio theory, can be detrimental to financial performance. According to stakeholder theory, companies are more successful than others because of social differences and different attitudes towards the company's stakeholders and their value formation. Socially responsible funds that use only a few screens benefit from a higher diversification rate, while funds with more screens may benefit from screening low-performing companies.

#### **4.4 Utility theory**

Economic utility theory defines an individual's investment decision as a trade-off between immediate consumption and delayed consumption. The investor weighs the benefits of immediate consumption against the benefits that would be achievable by investing unused funds and thus enjoying greater wealth and advantage at some point in the future. If an investor chooses to defer spending, he or she chooses, according to utility theory, the portfolio that delivers the greatest satisfaction over the long term (Nagy and Obenberger 1994). Von Neumann and Morgenstern introduced axioms related to utility theory in 1947. These axioms define investors as fully rational, risk avoiders, and wealth maximizers. In addition to this, the theory assumes investors maximize expected returns according to portfolio theory by using the mean-variance method. According to Friedman and Savage (1948), investors choose from a number of risky investment options the ones that yield the highest expected return for the investor. Therefore, investors choose

the portfolio that gives them the highest return, but at the same time the lowest expected risk, based on the average variance analysis by Markowitz (1952).

As mentioned in Chapter 2, a multi-attribute utility can bring a new perspective to the investors' decision-making process. An investor can derive non-economic benefit by investing wealth in socially responsible funds. Conscious investors see responsible investing as a consuming socially responsible attribute that brings benefit to the investor. Bollen describes this as a conditional utility function. An investor with a conditional utility function may experience positive returns from a responsible fund as stronger than from a conventional fund, which can result in higher inflows into socially responsible funds (2007). According to Renneboog et al. (2011) and Benson et al. (2008), socially responsible investors are less sensitive to negative returns and are more loyal to responsible funds than investors in conventional funds. Investors are also more likely to increase their investments in responsible funds they already own, regardless of past developments, suggesting that investors gain non-financial benefits by investing their funds responsibly. Furthermore, Benson et al. (2008) also identified limited options that would provide the same non-financial benefit to the investor as a reason for the loyalty of responsible investors.

## 5 Data and methodology

The following chapters provide a description of the data used in this study, which includes descriptions of funds and market conditions and a description of methods for comparing the performance of responsible and conventional funds. The data collection follows previous research by Renneboog et al. (2008b) in which the authors looked at the performance of socially responsible and conventional funds in Europe, North America, and Asia-Pacific markets. To control the availability and volume of data, research is limited to fund markets in the UK, Germany, France, Luxembourg and Belgium. For market cycles, I follow an approach similar to earlier studies by Nofsinger and Varma (2014) and Soler-Dominguez and Matallin-Saez (2015), using Eurostat and the Euro Area Business Cycle Network (EABCN) sites to define different European market conditions (Eurostat, 2022; EABCN, 2022). Methods used to measure performance are common models that earlier literature has found suitable for measuring fund performance (Bauer et al., 2005; Renneboog et al., 2008b; Nofsinger and Varma 2014; Wu et al. 2017; and Lean and Pizzutilo 2021).

To measure the performance of socially responsible and conventional funds under different market conditions, I follow previous research by Nofsinger and Varma (2014) using dummy variables. Dummy variables are built to model periods of expansion, recession, and slowdown. In other words, an expansion dummy variable is constructed in such a way that if a period is classified as an expansion period, its value is one and otherwise zero, creating an expansion dummy. The same procedure is done in other periods, creating dummies of recession and slowdown times.

### 5.1 Data description

The data for the thesis consists of fund data from five European countries with a sample period from January 1, 2005 to December 31, 2019. Destination countries include France, Germany, Great Britain, Belgium and Luxembourg. Since previous literature mainly focuses on studying the performance of socially responsible funds between 2000 and 2010,

this study seeks to look for more recent evidence of fund performance. In addition, this study excludes the COVID-19 crisis, since it is difficult to analyse its effects at this point, as well as in 2020, when the US presidential election was held, as it may have an impact on responsible investing in the European market.

The fund's data are collected from Thomson Reuters' Eikon Datastream on the basis that they have existed throughout the study period 2005-2019. Various keywords such as "Responsible", "Sustainable", "ESG", "Ethical" and "Environment" were used as search criteria and were limited to active funds, which excludes dead funds from research. Information on factor models is collected from the Fama French website and consists of factor data from the European market. This study uses the US T-bill as a risk-free rate for factor models retrieved from the Fama French website. This approach is consistent with previous research by Fama and French (2017) and Lean et al. (2015), who use the US T-bill to analyse European markets. In addition, factors are taken into account in US dollars, so this study has been done from the perspective of a US investor.

The final sample of the funds consisted of 48 responsible European funds and 96 conventional funds, which are described in more detail in the following figure. Funds are categorized by Morningstar category into different groups based on investment style: large cap mix, large cap growth, large cap value, mid cap mix, mid cap growth and mid-cap value. This study follows a matched pair approach first introduced by Mallin et al. (1995) and was later used in several studies on comparing responsible and conventional fund performance (Belghitar et al., 2017; Leite and Cortez, 2015; Leite and Cortez, 2014; Renneboog et al., 2008b; Kreander et al., 2005). For fund matching criteria, I follow a paper by Leite and Cortez (2015) by matching two standard funds for each responsible fund based on fund age, domicile, investment universe and style. The purpose of this method is to eliminate the impact of specific features that can affect the performance of funds and reduce the problem of comparability of funds (Mallin et al., 1995; Kreander et al., 2005). The selected European socially responsible funds and two matched conventional funds are described in Appendix 2.

**Figure 1.** Summary of SRI and conventional funds

<b>Fund summary</b>							
<b>Region</b>	<b>No. Funds</b>	<b>Mean Age</b>	<b>Median Age</b>	<b>Mean AUM</b>	<b>Median AUM</b>	<b>Mean expense ratio</b>	<b>Median expense ratio</b>
<b>Luxembourg</b>							
SRI	14	19,29	19,50	211	90	1,83	1,81
Non-SRI	28	19,39	20,00	199	97	1,80	1,85
<b>Germany</b>							
SRI	4	24,25	21,50	996	97	1,38	1,40
Non-SRI	8	24,38	22,00	485	180	1,74	1,62
<b>Belgium</b>							
SRI	3	18,33	18,00	64	47	1,11	0,79
Non-SRI	6	18,33	18,00	61	39	1,32	1,43
<b>UK</b>							
SRI	16	22,56	19,50	194	147	1,30	1,59
Non-SRI	32	22,31	19,50	407	125	1,35	1,53
<b>France</b>							
SRI	11	21,64	21,00	224	123	1,52	1,46
Non-SRI	22	21,77	22,00	281	75	1,71	1,63

Figure 1 provides an overview of the funds under investigation. The average ages between funds are very close to each other, which was one of the main selection criteria. Assets under management (AUM) and expense ratios describe the size and cost structure of funds. Based on the expense ratio, we can assume that funds are primarily actively managed. While the size of the funds was not one of matching criteria's, average AUMs are still relatively similar. The cost of funds is also very similar between funds, with the biggest differences being between the French and German funds.

**Figure 2.** Summary of investment styles

	Investment styles	
	SRI	Conv
Large Blend	21	42
Large Value	6	12
Large Growth	13	26
Mid Blend	3	6
Mid Value	1	2
Mid Growth	4	8
<b>Full sample</b>	<b>48</b>	<b>96</b>

In addition, Figure 2 illustrates the investment styles of SRI and traditional funds. These funds are categorized by Morningstar category as either blend, growth or value funds and based on the investment universe into large, middle and small funds. However, due to data limitations, this study includes only large and medium-sized funds. Utilizing a variety of factor models, the objective of the study is to determine the factor exposure of socially responsible and conventional funds in each market situation and to examine potential differences in investment styles.

### 5.1.1 Data selection

The final sample of responsible funds consisted of 48 funds from Luxembourg, France, Belgium, Germany and the United Kingdom. After controlling funds that are active and born before 2005, funds are selected based on their Morningstar category, which has a different investment style and universe. Selected funds are large and mid-cap funds with blend, growth and value investment styles. Datastream also provides total net worth per fund and total expense ratios for selected funds. Based on previous research from Gregory et al. (1997), Renneboog et al. (2008) and Reuters and Zitzewitz (2021), the authors

find no evidence that fund size has a significant impact on fund performance. Based on these results, this study does not take into account fund size when socially responsible funds are matched with conventional peers. Fund size and total cost ratios are considered descriptive statistics in this study.

After selecting responsible funds, two conventional funds are matched for each responsible fund. The final sample of conventional funds consists of 96 funds from the UK, Belgium, France, Germany and Luxembourg. Following papers from Leite and Cortez (2015, 2014), Nofsinger and Varma (2014) and Belghitar et al. (2017), funds have been matched based on similar interception date, domicile, investment universe and style. Due to data limitations, the date of interception of a conventional fund can vary by about a year and a half compared to a responsible fund. The investment universe and style are defined for each conventional fund based on the Morningstar class. Based on these criteria, two conventional funds are matched for each responsible fund according to the fund's age, domicile, investment style and universe. These criteria and methods are aligned with earlier literature, which generally includes two or three conventional funds of equal socially responsible (Statman, 2000; Bauer et al. 2005; Leite and Cortez, 2015, 2014; Belghitar et al. 2017 and Renneboog et al. 2008b).

### **5.1.2 Portfolio construction**

This master's thesis follows previous research by Bauer et al. (2005) in portfolio construction. Equally weighted portfolios are built on a country-by-country basis by taking the average monthly returns of funds. The same procedure has been repeated with conventional funds. The differential portfolio is formed by subtracting the average returns of the conventional funds from the returns of socially responsible funds in each country individually.

### 5.1.3 Survivorship bias

When looking at the performance of funds, it is important to note the biases associated with them as well. According to Elton et al. (1996), survivorship bias refers to the bias in which an investor considers only those securities that exist and exclude securities that has gone bust. In most cases, the reason for the bust of funds is their poor performance or sometimes the size of the fund compared to the rest of the market, which is why management does not find it profitable to maintain the fund. In some cases, the fund will not disappear but rather merge into a larger fund family. Elton et al. (1996) argue that the background to this merger is to continue to collect fees from investors and to hide the poor performance of the fund. Based on research by Elton et al. (1996) on the impact of survivorship bias in mutual funds, states that prior mutual fund researches suffer from survivorship bias since they don't include funds that have been closed down or merged during research period. Merged funds suffer poorer performance than other funds which leads to overestimation of fund performance. According to Bauer et al. (2005), by excluding dead funds out of the sample leads to overestimation of average returns. These overestimations in Bauer et al. (2005) research was approximately 0.17 percent in UK, 0.31 percent in US and 0.14 percent in Germany.

In 1992 Linnainmaa introduced the reserve survivorship bias in his research paper. Linnainmaa suggests that the correlation between fund performance and the survival of funds can cause another bias, which is the opposite of the survival bias. As we look at alphas estimate of data that is unbiased for survivorship, the results are biased downward compared to the actual alpha distribution. Investors tend to abandon a mutual fund if its posterior mean or so-called true alpha estimate falls below certain point and the fund disappears. Investors who correct survivorship bias through estimated alphas, which are average risk-adjusted returns. The gap between the posterior mean or true alpha and the estimated alpha is called the reserve survivorship bias. Based on the results, the four-factor model alpha has an average return of -0.49%, which describes the true alpha. Once controlled for survival bias, the average risk-adjusted return or estimated alpha is -0.92%. The magnitude of the survival bias estimate is 0.43 basis points.



Linnainmaa argues that the reverse survivorship bias affects the measure of fund performance and the abilities of the fund manager. Some funds tend to drop due to poor performance, some funds disappear due to bad luck rather than low or negative alpha.

This study only includes funds that were surviving during investigation period of 2005 to 2019. Datastream provides data on dead funds but not information about a merger with another fund. In addition, Morningstar removes data from dead funds, making it difficult to classify funds based on a different investment style and universe. Based on this, dead funds are not included in this study. Therefore, we can assume that the study suffers from survival bias and research results can be overestimated based on previous research by Linnainmaa (1992), Elton et al. (1992) and Bauer et al. (2005).

## **5.2 Definition of market conditions**

The European Commission database Eurostat and EABCN provide information on business cycles in Europe. Eurostat divides the European business cycle into three different states; expansion, recession and slowdown. The sampling period covers a total of three expansion cycles lasting a total of 126 months, two recessionary periods lasting 33 months and a total slowdown period lasting 21 months.

Previous research literature has divided market conditions into non-crisis and crisis periods based on expansion/recession metrics (Nofsinger and Varma, 2014, and Leite and Cortez, 2015 e.g.). However, this study looks more deeply into the performance of responsible funds, where the slowdown in the market has been taken into account. Eurostat also allows for a more detailed study of the timeline, but in this study we focus on market dividing into expansion, recession, and slowdown and examine performance over these periods.

**Figure 3.** Business cycles in Europe during period of 2005 to 2019 (Eurostat, 2022; EABCN, 2022)

European business cycles according to Eurostat	
Cycle phase	No. of months
January 2005 – December 2007 (Expansion)	36
January 2008 – March 2009 (Recession)	15
April 2009 – June 2009 (Slowdown)	3
July 2009 – June 2011 (Expansion)	24
July 2011 – December 2012 (Recession)	18
January 2013 – September 2013 (Slowdown)	9
October 2013 – March 2019 (Expansion)	66
April 2019 – December 2019 (Slowdown)	9

The sampling period consists of three expansion cycles, two periods of recession, which are during the financial crises of 2008-2009 and the euro crises in 2012, and three periods of slowdown. Expansion cycles describe the normal state of the market with increasing growth rates in the European market. Recessionary periods describe so-called periods of crisis, in which the rate of growth drops substantially. In addition, periods of slowdown describe market conditions where growth rates remain below the trend line, but the decline is not significant as during a recession. Therefore, periods of slowdown describe an intermediate stage in the market that can lead to either a normal phase or a crisis phase.

### 5.3 Performance measurements

This study uses different models to measure the performance of socially responsible and conventional funds. Papers by Wu et al. (2017) and Badia et al. (2020) use Sharpe and Sortino relationships to measure fund performance. In addition, this study employ CAPM, Fama and French three-factor model and Carhart four-factor model, which has become one of the most prominent models of socially responsible literature (Nofsinger and Varma, 2014; Leite and Cortez, 2015; Renneboog et al. 2008b; Bauer et al. 2006 and Lean et al. al. 2015). Jensen's alpha is derived based on calculations by CAPM.

### 5.3.1 Jensen's alpha

Michael Jensen (1968) developed the Jensen measure for assessing the performance of portfolios of risky investments. Earlier theories by Sharpe (1966) and Treynor (1965) about capital asset pricing and other risk measures allowed Jensen to form a measure of portfolio performance at a given systematic level of risk. Jensen's alpha provides an average return on a portfolio that is above or below what the capital pricing model predicts. If the securities or portfolio are drawn above the securities market line predicted by CAPM, the investment generate positive alpha and imply higher performance compared to the market. On the contrary, a security or portfolio drawn below security line shows negative alphas and weaker performance compared to markets (Bodie, Kane and Marcus, 2014).

The Jensen's alpha for portfolio p is formed as follows:

$$\alpha_p = r_{p,t} - (r_{f,t} + \beta_p(r_{m,t} - r_{f,t})) \quad (1)$$

Where  $\alpha_p$  denotes the average return of portfolio that is above or below the predicted return by capital asset pricing model or so called alpha.  $r_p$  is the expected portfolio return in time t,  $r_f$  is the risk-free rate,  $\beta_p$  denotes beta of the portfolio and  $r_m$  is the expected market return in time t.

### 5.3.2 Reward-to-Volatility ratios

Sharpe ratio or the reward to volatility ratio is a performance measure developed by William Sharpe in 1966. The Sharpe ratio measures the expected return of a security or portfolio compared to its riskiness and it is commonly used performance measure among investment managers (Bodie, Kane and Marcus, 2014; Sharpe, 1966). The Sharpe ratio for portfolio is formed as follow:

$$\frac{r_p - r_f}{\sigma_p} \quad (2)$$

Where  $r_p$  denotes the portfolio or security return,  $r_f$  is a risk-free rate and  $\sigma_p$  describes the standard deviation of the portfolios excess returns. Portfolio with high Sharpe ratio have higher risk-adjusted returns. When the Sharpe ratio of a portfolio is negative, the return on the portfolio is lower than the risk-free rate.

In addition to the standard Sharpe ratio, the study utilizes the Sortino ratio, in which the standard deviation of excess returns is replaced by a smaller partial standard deviation (LPSD), which takes poor returns into account. The Sortino ratio thus takes into account the risk of deterioration of the investment and thus, together with the Sharpe ratio, gives more reliable results of the risk-adjusted return on the investment (Sortino & Price, 1994). The Sortino ratio is formed as follows:

$$\frac{(r_p - r_f)}{\sigma_d} \quad (3)$$

Where portfolio return and risk-free rate remains the same but standard deviation of excess returns is replaced for standard deviation of the downside risk.

### 5.3.3 CAPM

The capital asset pricing model is a single-factor model that can be used to measure fund performance. CAPM is a widely used measure of fund performance and has been used in several previous literature to measure the performance of conventional and responsible funds (e.g., Statman, 2000; Nofsinger and Varma, 2014 and Bauer et al., 2005). CAPM also provides the basics for the Fama and French three-factor model, as well as the Carhart (1997) four-factor models. The formula is formed as follows:

$$R_t - R_{f,t} = \alpha_i + \beta_i(R_m - R_f) + \epsilon_t \quad (4)$$

Where  $R_i$  denotes portfolio returns,  $R_f$  is a risk-free rate,  $\beta_i$  beta of the investment and  $(ER_m - R_f)$  is the market premium. In order to measure performance in different market conditions, CAPM is modified to include expansion (EXP), recession (REC) and slow-down (SD) dummies. This approach follows the framework introduced by Nofsinger and Varma (2014) with slightly modifications. The CAPM model with expansion, recession and slowdown dummies is formed as follows:

$$R_t - R_{f,t} = \alpha_{EXP} D_{EXP,t} + \alpha_{REC} D_{REC,t} + \alpha_{SD} D_{SD,t} + \beta_i (R_{m,t} - R_{f,t}) + \epsilon_t \quad (5)$$

Where  $\alpha_{EXP}$ ,  $\alpha_{REC}$  and  $\alpha_{SD}$  are the monthly returns for expansion, recession and slow-down periods. Dummy variables  $D_{EXP,t}$ ,  $D_{REC,t}$  and  $D_{SD,t}$  are created separately and take value of 1 if the time  $t$  is defined as expansion, recession or slowdown period and 0 otherwise.

#### 5.3.4 Three-Factor model

The three-factor model of Fama and French (1993) is to extend the capital pricing model that incorporates size and value-to-market variables into the equation. The size variable is denoted as SMB (small minus big) and refers to the average return of three small portfolios minus the average of the three large portfolios. The book market variable is called HML (High minus Low) and refers to the average return of two value portfolio minus the average return of two growth portfolio. According to Fama and French, small capital stocks regularly outperform those of large capital and value stocks tend to outperform growth stocks. The three-factor model is estimated as follows:

$$R_{i,t} - R_{f,t} = \alpha_{i,t} + \beta_1 (R_{m,t} - R_{f,t}) + \beta_2 SMB_t + \beta_3 HML_t + \epsilon_{i,t} \quad (6)$$

Three-factor model is a nested model from CAPM which means that the difference between these who is the size (SMB) and book-to-market (HML) variables. Furthermore, in order to measure performance of funds during different market conditions, three factor

model is modified to include dummy variables for expansion, recession and slowdown periods. The three-factor model including expansion, recession and slowdown dummies is formed as follows:

$$R_{i,t} - R_{f,t} = \alpha_{EXP}D_{EXP,t} + \alpha_{REC}D_{REC,t} + \alpha_{SD}D_{SD,t} + \beta_1(R_{m,t} - R_{f,t}) + \beta_2SMB_t + \beta_3HML_t + \varepsilon_{i,t} \quad (7)$$

The definitions of dummy variables remain the same as in CAPM.

### 5.3.5 Carhart 4-Factor model

The third model for measuring performance is Carhart four-factor model (1997), an extended version of the Fama and French (1993) three-factor model. A four-factor model is a nested model of a three-factor model that incorporates the momentum coefficient into the equation. Momentum variables are defined as winners minus losers (WML), which is calculated for the 30% of companies with the highest returns minus 30% of the lowest returns. Carhart argues that stocks that have performed well over the past year continue to perform well the following year and underperforming stocks continue to perform poorly the following year. Carhart four-factor model is formed as follows:

$$R_t - R_{f,t} = \alpha_i + \beta_1(r_{m,t} - R_{f,t}) + \beta_2SMB_t + \beta_3HML_t + \beta_4WML_t + \varepsilon_t \quad (8)$$

Carhart four-factor model is a very commonly applied model in the responsible investing literature for measuring abnormal returns and represents a standard method for mutual fund performance. Studies by Renneboog et al. (2008b), Bauer et al. (200), Soler-Dominguez et al. (2016) and Badía, Ferruz and Cortez (2020) have, among others, applied this model and verified its suitability for studies of socially responsible investing. Studies by Nofsinger et al. (2014) and Leite et al. (2015) examine the performance of responsible funds during market crises, related to the topic of this master's research. Following the approach of Nofsinger and Varma (2014), the Carhart four-factor model has been modified to include a dummy variable for expansion, recession and slowdown cycles. The

four-factor model, including expansion, recession, and slowdown dummies, is formed as follows:

$$R_t - R_{f,t} = \alpha_{EXP}D_{EXP,t} + \alpha_{REC}D_{REC,t} + \alpha_{SD}D_{SD,t} + \beta_1(r_{m,t} - R_{f,t}) + \beta_2SMB_t + \beta_3HML_t + \beta_4WML_t + \varepsilon_t \quad (9)$$

The definitions of dummy variables remain the same as in CAPM.

#### 5.4 Limitations of the study

As related with other SRI studies, this research exhibit different limitations. Firstly, the sample size is limited to only a few European countries instead of all possible markets. This is due to data limitations and the criteria on which funds must exist before 2005 and be alive for the period from 2005 to 2019. In addition, information about Morningstar investment style and universe should be available from funds. Furthermore, this study only examines the European fund market, which prevents, for example, the study of a geographically dependent issue identified in previous literature (Badía, Ferruz and Cortez 2020; Lean and Pizzutilo 2021). Extending the study period could also provide a more detailed description of how funds' performance varies according to different market cycles or events. For example, the latest crisis of covid-19 has been overlooked in this study, the effects of which are still difficult to assess at this stage, but may provide good evidence for future research.

In addition, previous literature has made extensive use of various benchmark indices to study fund performance. Choosing the wrong benchmark proxy as a market factor can lead to false or inaccurate results (Reilly and Akhtar, 1995). To minimize this limitation, this study will conduct robustness tests on alternative market factors such as the STOXX 600 and STOXX sustainability indices. Finally, one of the key limitations of SRI literature is the socially responsible itself. Previous literature has found evidence that the label of a responsible fund is sometimes more of a marketing strategy than a truly responsible fund (Badia et al. (2020). In fact, Humphrey et al. (2016) and Henke (2016) state that the

universe of SRI funds have characteristics similar to traditional funds, meaning that some SRI funds are merely conventional funds in disguise. Furthermore, Statman and Glushkov (2016) support this conclusion by looking for evidence of socially responsible funds that are truly conventional and which only avoid investing in sin stocks. It should also be noted that the return of socially responsible funds can be affected by the fund manager's ability to choose effective stocks rather than true the responsibility of the investees. However, despite these limitations, the purpose of this study is to provide valuable and novel evidence for future research.



## 6 Result of the Empirical study

This chapter presents the results from the empirical analysis based on Sharpe and Sortino ratios and results from CAPM, Fama- French three-factor and Carhart four-factor models. The first section provides descriptive statistics of equally weighted funds and benchmark indices. The second and third chapter presents the empirical results of fund performance. The last chapter provides robustness results for factor models utilizing two alternative benchmark indices.

### 6.1 Descriptive statistics

Table 1 provides characteristics of the sample data from socially responsible and conventional funds and selected benchmark indices. All returns are expressed as percentages.

**Table 1. Descriptive statistics**

Region	Monthly return	Annual return	Max. monthly return	Min. monthly return	Monthly std. Dev	Skewness	Kurtosis
<b>United Kingdom</b>							
SRI	0,65	8,08	9,55	-16,04	3,70	-1,12	5,89
Conventional	0,67	8,35	9,08	-14,78	3,58	-0,99	5,39
<b>Luxembourg</b>							
SRI	0,45	5,56	12,91	-14,79	3,86	-0,85	5,13
Conventional	0,46	5,67	12,69	-14,58	3,83	-0,87	5,00
<b>France</b>							
SRI	0,42	5,16	13,05	-15,52	4,18	-0,83	4,76
Conventional	0,29	3,58	9,77	-14,60	3,50	-0,96	4,99
<b>Germany</b>							
SRI	0,51	6,30	12,62	-13,59	4,03	-0,87	4,92
Conventional	0,33	3,97	11,04	-16,96	3,63	-1,21	6,57
<b>Belgium</b>							
SRI	0,35	4,33	8,02	-11,79	3,10	-0,86	4,63
Conventional	0,36	4,38	9,86	-13,52	3,51	-0,95	4,73
<b>Benchmarks</b>							
FTSE4GOOD	0,23	2,81	12,76	-12,89	0,04	-0,66	4,23
MSCI Europe	0,14	1,74	5,51	-10,78	0,02	-0,93	5,63

Table 1 presents descriptive statistics on the funds and their performance throughout the investigation period. The table shows that the performance of responsible and traditional funds is relatively flat with the exception of the French and German funds. In France, responsible funds outperform traditional funds by 0.13 per cent per month and in Germany by 1.58 per cent a year. In Germany, the overperformance of responsible funds is even higher, at 0.18 per cent per month and 2.33 per cent a year. The overall performance of benchmark indices FTSE4GOOD and MSCI AC Europe is relatively low compared to the funds' performance.

## 6.2 Reward-to-volatility ratios

**Table 2. Sharpe ratio results**

	Sharpe ratio							
	Expansion periods		Recession periods		Slowdown periods		Overall	
	SRI	Conv	SRI	Conv	SRI	Conv	SRI	Conv
UK	-0,10	-0,09	-0,30	-0,27	0,33	0,25	-0,10	-0,10
Luxemboug	-0,13	-0,13	-0,40	-0,39	0,30	0,30	-0,15	-0,15
France	-0,12	-0,19	-0,43	-0,43	0,31	0,22	-0,14	-0,20
Germany	-0,11	-0,19	-0,38	-0,39	0,37	0,22	-0,13	-0,19
Belgium	-0,20	-0,17	-0,41	-0,42	0,20	0,25	-0,21	-0,18
Benchmarks								
MSCI Europe	-0,16		-0,40		0,24		-0,17	
FTSE4GOOD	-0,19		-0,43		0,23		-0,19	

Table 2 provides results for portfolios Sharpe ratios in different market conditions. As the results show, during expansion periods, socially responsible funds have a higher Sharpe ratio than conventional funds, but still negative suggesting a greater risk-free rate than the portfolio return. However, performance across countries is neutral in the UK and Luxembourg portfolios, but the French and German portfolios are clearly performing

better than normal. The Belgian portfolio shows slightly better performance for a conventional portfolio. Recessional period results again show negative Sharpe ratios and similar results between SRI and traditional funds. The results are also similar with benchmark ratios of -0.40 for MSCI Europe and -0.43 for FTSE4GOOD. During periods of deceleration, the performance of both funds emerges positive and responsible funds clearly perform better than normal funds. SRI funds also have higher Sharpe ratios than benchmark indices while traditional funds have similar or weaker results. However, throughout the sample period, both SRI and conventional and benchmark indices show negative Sharpe ratios, indicating that risk-free rates have been higher on average over the comparative period than returns on portfolios and indices.

**Table 3. Sortino Ratio results**

	Sortino ratio							
	Expansion periods		Recession periods		Slowdown periods		Overall	
	SRI	Conv	SRI	Conv	SRI	Conv	SRI	Conv
UK	-0,13	-0,12	-0,07	-0,02	0,25	0,24	-0,12	-0,12
Luxembourg	-0,18	-0,17	-0,12	-0,11	0,19	0,18	-0,18	-0,17
France	-0,18	-0,23	-0,15	-0,17	0,16	0,08	-0,17	-0,23
Germany	-0,16	-0,21	-0,13	-0,13	0,20	0,09	-0,15	-0,22
Belgium	-0,24	-0,21	-0,14	-0,13	0,11	0,13	-0,24	-0,21
<b>Benchmarks</b>								
MSCI Europe	-0,20		-0,15		0,03		-0,20	
FTSE4GOOD	-0,29		-0,17		0,09		-0,23	

Table 3 provides the results of portfolio and benchmark Sortino ratios in different market conditions. As mentioned in chapter 5.3.4, Sortino ratio differ slightly from Sharpe ratio as instead of using standard deviation of excess returns, Sortino ratio takes only the lower partial standard deviation of excess returns into account which refers to bad portfolio returns. Moreover, Sortino ratio captures only the standard deviation of downside risk which allows better view of portfolio or benchmark risk-adjusted performance. As

results from table 3 show, SRI funds perform slightly better than benchmark indices while conventional funds show varied results. For the most part, the results are similar with the Sharpe ratio, with French and German socially responsible funds outperforming conventional funds during the expansion periods. Recession time does not offer different outcomes, both funds outperform the market, but show neutral performance over each other. The most significant difference can be observed between the UK portfolios, where the conventional portfolio performs better than responsible, yet negatively. During the period of slowdown, some of the responsible funds are performing substantially better than conventional funds especially in France and Germany. As a whole, both SRI and conventional funds perform better than benchmark indices. Looking at the whole period, SRI funds perform slightly better than benchmarks, but negatively.

### **6.3 Factor models**

This section presents the results of single, three and four factor models under different market conditions. Each chapter presents separate results by factor model, using the MSCI Europe and FTSE4GOOD indices as market factors. In addition, the differences between the results of these indices used are presented as their own table. All figures are presented as a percentage and alphas of factor results annualized for convenience. All standard errors in factor models are Newey-West adjusted for heteroscedasticity and autocorrelation. (Newey-West, 1987).

#### **6.3.1 Single-factor**

Table 4 provides results of capital asset pricing model for socially responsible and conventional funds during different market conditions. Panel A of table 4 shows the results of CAPM with MSCI Europe as a market factor. Second part of table 4 provides the CAPM results with FTSE4GOOD as a market factor. Table 5 provides results of difference portfolios between SRI and conventional funds.

**Table 4. CAPM results**

		CAPM					
MSCI Europe		SRI	Conv	SRI	Conv	SRI	Conv
Panel A		Expansion periods		Recession periods		Slowdown periods	
	$\alpha$	0,87	1,08	4,36	5,90	7,29	3,59
UK	$\beta$ Mkt	0,59***	0,57***	0,65***	0,63***	0,45***	0,48***
	R <sup>2</sup> adj.	0,55	0,55	0,81	0,82	0,44	0,48
	$\alpha$	-0,37	-0,35	-3,37	-2,70	4,59	4,20
Lux	$\beta$ Mkt	0,63***	0,63***	0,63***	0,64***	0,64***	0,67***
	R <sup>2</sup> adj.	0,60	0,61	0,78	0,79	0,75	0,77
	$\alpha$	0,58	-2,51	-4,88	-4,61	4,84	0,25
Fra	$\beta$ Mkt	0,70***	0,61***	0,70***	0,58***	0,70***	0,58***
	R <sup>2</sup> adj.	0,66	0,63	0,82	0,82	0,81	0,80
	$\alpha$	0,25	-2,84	-3,68	-2,76	7,83	0,82
Ger	$\beta$ Mkt	0,62***	0,55***	0,62***	0,60***	0,58***	0,58***
	R <sup>2</sup> adj.	0,54	0,51	0,69	0,75	0,67	0,72
	$\alpha$	-2,70	-2,76	-2,76	-5,01	-0,23	2,12
Bel	$\beta$ Mkt	0,55***	0,53***	0,52***	0,52***	0,49***	0,51***
	R <sup>2</sup> adj.	0,63	0,42	0,82	0,70	0,76	0,65

  

		CAPM					
FTSE4GOOD		SRI	Conv	SRI	Conv	SRI	Conv
Panel B		Expansion periods		Recession periods		Slowdown periods	
	$\alpha$	2,40	2,46	5,66	6,71	6,05	2,57
UK	$\beta$ Mkt	0,78***	0,75***	0,85***	0,81***	0,70***	0,72***
	R <sup>2</sup> adj.	0,70	0,67	0,74	0,72	0,67	0,68
	$\alpha$	2,11***	1,98**	1,89	2,35	3,62**	3,35
Lux	$\beta$ Mkt	0,95***	0,93***	0,96***	0,96***	0,93***	0,96***
	R <sup>2</sup> adj.	0,96	0,94	0,96	0,96	0,97	0,97
	$\alpha$	2,94***	-0,43	-0,08	-0,81	4,23**	-0,30
Fra	$\beta$ Mkt	1,00***	0,88***	1,03***	0,86***	0,98***	0,82***
	R <sup>2</sup> adj.	0,96	0,94	0,95	0,93	0,97	0,96
	$\alpha$	2,87**	-0,57	2,58	1,40	6,72**	-0,07
Ger	$\beta$ Mkt	0,96***	0,84***	0,99***	0,89***	0,86***	0,84***
	R <sup>2</sup> adj.	0,90	0,86	0,91	0,87	0,90	0,94
	$\alpha$	-0,80	-0,20	0,84	0,28	-0,80	1,06
Bel	$\beta$ Mkt	0,80***	0,86***	0,78***	0,82***	0,70***	0,77***
	R <sup>2</sup> adj.	0,94	0,80	0,95	0,95	0,95	0,92

Panel A in Table 4 shows the single-factor model results using the conventional benchmark MSCI Europe as proxy for market factor. Results from different market conditions do not provide statically significant results when utilizing a conventional benchmark. During expansion periods, responsible and conventional funds, as a rule, underperform relative to the market. However, responsible funds perform slightly better than markets

in the French and German portfolios, but the performance is only half a percent. The United Kingdom both portfolios perform well during periods of expansion, producing alphas around 1 per cent. As we move into recession, both fund performance becomes negative, excluding the UK where both funds perform positively. During slowdown periods, the performance of both turns positive of which the responsible outperform conventional funds. Overall, the performance of the UK portfolios held up best across market conditions while remaining positive for the entire sample period. An interesting contrast to earlier literature can be seen in alpha estimates of the transition from expansion times to recession as Nofsinger and Varma (2014) show improved performance of both funds as they move from crisis times to crisis times. For the market factor, the coefficients show statistically significant results at the 1% significance level across all portfolios throughout the investigation period. In fact, responsible funds tend to have a higher sensitivity to market factor than conventional funds. However, there are differences in results between funds from different countries, but generally responsible funds show greater sensitivity that contrasts with previous literature (Statman, 2000; Cortez et al. 2012 and Leite and Cortez, 2014).

Panel B of Table 4 shows the CAPM results using the FTSE4GOOD index as a benchmark. In terms of performance, alphas of socially responsible funds are positive and statistically significant in Luxembourg, France and Germany portfolios at significance levels of 1% and 5% during the expansion period. When comparing panel A and B results with each other, using a responsible benchmark, performance of the funds are higher and more favourable, supporting the findings of Cortez et al. (2012) and Statman (2000). Similar to Panel A, market factors are statically significant in each portfolio throughout the research period. Sensitivities to market factors are also significantly higher than in Table A panel, which contrasts with the previous literature when using responsible benchmark (Cortez et al., 2012; Leite and Cortez, 2014 and Statman, 2000). During the recession, alphas are predominantly positive but not significant in any portfolio similar to Panel A results. During periods of slowdown, portfolios show statistically significant alphas in the Luxembourg, French and Belgian responsible portfolios at 5% significance level. Unlike Panel A,

when using a responsible benchmark, the sensitivity of funds to market factors increases and is, as a rule, higher with responsible funds in every market condition. When using a responsible benchmark, estimates for funds alpha and beta rise, which is partly in line with earlier findings. Cortez et al. (2014) and Statman (2000) reported higher alpha values when using responsible benchmarks, but lower beta coefficients. Contrary to the A-panel's findings, both funds do mainly better during a recession than the expansion, in line with the findings of Nofsinger and Varma (2014).

Interesting results can also be seen between the benchmarks used. After comparing differences between adjusted  $R^2$  values, it seems that socially responsible indices have better explaining power compared to conventional indices. Looking at all countries and time periods, it can be seen that adjusted  $R^2$  is clearly higher for the responsible index than for the conventional one. An exception can be found for UK portfolios during the recession period. However, these results appear to be the opposite of what has been reported in previous studies (Leite and Cortez, 2014; Bauer et al. 2005). As mentioned earlier, Leite and Cortez (2015) and Statman (2000) find that socially responsible benchmarks leads to higher performance but lower exposure to the market factor. Additionally, a study from Cortez et al. (2012) finds supporting evidence where performance and sensitivity to market factor are both lower when using a responsible benchmark. This evidence is partly valid in this study, as performance is better when using a responsible benchmark, but market exposure is significantly higher than with conventional benchmark. In contrast to previous literature, where the differences between responsible and conventional funds have been widely questioned, this result provides a fresh viewpoint for this issue (Bauer et al., 2005; Leite and Cortez, 2014).

**Table 5. CAPM differences between SRI and conventional funds**

MSCI Europe		CAPM		
		SRI - Conv	SRI - Conv	SRI - Conv
Panel A		Expansion periods	Recession periods	Slowdown periods
	$\alpha$	-0,21	-1,54	3,70***
UK	$\beta$ Mkt	0,01	0,02	-0,03**
	R <sup>2</sup> adj.	0,00	0,01	0,22
	$\alpha$	-0,01	-0,67	0,39
Lux	$\beta$ Mkt	0,00	-0,01	-0,03*
	R <sup>2</sup> adj.	-0,01	-0,02	0,10
	$\alpha$	3,08***	-0,27	4,60**
Fra	$\beta$ Mkt	0,09***	0,11***	0,12***
	R <sup>2</sup> adj.	0,41	0,61	0,50
	$\alpha$	3,09***	-0,92	7,00***
Ger	$\beta$ Mkt	0,08***	0,02	0,01
	R <sup>2</sup> adj.	0,13	-0,02	-0,05
	$\alpha$	0,06	2,25	-2,35
Bel	$\beta$ Mkt	0,03	0,01	-0,02
	R <sup>2</sup> adj.	0,00	-0,03	-0,04
FTSE4GOOD		CAPM		
		SRI - Conv	SRI - Conv	SRI - Conv
Panel B		Expansion periods	Recession periods	Slowdown periods
	$\alpha$	-0,06	-1,05	3,48***
UK	$\beta$ Mkt	0,03**	0,04*	-0,03
	R <sup>2</sup> adj.	0,03	0,08	0,06
	$\alpha$	0,13	-0,46	0,27
Lux	$\beta$ Mkt	0,02**	0,00	-0,03
	R <sup>2</sup> adj.	0,02	-0,03	0,04
	$\alpha$	3,37***	0,73	4,53***
Fra	$\beta$ Mkt	0,12***	0,17***	0,16***
	R <sup>2</sup> adj.	0,50	0,77	0,56
	$\alpha$	3,44***	1,17	6,79***
Ger	$\beta$ Mkt	0,12***	0,09*	0,02***
	R <sup>2</sup> adj.	0,20	0,14	-0,04
	$\alpha$	-0,60	0,57	-1,86
Bel	$\beta$ Mkt	-0,05	-0,05	-0,07
	R <sup>2</sup> adj.	0,01	0,02	0,03

Table 5 reports the CAPM difference results between the SRI and conventional portfolios. Despite no statistically significant alphas, the observed differences between SRI and conventional funds show positive and statistically significant results in France and Germany



portfolios during expansion periods with both benchmarks. Mainly the differences between portfolios are small and negative but in France and Germany, socially responsible funds outperform conventional funds substantially. Differences in recessionary periods indicate a more favourable performance for both funds when using responsible benchmarks, but neither leads to statistically significant results. The results of the slowdown period are positive and statistically significant in the portfolios of the UK, France and Germany using both benchmarks. Unlike earlier periods, during periods of slowdown, results are not as favourable when a responsible benchmark is used. Moreover, only the Belgian conventional fund can exceed socially responsible funds during a slowdown, but not significantly.

Overall, SRI funds show better performance during expansion and slowdown periods which differs from the previous literature (Nofsinger and Varma, 2014; Leite and Cortez, 2015). Nofsinger and Varma (2014) argue that during crisis times, SRI funds tend to perform better than conventional funds vice versa, during non-crisis the SRI funds underperform the conventional funds. Moreover, Leite and Cortez (2015) report similar results from the French markets, where French socially responsible funds outperform conventional funds during crisis times and underperform non-crisis times. Looking at both benchmark indices, difference results can be found to be predominantly aligned with each other, although performance estimates change depending on the benchmark used. However, the weaker performance of responsible funds during a recession is clearly noticeable when using a conventional benchmark, but with a responsible benchmark, the overperformance of conventional funds has reversed. However, the results given by both benchmarks are not statically significant in times of recession.

Market factors show positive and higher exposure to socially responsible funds throughout the sample period, consistent with findings from the French stock market by Leite and Cortez (2015) but differs with the findings from Statman, (2000) and Cortez et al. (2012). The results suggest that socially responsible funds tend to be more sensitive to market movements. On the other hand, the findings of Bauer et al. (2005) and

Renneboog et al. (2008) show evidence to the contrary, suggesting that conventional funds mainly have greater exposure to market factors than socially responsible funds. As the results of Panels A and B show, the French and German portfolios exhibit substantially higher market exposures compared to conventional funds over the entire sample period. These findings are also statistically significant at the 1% level. Furthermore, The UK and Luxembourg portfolios exhibit positive and statistically significant differences during expansion and recession periods.

### **6.3.2 Three-factor**

Table 6 provides results of Fama and French three-factor model for socially responsible and conventional funds with MSCI Europe as a market factor. Table 7 shows the results of three-factor model with FTSE4GOOD as a market factor. Finally, table 8 provides results of difference portfolios between SRI and conventional funds.

**Table 6. Three-factor model results with the MSCI Europe benchmark**

MSCI Europe		Three-factor model				
		Conventional funds				
		$\alpha$	$\beta$ Mkt	SMB	HML	R <sup>2</sup> adj.
UK	Expansion	1,21	0,61***	0,19	-0,18*	0,56
	Recession	5,27	0,69***	0,14	-0,41*	0,84
	Slowdown	3,15	0,42***	0,12	0,20	0,44
Lux	Expansion	0,02	0,67***	0,03	-0,19*	0,62
	Recession	-3,90	0,70***	0,01	-0,44*	0,80
	Slowdown	3,24	0,63***	0,17	0,14	0,75
Fra	Expansion	-2,22	0,63***	0,00	-0,14	0,63
	Recession	-5,09	0,62***	0,03	-0,22	0,81
	Slowdown	0,22	0,53***	0,05	0,16	0,79
Ger	Expansion	-2,47	0,59***	0,04	-0,21*	0,51
	Recession	-3,24	0,69***	0,24	-0,52**	0,79
	Slowdown	-0,77	0,56***	0,24	0,08	0,70
Bel	Expansion	-2,09	0,58***	-0,07	-0,29**	0,44
	Recession	-6,37	0,60***	0,00	-0,51**	0,73
	Slowdown	1,05	0,51***	0,15	0,00	0,62

  

MSCI Europe		Three-factor model				
		SRI funds				
		$\alpha$	$\beta$ Mkt	SMB	HML	R <sup>2</sup> adj.
UK	Expansion	1,18	0,64***	0,15	-0,25**	0,57
	Recession	4,01	0,72***	0,22	-0,44*	0,84
	Slowdown	7,13	0,37**	0,09	0,25	0,41
Lux	Expansion	0,30	0,67***	-0,11	-0,25**	0,61
	Recession	-4,98	0,70***	-0,07	-0,48*	0,79
	Slowdown	3,61	0,61***	0,17	0,13	0,73
Fra	Expansion	1,03	0,72***	-0,15	-0,12	0,66
	Recession	-5,92	0,73***	-0,12	-0,21	0,81
	Slowdown	4,70	0,64***	0,07	0,19	0,81
Ger	Expansion	0,94	0,67***	-0,11	-0,26**	0,55
	Recession	-5,74	0,73***	-0,03	-0,71**	0,72
	Slowdown	6,70	0,57***	0,16	0,06	0,64
Bel	Expansion	-2,16	0,58***	-0,14	-0,18**	0,64
	Recession	-3,62	0,56***	-0,05	-0,24	0,82
	Slowdown	0,42	0,44***	-0,05	0,13	0,75

Table 6 shows the results of the three-factor model using the conventional benchmark MSCI Europe as a market factor. The results of the three-factor model show similar findings to the single-factor model, neither socially responsible nor conventional portfolios exhibit statistically significant alphas during different market conditions. Socially responsible funds perform slightly better during expansion cycles, but during a recession conventional funds show better performance than socially responsible funds. This finding contradicts earlier literature, but supports CAPM results (Nofsinger and Varma, 2014).

During the slowdown in the market, socially responsible funds performed significantly better than conventional funds. Also, only UK portfolios were able to maintain performance persistence throughout the study period during the transition to different market situations.

Market factors remain significant but slightly higher compared to CAPM results. Sensitivity to market factor are slightly higher for responsible funds in each period, which is also consistent with previous CAPM results as well as findings from Leite and Cortez (2015). The size coefficients of conventional funds are predominantly positive, while socially responsible funds have a negative impact on the size factor. When using a conventional benchmark, conventional and responsible funds appear to invest in companies of opposite size. As possible justifications for this observation, Leite and Cortez (2014) propose differences between negative and positive “best-in-class” strategies. Because larger companies are more likely to be excluded from SRI portfolios when using negative screens, but are more likely to be included in portfolios if a positive “best-in-class approach” is used. The reason for this is that generally the companies that perform best in each sector are likely to be large, stable companies. However, neither of the results show statistically significant results at any level. Value factor is mainly negative for both funds during expansion and recession periods which refers to higher exposure to growth stocks. A bias against value stocks of socially responsible funds may be due the exclusion of traditional value shares operating in the chemical or energy sector, which typically involve high environmental risks (Leite and Cortez, 2014). With the transition to slowdown periods, the value factor becomes positive and signals a higher exposure to value stocks. However, the value factor is statically significant only in expansion and recession periods, which may partly explain the returns of both portfolios during these periods. During a period of slowdown, the switch to value stocks can be seen as a natural change, as they tend to hold better in bad economic conditions (Leite and Cortez, 2015).

**Table 7. Three-factor results with the FTSE4GOOD benchmark**

FTSE4GOOD		Three-factor model				
		Conventional funds				
		$\alpha$	$\beta$	SMB	HML	R <sup>2</sup> adj.
UK	Expansion	2,22	0,79***	0,36***	-0,07	0,70
	Recession	9,34	0,81***	0,38	0,13	0,73
	Slowdown	1,87	0,72***	0,10	0,01	0,65
Lux	Expansion	1,95***	0,97***	0,25***	-0,12***	0,96
	Recession	3,61	0,98***	0,27***	-0,04	0,97
	Slowdown	2,25	0,99***	0,13	-0,07	0,97
Fra	Expansion	-0,53	0,90***	0,21***	-0,06**	0,96
	Recession	1,13	0,85***	0,26***	0,15	0,95
	Slowdown	-0,39	0,81***	0,01	0,00	0,96
Ger	Expansion	-0,53	0,89***	0,25***	-0,17***	0,88
	Recession	3,56	0,94***	0,50***	-0,10	0,91
	Slowdown	-1,83	0,90***	0,21*	-0,12	0,95
Bel	Expansion	0,12	0,91***	0,16**	-0,26***	0,82
	Recession	0,65	0,87***	0,24***	-0,20***	0,97
	Slowdown	-0,30	0,86***	0,12	-0,21**	0,93

FTSE4GOOD		Three-factor model				
		SRI funds				
		$\alpha$	$\beta$	SMB	HML	R <sup>2</sup> adj.
UK	Expansion	2,31	0,83***	0,33***	-0,14*	0,73
	Recession	8,66	0,86***	0,47**	0,10	0,76
	Slowdown	5,53	0,68***	0,08	0,04	0,64
Lux	Expansion	2,32***	0,98***	0,12***	-0,18***	0,97
	Recession	2,54	0,98***	0,19**	-0,08	0,97
	Slowdown	2,44	0,97***	0,13	-0,09	0,98
Fra	Expansion	2,90***	1,01***	0,09**	-0,03	0,96
	Recession	1,58***	1,01***	0,15	0,21**	0,96
	Slowdown	4,04*	0,97***	0,03	0,01	0,97
Ger	Expansion	3,12***	1,00***	0,13**	-0,20***	0,91
	Recession	2,56	1,05***	0,25**	-0,31**	0,94
	Slowdown	5,33	0,94***	0,13	-0,17	0,91
Bel	Expansion	-0,66	0,82***	0,05	-0,10***	0,95
	Recession	2,06	0,77***	0,16**	0,09	0,95
	Slowdown	-0,28	0,70***	-0,08	-0,01	0,95

Table 7 shows the results of the three-factor model using the responsible benchmark FTSE4GOOD as a market factor. Results from the three factor model support previous CAPM findings. Compared with the results in Table 6, the responsible benchmark alpha estimates are higher and more favorable for both of the funds. In addition, alpha values are now positive and statistically significant in socially responsible portfolios in Luxembourg, France and Germany, as well as in Luxembourg conventional portfolios at a 1% significance level.

Market factors are statistically significant and higher compared to the conventional benchmark. Similar to the results of previous models, responsible funds show greater exposure to the market factor than conventional funds, but this is only noticeable during periods of expansion and recession. Also, similar to CAPM results, responsible funds exhibit higher sensitivity to market factor compared to conventional funds during expansion and recession periods, but lower during slowdown. A clear difference from previous three-factor model results is that the size coefficients of both funds are positive throughout the study period and show statistically significant results during periods of expansion and also in rare cases during the recession. This result implies that means both portfolios are more exposed to small-cap stocks than large stocks, supporting the small-cap bias reported in previous literature (Rudd, 1981; Bauer et al. 2005, 2006 and Leite and Cortez, 2015). While both funds are more exposed to small caps, socially responsible funds seem to be less than their comparable conventional peers. This finding supports the previous evidence of Leite and Cortez (2015) and Nofsinger and Varma (2014), but differs from those of Bauer et al. (2005, 2006). As previously mentioned, Cortez et al. (2012) Leite and Cortez (2014) proposed as a possible justification for rigorous screening strategies of responsible funds. However, this result is somewhat interesting because most of the funds utilized in the study are classified in the large-cap investment universe.

The coefficients in value factor show negative and statistically significant results over expansion periods, meaning that both portfolios are more growth-oriented than value. However, value coefficients show substantial changes over time as the coefficient becomes less negative or positive during a recession. In addition, during periods of slowdown, the value factor is mainly less negative or positive than during expansion cycles. However, these findings differ with previous results, where during the slowdown period funds exhibit mainly positive exposure on value factor. As mentioned earlier, this result is not surprising as investors tend to rely more on value stocks during bad economic states (Leite and Cortez, 2015). Generally, size and value factors are able to explain fund

returns only during expansion and recession, while during slowdown periods results are usually insignificant.

As with past results, when using a responsible benchmark, estimates for funds' performance are more favorable than when using a conventional benchmark. In addition, when a responsible benchmark is used, the results show higher beta estimates and better explanation power measured by adjusted  $R^2$  than traditional benchmarks. As previously noted, these results partially contradict previous observations by Bauer et al. (2005) and Leite and Cortez (2014), but support the hypothesis of higher performance estimates observed by Cortez et al. (2012) and Statman (2000). In addition, both funds increase their exposure to the size factor as they move into expansion into recessionary periods, but decrease during periods of slowdown similarly to the findings of Leite and Cortez (2015) as funds move from crisis to crisis.

Furthermore, results show conflicting evidence between the value factor and the different benchmark. Based on a conventional benchmark, both funds are more exposed to growth stocks during expansion and recession, but increase exposure to value stocks during slowing periods. Similar results can also be seen in the responsible benchmark, but the results differ considerably between countries compared to the conventional benchmark. Generally, value stocks tend to hold better in the states of bad economics, which may partly explain the shift to value stocks as moving into recession or slowdown, but this effect is not clearly visible when using responsible benchmarks. Furthermore, based on both benchmarks, the value factor seems to be more important in explaining asset performance than the size factor. In fact, the size factor is only statistically significant when a responsible benchmark is used

**Table 8. Three-factor difference results between SRI and conventional funds**

		Three-factor model				
MSCI		SRI - Conv				
		$\alpha$	$\beta$ Mkt	SMB	HML	R <sup>2</sup> adj.
UK	Expansion	-0,03	0,02*	-0,04	-0,06**	0,04
	Recession	-1,26	0,02	0,08	-0,03	0,05
	Slowdown	3,97***	-0,05***	-0,02	0,05*	0,29
Lux	Expansion	0,28	0,01	-0,14***	-0,05***	0,36
	Recession	-1,08	0,00	-0,08*	-0,04	0,02
	Slowdown	0,37	-0,03	0,00	-0,01	0,01
Fra	Expansion	3,25***	0,09***	-0,14***	0,02	0,55
	Recession	-0,83	0,11***	-0,15***	0,01	0,69
	Slowdown	4,48**	0,11***	0,02	0,03	0,44
Ger	Expansion	3,41***	0,08***	-0,15***	-0,05	0,21
	Recession	-2,50	0,04	-0,27***	-0,19*	0,19
	Slowdown	7,47***	0,011	-0,08	-0,02	-0,13
Bel	Expansion	-0,07	0,01	-0,07	0,11	0,01
	Recession	2,75	-0,03	-0,05	0,27**	0,14
	Slowdown	-0,63	-0,07	-0,20	0,13	0,05
FTSE4GOOD		SRI - Conv				
		$\alpha$	$\beta$ Mkt	SMB	HML	R <sup>2</sup> adj.
UK	Expansion	0,09	0,04***	-0,03	-0,06**	0,07
	Recession	-0,68	0,05**	0,09*	-0,03	0,15
	Slowdown	3,67***	-0,04*	-0,02	0,04	0,03
Lux	Expansion	0,37	0,02**	-0,13***	-0,05***	0,37
	Recession	-1,07	0,00	-0,08	-0,05	0,02
	Slowdown	0,19	-0,02	0,00	-0,03	-0,05
Fra	Expansion	3,42***	0,11***	-0,12***	0,04**	0,60
	Recession	0,46	0,16***	-0,11***	0,07*	0,84
	Slowdown	4,43**	0,16***	0,01	0,00	0,51
Ger	Expansion	3,64***	0,11***	-0,12	-0,04	0,25
	Recession	-1,00	0,11	-0,25	-0,21	0,36
	Slowdown	7,15***	0,04	-0,08	-0,05	-0,10
Bel	Expansion	-0,79	-0,09**	-0,11	0,16**	0,05
	Recession	1,42	-0,10**	-0,07	0,29***	0,30
	Slowdown	0,02	-0,16**	-0,20	0,20**	0,26

Table 8 shows the differences between SRI and conventional portfolios. Similar to results from CAPM, performance differences between socially responsible and conventional portfolios range from 3% to 8% annum and are statistically significant in 1% and 5% of



the significance levels. During the expansion periods, SRI funds perform better on average than conventional funds and the divergence is positive and statistically significant in the French and German portfolios despite the benchmark used. Although, the performance of funds is higher when using a responsible benchmark, Table 8 shows that the magnitude of the differences remains the same. The results are also consistent with CAPM findings where differences between portfolios remained the same when using a different benchmark. During a recession, conventional funds show better performance compared with responsible funds, but these results remain statistically insignificant as in past results. During the recession, socially responsible funds outperform traditional funds in each country, with significant differences between the UK, French and German portfolios.

Sensitivity to market factors suggests a higher risk for SRI funds, consistent with findings from CAPM and earlier literature. Variations in the factor of size and value coefficients indicate that funds differ in investing styles, at least at the level of different countries. After all, responsible and conventional benchmarks give mixed results from funds' investment style, but the results suggest that both funds tend to be more exposed to growth stocks, and in fact socially responsible funds tend to be more growth-focused than conventional funds supported by earlier findings by Bauer et al. (2005) and Cortez et al. (2012). However, the findings do not provide support for Bauer et al. (2005) observations of lower exposure of responsible funds to value stocks. The lower exposure of responsible funds to small cap stocks and higher large cap stocks supports the findings of Leite and Cortez (2015), Nofsinger and Varma (2014) and Leite and Cortez (2014) from European and US stock markets, but contradicts the small-cap bias of responsible funds presented in the literature with (Bauer et al., 2005, 2006, Renneboog et al., 2008b and Cortez et al., 2014). The findings are also of interest because, according to Figure 2, the majority of funds are classified as large mixed or value funds, but appear to invest more in small-cap and growth stocks. As a possible justification for these results, Leite and Cortez (2014, 2015) suggest rigorous screening strategies by responsible funds leading to the exclusion of larger and traditional energy value companies from the SRI portfolio

### **6.3.3 Carhart four-factor**

Table 9 provides results of Carhart four-factor model for socially responsible and conventional funds with MSCI Europe as a market factor. Table 10 shows the results of four-factor model with FTSE4GOOD as a market factor. Finally, table 11 provides results of difference portfolios between SRI and conventional funds.

**Table 9. Four-factor model results with the MSCI Europe benchmark**

MSCI Europe		Carhart factor-model					
		Conventional funds					
		$\alpha$	$\beta$	SMB	HML	WML	R <sup>2</sup> adj.
UK	Expansion	-0,29	0,62***	0,16	-0,12	0,14	0,57
	Recession	5,13	0,67***	0,12	-0,52**	-0,12	0,84
	Slowdown	3,87	0,39**	0,06	0,17	-0,05	0,41
Lux	Expansion	0,43	0,67***	0,03	-0,21*	-0,04	0,61
	Recession	-3,94	0,69***	0,00	-0,48*	-0,04	0,80
	Slowdown	5,84	0,50***	-0,05	0,04	-0,18*	0,79
Fra	Expansion	-1,26	0,63***	0,01	-0,18*	-0,09	0,64
	Recession	-5,20	0,60***	0,02	-0,31	-0,10	0,81
	Slowdown	1,80	0,45***	-0,09	0,09	-0,11	0,80
Ger	Expansion	-2,24	0,58***	0,04	-0,22*	-0,02	0,51
	Recession	-3,29	0,68***	0,23	-0,56**	-0,05	0,78
	Slowdown	1,68	0,44***	0,03	-0,02	-0,17*	0,74
Bel	Expansion	-2,71	0,58***	-0,08	-0,26*	0,06	0,43
	Recession	-6,45	0,58***	-0,01	-0,58**	-0,07	0,72
	Slowdown	3,06	0,41***	-0,03	-0,08	-0,14	0,64

  

MSCI Europe		SRI funds					
		$\alpha$	$\beta$	SMB	HML	WML	R <sup>2</sup> adj.
UK	Expansion	0,19	0,64***	0,14	-0,20*	0,09	0,57
	Recession	3,93	0,70***	0,21	-0,50*	-0,07	0,84
	Slowdown	8,19	0,32*	0,01	0,21	-0,07	0,39
Lux	Expansion	0,67	0,67***	-0,11	-0,26**	-0,03	0,61
	Recession	-5,02	0,69***	-0,08	-0,52*	-0,04	0,78
	Slowdown	6,48	0,47***	-0,07	0,01	-0,19**	0,78
Fra	Expansion	1,92	0,72***	-0,13	-0,16	-0,08	0,66
	Recession	-5,98	0,71***	-0,13	-0,26	-0,06	0,81
	Slowdown	7,24	0,52***	-0,14	0,09	-0,17**	0,84
Ger	Expansion	0,30	0,67***	-0,12	-0,23*	0,06	0,55
	Recession	-5,78	0,72***	-0,04	-0,74**	-0,04	0,71
	Slowdown	10,39*	0,40***	-0,14	-0,08	-0,24**	0,72
Bel	Expansion	-1,32	0,58***	-0,13	-0,21**	-0,08	0,64
	Recession	-3,68	0,55***	-0,06	-0,29	-0,06	0,81
	Slowdown	1,38	0,39***	-0,13	0,09	-0,07	0,75

Table 9 shows Carhart four-factor model results, using the standard benchmark MSCI Europe as the market factor. After controlling the Momentum factor WML, alpha estimates are in some cases more favorable than the three-factor model. This finding is also interesting because both Cortez et al. (2012) and Nofsinger and Varma (2014) show that the inclusion of additional factors in the model weakens the estimated alphas. Similar to past results, expansion and recession periods do not provide statistically significant re-

sults. During periods of deceleration, Alpha estimates for the German Responsible Portfolio are statistically significant in 10% significance level. In line with the performance of previous models, responsible funds perform better during periods of expansion and slowdown, but weaker in recessionary times.

The Sensitivities to market factors are similar to previous models although the odds are slightly lower than the three-factor model. The size factor coefficients show lower exposure to small caps for conventional funds and higher exposure to large caps for both, leading to conflicting results with respect to small-cap biases outlined in previous literature, but supporting observations of Leite and Cortez (2015). Compared with the three-factor model, both funds increase exposure to growth stocks and reduce their exposure to value during slowdown periods. Momentum factors are predominantly negative, which suggests that portfolios are less susceptible to momentum strategies. The momentum factor is also statistically significant in some cases during periods of slow-down, partly explaining the funds' performance during this time. In addition, it appears that based on a conventional benchmark, the size factor cannot explain any of these returns, while the value factor is able to explain the returns of periods of expansion and recession and momentum during periods of slowdown.

**Table 10. Four-factor results with the FTSE4GOOD benchmark**

FTSE4GOOD		Carhart four-factor					R <sup>2</sup> adj.
		Conventional funds					
		$\alpha$	$\beta$	SMB	HML	WML	
UK	Expansion	0,08	0,80***	0,33***	0,03	0,20***	0,57
	Recession	8,88	0,77***	0,34	-0,03	-0,16	0,73
	Slowdown	-0,01	0,86***	0,24	0,05	0,12	0,65
Lux	Expansion	1,48*	0,97***	0,25***	-0,10***	0,04	0,61
	Recession	3,66	0,99***	0,28***	-0,02	0,02	0,97
	Slowdown	2,47	0,98***	0,11	-0,07	-0,01	0,97
Fra	Expansion	-0,37	0,90***	0,21***	-0,07**	-0,02	0,64
	Recession	0,99	0,84***	0,25**	0,10	-0,05	0,95
	Slowdown	-0,71	0,84***	0,04	0,01	0,02	0,96
Ger	Expansion	-1,10	0,89***	0,25***	-0,14**	0,05	0,51
	Recession	3,55	0,94***	0,50***	-0,11	0,00	0,91
	Slowdown	-1,58	0,88***	0,19	-0,12	-0,02	0,95
Bel	Expansion	-1,35	0,92***	0,14*	-0,19***	0,14**	0,43
	Recession	0,65	0,87***	0,24***	-0,20**	0,00	0,97
	Slowdown	-0,83	0,90***	0,16	-0,20**	0,03	0,93

  

FTSE4GOOD		SRI funds					R <sup>2</sup> adj.
		$\alpha$	$\beta$	SMB	HML	WML	
UK	Expansion	0,62	0,84***	0,31***	-0,06	0,16**	0,57
	Recession	8,37	0,84***	0,45*	0,00	-0,10	0,76
	Slowdown	3,90	0,80***	0,20	0,08	0,10	0,63
Lux	Expansion	1,78**	0,99***	0,11***	-0,15***	0,05*	0,97
	Recession	2,60	0,99***	0,20**	-0,06	0,02	0,97
	Slowdown	2,90	0,94***	0,10	-0,10	-0,03	0,98
Fra	Expansion	2,87***	1,01***	0,09**	-0,03	0,00	0,66
	Recession	1,58	1,01***	0,15	0,21*	0,00	0,96
	Slowdown	4,47*	0,94***	0,00	0,00	-0,03	0,97
Ger	Expansion	1,54	1,00***	0,11*	-0,13**	0,14***	0,55
	Recession	2,68	1,06***	0,26**	-0,27*	0,04	0,93
	Slowdown	6,69*	0,85***	0,03	-0,19*	-0,08	0,91
Bel	Expansion	-0,56	0,82***	0,05	-0,11***	-0,01	0,64
	Recession	2,02	0,77***	0,16*	0,07	-0,02	0,95
	Slowdown	-1,22	0,77***	0,00	0,01	0,06*	0,96

Table 10 presents Carhart four-factor model results, using the responsible benchmark FTSE4GOOD as the market factor. Like previous models, funds' performance in different market situations gives similar results, but alpha estimates have decreased from the three-factor model and become less significant after controlling momentum factor. Overall, coefficients in market and size factor remain similar, socially responsible funds exhibit

higher exposure on market factor but lower on size factor compared to conventional funds. In addition, both funds show statistically significant exposure to the full multiplier during expansion and recession. For value factor, both funds exhibit significant exposure on growth stocks during expansion periods. In general, responsible funds are slightly more exposed to growth stocks at the time of expansion, but increase exposure to growth equities during the recession and slowdown, although this finding is only visible in UK, French and Belgian portfolios. Momentum factor coefficients, as a rule, show positive and statistically significant results during expansion and deceleration. Positive momentum factor loading imply that both funds are more exposed to momentum strategies and partially explain funds' returns.

The findings between different benchmarks of the Carhart four-factor model show similar results to the single and three-factor model. As in the past, alpha estimates with responsible benchmarks are mainly more favorable compared to traditional benchmarks, as well as beta estimates that are significantly higher at responsible benchmarks. An interesting difference from previous models can be observed from the expansion period adjusted  $R^2$ , which is almost identical between conventional and responsible benchmark indices. In other market conditions, the results support previous findings in which responsible benchmarks have better explanative power than conventional benchmarks. In terms of style, value and momentum factors seem to be more important in explaining the performance of both funds than the size when looking at both benchmarks. It should be noted that the size factor is statistically significant only when using a responsible benchmark as a proxy for market participants.

**Table 11. Four-factor difference results between SRI and conventional funds**

MSCI Europe		Carhart four-factor					
		SRI-conv					
		$\alpha$	$\beta$	SMB	HML	WML	R <sup>2</sup> adj.
UK	Expansion	0,47	0,02*	-0,03	-0,09***	-0,05*	0,06
	Recession	-1,20	0,03*	0,09*	0,01	0,05	0,09
	Slowdown	4,33***	-0,06***	-0,05	0,04	-0,02	0,36
Lux	Expansion	0,23	0,01	-0,14***	-0,05***	0,00	0,35
	Recession	-1,08	0,00	-0,08*	-0,04	0,00	-0,02
	Slowdown	0,64	-0,04	-0,02	-0,03	-0,02	-0,01
Fra	Expansion	3,18***	0,09***	-0,15***	0,02	0,01	0,55
	Recession	-0,79	0,12***	-0,15***	0,04	0,04	0,69
	Slowdown	5,44***	0,07*	-0,05	-0,01	-0,06*	0,53
Ger	Expansion	2,53***	0,09***	-0,16***	-0,01	0,08**	0,24
	Recession	-2,48	0,05	-0,27***	-0,18	0,01	0,17
	Slowdown	8,71***	-0,04	-0,17	-0,07	-0,07*	0,03
Bel	Expansion	1,39	0,00	-0,05	0,04	-0,14**	0,04
	Recession	2,77	-0,03	-0,05	0,28**	0,01	0,11
	Slowdown	-1,67	-0,02	-0,11	0,17	0,07	0,12
FTSE4GOOD		SRI-conv					
		$\alpha$	$\beta$	SMB	HML	WML	R <sup>2</sup> adj.
UK	Expansion	0,54	0,04**	-0,02	-0,08***	-0,04*	0,09
	Recession	-0,51	0,06***	0,11**	0,03	0,06*	0,22
	Slowdown	3,91***	-0,06**	-0,04	0,03	-0,02	0,04
Lux	Expansion	0,29	0,02**	-0,13***	-0,05***	0,01	0,37
	Recession	-1,06	0,00	-0,08*	-0,04	0,00	-0,02
	Slowdown	0,430	-0,04	-0,02	-0,03	-0,02	-0,09
Fra	Expansion	3,24***	0,11***	-0,12***	0,05**	0,02	0,60
	Recession	0,59	0,17***	-0,10***	0,12***	0,05**	0,86
	Slowdown	5,18***	0,10*	-0,04	-0,01	-0,05	0,54
Ger	Expansion	2,64***	0,12***	-0,13***	0,01	0,09***	0,29
	Recession	-0,87	0,12***	-0,24***	-0,16	0,05	0,35
	Slowdown	8,27***	-0,04	-0,16	-0,07	-0,07	0,01
Bel	Expansion	0,80	-0,10***	-0,09	0,08	-0,15**	0,09
	Recession	1,37	-0,10**	-0,08	0,27**	-0,02	0,27
	Slowdown	-0,40	-0,13	-0,17	0,21**	0,03	0,23

Table 11 shows the differences between SRI and conventional portfolios. Performance differences between socially responsible and conventional portfolios range from 3% to 9% per year and are statistically significant at 1% significance levels. In addition, these results are slightly higher than for single and three-factor models. As has been noted in

previous results, socially responsible funds outperform conventional funds during expansion and slowdown periods regardless of the benchmark or model used, although the magnitudes between funds differ slightly. During the recession, the underperformance of responsible funds ranges from -1% to 2%, but is not statistically significant in any of the outcomes and kept the conclusion the same throughout the study. Overall, these results are contradict to previous literature on this topic (Nofsinger and Varma, 2014; Leite and Cortez, 2015), but find supporting evidence with Belghitar, Clark and Deshmukh 2017 and Lean and Pizzutilo 2021 studies.

Generally, odds coefficient results between different benchmarks show conclusions similar to those found in single and three-factor models. Sensitivity to market risk remains higher in socially responsible funds when both benchmarks are used, supporting the findings of Leite and Cortez (2015). This is an interesting result because earlier literature has, as a rule, offered observations of the higher exposure of conventional funds to market factors (Cortez et al. 2012; Leite and Cortez, 2014 and Renneboog et al. 2008b). However, these results need to be treated with a reserved basis, since different studies mainly use different benchmarks that can significantly affect the estimated outcomes (Reilly and Akhtar, 1995).

As for the size factor, socially responsible funds have lower exposure to small-cap stocks and are more tilted to large stocks. Although evidence can be found in earlier literature to support this, most of the earlier literature reports significant small-cap bias on responsible funds (Renneboog et al. 2008b; Bauer et al. 2005, 2006, and Cortez et al. 2012). Negative differences between value factors indicate a higher orientation of responsible funds towards growth-equities or a lower orientation towards value-equities for which previous literature provides small support (Bauer et al. 2005, 2006; Leite and Cortez, 2015) However, results differ by country, which also supports the findings of Renneboog et al. (2008b) in Europe, showing variations in investment styles from country to country influenced by different cultures and attitudes towards responsible investing (Badía, Fer-



ruz and Cortez, 2020; Lopez-Arceiz et al., 2018). In terms of momentum factors, the results show greater exposure of responsible funds to momentum strategies compared to traditional funds. However, greater exposure of conventional funds to momentum strategies would appear to be a during slowdown periods. These results also differ from earlier literature that finds evidence of higher exposure of conventional funds to momentum strategies (Renneboog, et al. 2008b; Leite and Cortez, 2015). Nofsinger and Varma (2014) suggest as one possible reason responsible funds' negative exposure to momentum strategies from a constrained investment universe and strict strategies of SRI funds, which undermines their ability to participate in a momentum strategy. This reasoning is partially valid based on Table 9 where the exposure to the momentum factor of responsible funds is predominantly negative, but contradicts the findings in Table 10, although responsible funds have negative momentum coefficients in some cases.

#### **6.4 Robustness tests**

In order to test robustness of my results, I follow research from Bauer et al. (2005) and Renneboog et al. (2008b) and divide the sample in three different sub-samples. First sub-period is 2005 to 2009, second 2010 to 2014 and lastly, 2015 to 2019. For the second robustness test, I follow research from Renneboog et al. (2008) with using alternative benchmark indices as market factor. Selected benchmark indices are STOXXX 600 and STOXXX Europe Sustainability, where the former being an alternative benchmark to the MSCI Europe index and the latter to the FTSE4GOOD index.

For the sake of brevity, robustness results contain only alphas for SRI and conventional portfolios and the differences between these portfolios. The intention of robustness tests is to look at the performance of responsible and conventional funds using a different benchmark as well as to examine fund performance across different benchmarks outside of market cycles. These robustness tests are performed using Carhart four-factor model, which should be able to best explain the returns of the funds.

#### **6.4.1 Sub-periods**

The main results of this study included a comparison between the performance of SRI and conventional funds in different market situations. In the study, time periods were classified into three different categories during which performance was measured. This approach can lead to misleading results because it only tests performance within that time period. Furthermore, the expansion periods contains nearly 70 percent of total observations that may affect to results. Therefore, I follow Bauer et al. (2005) to examine performance of socially responsible and conventional funds over time by dividing the research period into three different sub-periods. Each sub-period contains 60 observations over a five-year period. This approach provides a better opportunity to examine the continuity of performance of SRI and conventional funds in different market situations, as the sample period is not directly divided into different business cycles.

**Table 12. Four-factor sub-period results**

MSCI Europe		Carhart four-factor		
Panel A		Sub-period 1	Sub-period 2	Sub-period 3
		$\alpha$	$\alpha$	$\alpha$
UK	SRI	-5,15	4,79	2,88
	Conv	-2,92	4,88	1,28
	SRI-Conv	-2,23**	-0,08	1,60**
Lux	SRI	-8,46**	4,93*	2,88
	Conv	-8,34**	5,39**	2,63
	SRI-Conv	-0,13	-0,46	0,25
Fra	SRI	-7,12*	3,96	4,34
	Conv	-10,85***	3,39	1,02
	SRI-Conv	3,73***	0,57	3,32***
Ger	SRI	-7,10	5,60	3,03
	Conv	-8,30**	3,09	-0,14
	SRI-Conv	1,20	2,51*	3,17**
Bel	SRI	-11,45***	4,08**	1,29
	Conv	-11,41***	5,92**	-1,73
	SRI-Conv	-0,04	-1,84	3,02
FTSE4GOOD		Carhart four-factor		
Panel B		Sub-period 1	Sub-period 2	Sub-period 3
		$\alpha$	$\alpha$	$\alpha$
UK	SRI	0,89	1,16	1,99
	Conv	2,75	1,45	0,43
	SRI-Conv	-1,86	-0,29	1,56**
Lux	SRI	2,20	0,83	1,72
	Conv	2,18	1,43	1,49
	SRI-Conv	0,02	-0,60	0,23
Fra	SRI	3,49*	-0,08	3,14
	Conv	-2,27	0,14	-0,08
	SRI-Conv	5,76***	-0,22	3,21***
Ger	SRI	4,70**	0,97	1,91
	Conv	0,28	-0,92	-1,12
	SRI-Conv	4,42**	1,89	3,03***
Bel	SRI	-4,08**	1,01	0,35
	Conv	-0,84	2,31	-2,66
	SRI-Conv	-3,23*	-1,30	3,01

The first part of the table 12 provides results for three sub-periods using MSCI Europe as a market factor. The second part provides the results of FTSE4good as a market factor. The results of Sub-period 1 of Panel A show statistically significant alpha values in the

French and Belgian portfolios. Overall, SRI funds tend to slightly outperform conventional funds, but these differences are statistically significant only in UK and France with -2.24 and 3.70 percent annually, respectively. Sub-period 2 alphas are statistically significant in each portfolio except for Germany conventional portfolio. Germany and Belgium portfolios exhibit statistically significant alphas at 1 percent level. However, for sub-period 2, the performance of SRI and conventional funds is relatively at the same level and no significant differences are observed. Final period does not provide any statistically significant alphas but differences show positive and statistically significant results in UK, France and Germany portfolios pointing outperformance of SRI funds. Results from the FTSE4GOOD as a market factor provide similar results with the MSCI Europe benchmark. During sub-period 1, SRI funds show slightly better performance in UK and Luxembourg and substantially higher in France, Germany and Belgium portfolios. In sub-period 2, conventional funds show better performance compared to part one. Final sub-period show that SRI funds provided superior risk-adjusted returns compared to conventional funds and results are also significant in three cases.

Overall, SRI funds show statistically significant outperformance in UK, France and Germany portfolios while in Belgium, conventional funds tend to perform better than SRI funds. These findings are in line with previous approaches as the differences between SRI and conventional funds are only significant when difference is positive. Moreover, it seems that it does not matter in which economics state the markets are as SRI funds show statistically significant results in most of the periods.

#### **6.4.2 Alternative benchmarks**

The selected market proxies for the main results are MSCI Europe and FTSE4GOOD indices that are widely used in previous literature and benchmark indices for the funds. However, choosing the wrong proxy for a market factor can lead to wrong results in beta measurements because of inappropriate proxy and, in addition, inaccurate results (Reilly

and Akhtar, 1995). To avoid a benchmark error, STOXXX 600 and STOXXX Europe sustainability benchmarks are selected for the robustness tests.

**Table 13. Four-factor results with alternative benchmarks**

STOXXX 600		Carhart four-factor		
Panel A		Expansion periods	Recession periods	Slowdown periods
		$\alpha$	$\alpha$	$\alpha$
UK	SRI	0,15	8,87	4,47
	Conv	-0,36	9,41	0,62
	SRI-Conv	0,51	-0,53	3,85***
Lux	SRI	1,20*	2,66	3,63**
	Conv	0,92	3,71**	3,18
	SRI-Conv	0,28	-1,05	0,44
Fra	SRI	2,26***	1,67	5,30**
	Conv	-0,90	1,09	-0,12
	SRI-Conv	3,17***	0,58	5,41***
Ger	SRI	0,96	2,70	7,32**
	Conv	-1,59	3,71	-1,00
	SRI-Conv	2,55***	-1,01	8,32***
Bel	SRI	-1,05	2,09	-0,68
	Conv	-1,89	0,59	-0,25
	SRI-Conv	0,84	1,50	-0,43

  

STOXXX Europe Sustainability		Carhart four-factor		
Panel B		Expansion periods	Recession periods	Slowdown periods
		$\alpha$	$\alpha$	$\alpha$
UK	SRI	-0,63	10,03	0,90
	Conv	-1,11	10,31	-3,00
	SRI-Conv	0,48	-0,28	3,91***
Lux	SRI	0,30	4,54	-0,31
	Conv	0,04	5,49*	-0,66
	SRI-Conv	0,26	-0,95	0,35
Fra	SRI	1,34	3,47	1,50
	Conv	-1,70**	2,65	-3,08
	SRI-Conv	3,04***	0,82	4,58**
Ger	SRI	0,05	4,65	3,61
	Conv	-2,41*	5,34	-4,39
	SRI-Conv	2,46***	-0,69	8,00***
Bel	SRI	-1,77**	3,55	-3,48
	Conv	-2,68*	2,31	-3,89
	SRI-Conv	0,91	1,23	0,41

Table 15 provides the robustness results of Carhart four-factor model with different market factors. The results between main findings and robustness test of Carhart four-factor

models show almost similar results compared to MSCI Europe and FTSE4GOOD indices. During expansion periods, SRI funds outperform conventional funds in each country and show statistically significant results in two cases. In recession periods, conventional funds outperform SRI funds but not statistically significantly. Moreover, slowdown periods show substantially outperformance of SRI funds with statistically significant results in three of the cases. Some of the factor coefficients show slightly different magnitudes, but the conclusion remains the same. Using alternative benchmark indices does not change the returns of SRI and conventional portfolios and yield different results between portfolios.

## 7 Conclusions

The objective of this study was to examine the performance of European socially responsible funds compared to characteristics-matched conventional funds during period of 2005 to 2019. In addition, this study examined whether the socially responsible and conventional funds differ in terms of Investment style and do investment styles change in different market conditions. Previous studies of socially responsible literature have acknowledged underperformance of socially responsible funds during normal times, but not during bad economic states. While interest in responsible investing has increased among academic studies, the results have been mostly significant and demonstrated unnecessary responsible investing in terms of returns. This study provided new evidence in the field of responsible investing, showing that responsible investors may not have to sacrifice returns expectations when investing responsibly.

Prior to empirical research, a matched pair approach was implemented to create portfolios matching characteristics to compare fund performance. The criteria for the pair's approach considered the funds age, domicile, investment universe and style. Based on these criteria, two conventional funds of similar characteristics were matched for each socially responsible counterpart. In performance measurements, reward-volatility ratios and three different factor models; CAPM, Fama and French three-factor and Carhart four-factor were utilized in this study.

Given the first hypothesis of the study, the performance of responsible funds was expected to underperform the conventional funds during normal market times (e.g., Leite and Cortez, 2015; Nofsinger and Varma, 2014). In terms of performance, looking at the results of different models and benchmarks, responsible funds outperform conventional funds and thus leads to reject the hypothesis on underperformance of socially responsible funds during normal times. After considering robustness test with alternative benchmarks, the results lead to the same outcome which supports the conclusion and the rejection of the hypothesis. The results also showed that fund performance varies from country to country, which can be attributed to cultural differences and the attitudes of

investors in different countries towards responsibility (Badía, Ferruz and Cortez, 2020). For the second hypothesis, the performance of responsible funds was expected to outperform the conventional funds during crisis times (e.g., Leite and Cortez, 2015; Nofsinger and Varma, 2014). Responsible funds' Crisis Performance was mainly inferior to conventional funds, leading to the rejection of the second hypothesis. However, it was noteworthy to note that the results during recessions are not statically significant in any model or benchmark used, partly supporting earlier findings in the literature. These results are also robust after using alternative STOXXX 600 and STOXXX sustainability benchmarks. The third hypothesis of the study, the performance of responsible funds was expected to outperform the conventional funds during intermediate market times. Results from these periods indicate a clear overperformance of responsible funds compared to conventional funds that supports the hypothesis. The results was also robust after using alternative benchmarks. In addition, another robustness test with sub-periods showed the performance of funds in different market cycles at the same time. Based on the findings, it can be concluded that on average the performance of responsible funds was better when looking at different periods supporting the key findings of this study.

In addition, this study explored differences in investment style between socially responsible and conventional funds. The fourth hypothesis expected the investment styles of responsible and conventional funds to differ in different market situations. Previous literature has provided different evidence on how the investment styles of funds differ in general and in different market situations. In this context, majority of previous literature have reached to conclusion of small cap bias and growth-oriented investment styles among socially responsible funds. The results of this study in relation to investment style differ significantly between different models and benchmarks to some extent. However, I found small evidence that supports the findings of Leite and Cortez (2015) where responsible funds were less exposed to small-cap stocks and slightly more toward big stocks. On top of that, the results support earlier literature's claim that responsible funds tilt more towards growth equities. In fact, results with different models show that both funds were more inclined towards growth stocks, of which were responsible a little more.



In the case of Momentum strategies, I found evidence of a higher exposure of responsible funds than conventional ones, which somewhat contradicts previous studies (Leite and Cortez, 2015; Renneboog et al. 2008b). Nonetheless, due to differences in results, no clear conclusion about differences in fund investment styles could be drawn but allows to partly accept the fourth hypothesis that investment styles differ between socially responsible and conventional funds. However, these results confirmed that further research is required to investigate the problem.

Lastly, this study examined how fund investment styles changes along with different market situations. The fifth hypothesis expected the investment style of funds to change in different market situations (Leite and Cortez, 2015). After moving from normal market conditions towards recession and slowdown, both funds increased their exposure to small cap stocks or reduce their exposure on large stocks depending on benchmark used, in contrast to previous literature (Leite and Cortez, 2015). In addition, both funds increased their exposure to value stocks as they moved away from expansion periods. During periods of slowdown, traditional funds were more exposed to momentum strategies. However, I found no evidence of higher exposure of conventional funds to momentum strategies during expansion and recession periods. However, like the earlier hypothesis, results differ between different benchmarks, making it difficult to create a robust conclusion based on these results. However, similar to the fourth hypothesis, we were partially able to accept the hypothesis that the investment style of funds changes according to different market situations. After all, the results showed that this problem requires further research to establish a more solid conclusion.

This study confirmed the existence of conflicting evidence between prevailing literatures that needs to be examined in the future. It should be noted that these results were limited to this sample and time period. As has been noted from results and previous literature, there can be significant differences between responsible countries and responsible investing in different countries, and therefore results should be treated with caution. The concept of responsible investing has long roots, but its development is still in its early

stages. As Henke (2016) and Humphrey et al. (2016) have argued that some socially responsible funds are merely conventional funds in disguise that can cause bias in the field of socially responsible investing. Therefore, future research should focus more on this issue, for example implementing ESG data more broadly to support research on socially responsible investing. In addition, this research could be improved by constructing a local factor similar to Leite and Cortez (2015) to study fund diversification and tendency towards domestic equities. In addition, it would provide a more detailed explanation of how returns on funds were generated.

## References

- Amel-Zadeh, A., & Serafeim, G. (2018). Why and how investors use ESG information: Evidence from a global survey. *Financial Analysts Journal*, 74(3), 87-103. <https://doi.org/10.2469/faj.v74.n3.2>
- Areal, N., Cortez, M. C. & Silva, F. (2013). The conditional performance of US mutual funds over different market regimes: Do different types of ethical screens matter? *Financial markets and portfolio management*, 27(4), 397-429. <https://doi.org/10.1007/s11408-013-0218-5>
- Badía, G., Ferruz, L. & Cortez, M. C. (2021). The performance of social responsible investing from retail investors' perspective: International evidence. *International journal of finance and economics*, 26(4), 6074-6088. <https://doi.org/10.1002/ijfe.2109>
- Barber, B. M., Morse, A. & Yasuda, A. (2021). Impact investing. *Journal of financial economics*, 139(1), 162-185. <https://doi.org/10.1016/j.jfineco.2020.07.008>
- Barnett, M. L. & Salomon, R. M. (2006). Beyond dichotomy: The curvilinear relationship between social responsibility and financial performance. *Strategic management journal*, 27(11), 1101-1122. <https://doi.org/10.1002/smj.557>
- Bauer, R., Koedijk, K. & Otten, R. (2005). International evidence on ethical mutual fund performance and investment style. *Journal of banking & finance*, 29(7), 1751–1767. <https://doi.org/10.1016/j.jbankfin.2004.06.035>
- Bauer, R., Otten, R. & Rad, A. T. (2006). Ethical investing in Australia: Is there a financial penalty? *Pacific-Basin finance journal*, 14(1), 33-48. <https://doi.org/10.1016/j.pacfin.2004.12.004>

- Becchetti, L., Ciciretti, R., Dalò, A. & Herzel, S. (2015). Socially responsible and conventional investment funds: Performance comparison and the global financial crisis. *Applied economics*, 47(25), 2541-2562. <https://doi.org/10.1080/00036846.2014.1000517>
- Becht, M., Franks, J., Mayer, C. & Rossi, S. (2010). Returns to Shareholder Activism: Evidence from a Clinical Study of the Hermes UK Focus Fund. *The Review of financial studies*, 23(3), 3093-3129. <https://doi.org/10.1093/rfs/hhn054.ra>
- Belghitar, Y., Clark, E. & Deshmukh, N. (2014). Does it pay to be ethical? Evidence from the FTSE4Good. *Journal of banking & finance*, 47, 54-62. <https://doi.org/10.1016/j.jbankfin.2014.06.027>
- Belghitar, Y., Clark, E., & Deshmukh, N. (2017). Importance of the fund management company in the performance of socially responsible mutual funds. *Journal of Financial Research*, 40(3), 349-367. <https://doi.org/10.1111/jfir.12127>
- Bello, Z. Y. (2005). SOCIALLY RESPONSIBLE INVESTING AND PORTFOLIO DIVERSIFICATION. *The Journal of financial research*, 28(1), 41-57. <https://doi.org/10.1111/j.1475-6803.2005.00113.x>
- Benson, K. L. & Humphrey, J. E. (2008). Socially responsible investment funds: Investor reaction to current and past returns. *Journal of banking & finance*, 32(9), 1850-1859. <https://doi.org/10.1016/j.jbankfin.2007.12.013>
- Blake, D., Caulfield, T., Ioannidis, C., & Tonks, I. (2017). New evidence on mutual fund performance: A comparison of alternative bootstrap methods. *Journal of Financial and Quantitative Analysis*, 52(3), 1279-1299.

- Bodie, Z., Kane, A. & Marcus, A. J. (2014). *Investments* (10th global ed.). McGraw Hill Education.
- Bollen, N. P. B. (2007). Mutual Fund Attributes and Investor Behavior. *Journal of financial and quantitative analysis*, 42(3), 683-708.  
<https://doi.org/10.1017/S0022109000004142>
- Carhart, M. M. (1997). On Persistence in Mutual Fund Performance. *The Journal of finance* (New York), 52(1), 57-82. <https://doi.org/10.1111/j.1540-6261.1997.tb03808.x>
- Cortez, M. C., Silva, F. & Areal, N. (2009). The Performance of European Socially Responsible Funds. *Journal of business ethics*, 87(4), 573-588.  
<https://doi.org/10.1007/s10551-008-9959-x>
- Cortez, M. C., Silva, F., & Areal, N. (2012). Socially responsible investing in the global market: The performance of US and European funds. *International Journal of Finance & Economics*, 17(3), 254-271. <https://doi.org/10.1002/ijfe.454>
- Dimson, E., Karakas, O. & Li, X. (2015). Active Ownership. *The Review of financial studies*, 28(12), 3225-3268. <https://doi.org/10.1093/rfs/hhv044>
- Eccles, N. S., & Viviers, S. (2011). The origins and meanings of names describing investment practices that integrate a consideration of ESG issues in the academic literature. *Journal of business ethics*, 104(3), 389-402.
- El Ghouli, S. & Karoui, A. (2017). Does corporate social responsibility affect mutual fund performance and flows? *Journal of banking & finance*, 77, 53-63.  
<https://doi.org/10.1016/j.jbankfin.2016.10.009>

- Elton, E. J. & Gruber, M. J. (1997). Modern portfolio theory, 1950 to date. *Journal of banking & finance*, 21(11), 1743-1759. [https://doi.org/10.1016/S0378-4266\(97\)00048-4](https://doi.org/10.1016/S0378-4266(97)00048-4)
- Elton, E. J., Gruber, M. J. & Blake, C. R. (1996). Survivorship Bias and Mutual Fund Performance. *The Review of financial studies*, 9(4), 1097-1120. <http://www.jstor.org/stable/2962224>
- Euro Area Business Cycle Network. (2021). Chronology of Euro Area Business Cycles. Retrieved September 25, 2021, <https://eabcn.org/dc/chronology-euro-area-business-cycles>
- European Commission. (2021). Eurostat. Business Cycle Clock. Retrieved September 25, 2021, from <https://ec.europa.eu/eurostat/cache/bcc/bcc.html>
- Eurosif. (2014). European SRI Study. Retrieved December 05, 2021, <https://www.eurosif.org/news/eurosif-report-2014/>
- Fama, E. F. & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of financial economics*, 33(1), 3-56. [https://doi.org/10.1016/0304-405X\(93\)90023-5](https://doi.org/10.1016/0304-405X(93)90023-5)
- FAMA, E. F. & FRENCH, K. R. (2010). Luck versus Skill in the Cross-Section of Mutual Fund Returns. *The Journal of finance (New York)*, 65(5), 1915-1947. <https://doi.org/10.1111/j.1540-6261.2010.01598.x>
- FAMA, E. F. & FRENCH, K. R. (2010). Luck versus Skill in the Cross-Section of Mutual Fund Returns. *The Journal of finance (New York)*, 65(5), 1915-1947. <https://doi.org/10.1111/j.1540-6261.2010.01598.x>

Fama, E. F. & French, K. R. (2015). A five-factor asset pricing model. *Journal of financial economics*, 116(1), 1-22. <https://doi.org/10.1016/j.jfineco.2014.10.010>

Fama, E. F. & French, K. R. (2017). International tests of a five-factor asset pricing model. *Journal of financial economics*, 123(3), 441-463. <https://doi.org/10.1016/j.jfineco.2016.11.004>

Fama, E. F. & French, K. R. (2018). Choosing factors. *Journal of financial economics*, 128(2), 234-252. <https://doi.org/10.1016/j.jfineco.2018.02.012>

Fama, E. F. (1970). EFFICIENT CAPITAL MARKETS: A REVIEW OF THEORY AND EMPIRICAL WORK. *The Journal of finance* (New York), 25(2), 383-417. <https://doi.org/10.1111/j.1540-6261.1970.tb00518.x>

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Cambridge university press.

Friedman, M. & Savage, L. J. (1948). The Utility Analysis of Choices Involving Risk. *The Journal of political economy*, 56(4), 279-304. <https://doi.org/10.1086/256692>

Friedman, M. (1962). *Capitalism and freedom*. University of Chicago press.

GIIN. 2021. What You Need to Know about Impact Investing. Global Impact Investing Network. <https://thegiin.org/impact-investing/need-to-know/#what-is-impact-investing>.

Gregory, A., Matatko, J., & Luther, R. (1997). Ethical unit trust financial performance: small company effects and fund size effects. *Journal of Business Finance & Accounting*, 24(5), 705-725.

- Hamilton, S., Jo, H. & Statman, M. (1993). Doing Well While Doing Good? The Investment Performance of Socially Responsible Mutual Funds. *Financial analysts journal*, 49(6), 62-66. <https://doi.org/10.2469/faj.v49.n6.62>
- Harrison, J. S., Bosse, D. A. & Phillips, R. A. (2010). Managing for stakeholders, stakeholder utility functions, and competitive advantage. *Strategic management journal*, 31(1), 58-74. <https://doi.org/10.1002/smj.801>
- Henke, H. (2016). The effect of social screening on bond mutual fund performance. *Journal of banking & finance*, 67, 69-84. <https://doi.org/10.1016/j.jbankfin.2016.01.010>
- Humphrey, J. E., Warren, G. J. & Boon, J. (2016). What is Different about Socially Responsible Funds? A Holdings-Based Analysis. *Journal of business ethics*, 138(2), 263-277. <https://doi.org/10.1007/s10551-015-2583-7>
- Ielasi, F. & Rossolini, M. (2019). Responsible or Thematic? The True Nature of Sustainability-Themed Mutual Funds. *Sustainability (Basel, Switzerland)*, 11(12), 3304. <https://doi.org/10.3390/su11123304>
- Ielasi, F. & Rossolini, M. (2019). Responsible or Thematic? The True Nature of Sustainability-Themed Mutual Funds. *Sustainability (Basel, Switzerland)*, 11(12), 3304. <https://doi.org/10.3390/su11123304>
- In, F., Kim, M., Park, R. J., Kim, S. & Kim, T. S. (2014). Competition of socially responsible and conventional mutual funds and its impact on fund performance. *Journal of banking & finance*, 44, 160-176. <https://doi.org/10.1016/j.jbankfin.2014.03.030>
- Ippolito, R. A. (1993). On Studies of Mutual Fund Performance, 1962-1991. *Financial analysts journal*, 49(1), 42-50. <https://doi.org/10.2469/faj.v49.n1.42>



- Jacobs, B. I. & Levy, K. N. (2014). Smart beta versus smart alpha. *Journal of portfolio management*, 40(4), 4-7. <https://doi.org/10.3905/jpm.2014.40.4.004>
- Jensen, M. C. (1968). THE PERFORMANCE OF MUTUAL FUNDS IN THE PERIOD 1945-1964. *The Journal of finance (New York)*, 23(2), 389-416. <https://doi.org/10.1111/j.1540-6261.1968.tb00815.x>
- Kreander, N., Gray, R., Power, D. & Sinclair, C. (2005). Evaluating the Performance of Ethical and Non-ethical Funds: A Matched Pair Analysis. *Journal of business finance & accounting*, 32(7-8), 1465-1493. <https://doi.org/10.1111/j.0306-686X.2005.00636.x>
- Lean, H. H., & Pizzutilo, F. (2021). Performances and risk of socially responsible investments across regions during crisis. *International Journal of Finance & Economics*, 26(3), 3556-3568. <https://doi.org/10.1002/ijfe.1975>
- Lean, H. H., Ang, W. R. & Smyth, R. (2015). Performance and performance persistence of socially responsible investment funds in Europe and North America. *The North American journal of economics and finance*, 34, 254-266. <https://doi.org/10.1016/j.najef.2015.09.011>
- Leite, P. & Cortez, M. C. (2014). Style and performance of international socially responsible funds in Europe. *Research in international business and finance*, 30, 248-267. <https://doi.org/10.1016/j.ribaf.2013.09.007>
- Leite, P. & Cortez, M. C. (2015). Performance of European socially responsible funds during market crises: Evidence from France. *International review of financial analysis*, 40, 132-141. <https://doi.org/10.1016/j.irfa.2015.05.012>

- Lesser, K., Rößle, F. & Walkshäusl, C. (2016). Socially responsible, green, and faith-based investment strategies: Screening activity matters. *Finance research letters*, 16, 171-178. <https://doi.org/10.1016/j.frl.2015.11.001>
- Linnainmaa, J. T. (2013). Reverse Survivorship Bias. *The Journal of finance (New York)*, 68(3), 789-813. <https://doi.org/10.1111/jofi.12030>
- López-Arceiz, F. J., Bellostas-Pérezgrueso, A. J. & Moneva, J. M. (2018). Evaluation of the Cultural Environment's Impact on the Performance of the Socially Responsible Investment Funds. *Journal of business ethics*, 150(1), 259-278. <https://doi.org/10.1007/s10551-016-3189-4>
- Malkiel, B. G. (2015). Practical Applications of Is Smart Beta Really Smart? *Practical applications of institutional investor journals*, 2(4), 1-5. <https://doi.org/10.3905/pa.2015.2.4.099>
- Mallin, C., Saadouni, B. & Briston, R. (1995). THE FINANCIAL PERFORMANCE OF ETHICAL INVESTMENT FUNDS. *Journal of business finance & accounting*, 22(4), 483-496. <https://doi.org/10.1111/j.1468-5957.1995.tb00373.x>
- Markowitz, H. (1952). Portfolio selection. *The Journal of finance (New York)*, 7(1), 77-91. <https://doi.org/10.1111/j.1540-6261.1952.tb01525.x>
- Markowitz, H. M. (1991). Foundations of Portfolio Theory. *The Journal of finance (New York)*, 46(2), 469-477. <https://doi.org/10.1111/j.1540-6261.1991.tb02669.x>
- Matallin-Saez, J. C., Soler - Dominguez, A., de Mingo-Lopez, D. V., & Tortosa-Ausina, E. (2019). Does socially responsible mutual fund performance vary over the business cycle? New insights on the effect of idiosyncratic SR features. *Business Ethics: A European Review*, 28(1), 71-98.

- Nagy, R. A. & Obenberger, R. W. (1994). Factors Influencing Individual Investor Behavior. *Financial analysts journal*, 50(4), 63-68. <https://doi.org/10.2469/faj.v50.n4.63>
- Nofsinger, J. & Varma, A. (2014). Socially responsible funds and market crises. *Journal of banking & finance*, 48, 180-193. <https://doi.org/10.1016/j.jbankfin.2013.12.016>
- Reilly, F. K. & Akhtar, R. A. (1995). The Benchmark Error Problem with Global Capital Markets. *Journal of portfolio management*, 22(1), 33-52. <https://doi.org/10.3905/jpm.1995.409547>
- Renneboog, L., Ter Horst, J. & Zhang, C. (2008b). The price of ethics and stakeholder governance: The performance of socially responsible mutual funds. *Journal of corporate finance (Amsterdam, Netherlands)*, 14(3), 302-322. <https://doi.org/10.1016/j.jcorpfin.2008.03.009>
- Renneboog, L., Ter Horst, J. & Zhang, C. (2011). Is ethical money financially smart? Non-financial attributes and money flows of socially responsible investment funds. *Journal of financial intermediation*, 20(4), 562-588. <https://doi.org/10.1016/j.jfi.2010.12.003>
- Renneboog, L., Ter Horst, J., & Zhang, C. (2008a). Socially responsible investments: Institutional aspects, performance, and investor behavior. *Journal of banking & finance*, 32(9), 1723-1742. <https://doi.org/10.1016/j.jbankfin.2007.12.039>
- Reuter, J. & Zitzewitz, E. (2021). How Much Does Size Erode Mutual Fund Performance? A Regression Discontinuity Approach. *REVIEW OF FINANCE*, 25(5), 1395-1432. <https://doi.org/10.1093/rof/rfab016>
- Riedl, A., & Smeets, P. (2017). Why do investors hold socially responsible mutual funds? *The Journal of Finance*, 72(6), 2505-2550. <https://doi.org/10.1111/jofi.12547>

- Rudd, A. (1981). Social Responsibility and Portfolio Performance. *California management review*, 23(4), 55-61. <https://doi.org/10.2307/41164931>
- Scholten, B. & Sievanen, R. (2013). Drivers of Socially Responsible Investing: A Case Study of Four Nordic Countries. *Journal of business ethics*, 115(3), 605-616. <https://doi.org/10.1007/s10551-012-1410-7>
- Schueth, S. (2003). Socially responsible investing in the United States. *Journal of business ethics*, 43(3), 189-194. <https://doi.org/10.1023/A:1022981828869>
- Sharpe, W. F. (1964). CAPITAL ASSET PRICES: A THEORY OF MARKET EQUILIBRIUM UNDER CONDITIONS OF RISK. *The Journal of finance (New York)*, 19(3), 425-442. <https://doi.org/10.1111/j.1540-6261.1964.tb02865.x>
- Soler-Domínguez, A. & Matallín-Sáez, J. C. (2016). Socially (ir)responsible investing? The performance of the VICEX Fund from a business cycle perspective. *Finance research letters*, 16, 190-195. <https://doi.org/10.1016/j.frl.2015.11.003>
- Sortino, F. A., & Price, L. N. (1994). Performance measurement in a downside risk framework. *The Journal of Investing*, 3(3), 59-64. <https://doi.org/10.3905/joi.3.3.59>
- Statman, M. & Glushkov, D. (2016). Classifying and Measuring the Performance of Socially Responsible Mutual Funds. *Journal of portfolio management*, 42(2), 140-151. <https://doi.org/10.3905/jpm.2016.42.2.140>
- Statman, M. (2000). Socially Responsible Mutual Funds. *Financial analysts journal*, 56(3), 30-39. <https://doi.org/10.2469/faj.v56.n3.2358>
- Von Neumann, J., & Morgenstern, O. (1947). *Theory of games and economic behavior*, 2nd rev.

- Waddock, S. A. & Graves, S. B. (1997). The corporate social performance – financial performance link. *Strategic management journal*, 18(4), 303-319. [https://doi.org/10.1002/\(SICI\)1097-0266\(199704\)18:4<303::AID-SMJ869>3.0.CO;2-G](https://doi.org/10.1002/(SICI)1097-0266(199704)18:4<303::AID-SMJ869>3.0.CO;2-G)
- Wermers, R. (2000). Mutual Fund Performance: An Empirical Decomposition into Stock-Picking Talent, Style, Transactions Costs, and Expenses. *The Journal of finance* (New York), 55(4), 1655-1695. <https://doi.org/10.1111/0022-1082.00263>
- Wu, J., Lodorfos, G., Dean, A. & Gioulmpaxiotis, G. (2017). The Market Performance of Socially Responsible Investment during Periods of the Economic Cycle – Illustrated Using the Case of FTSE. *Managerial and decision economics*, 38(2), 238-251. <https://doi.org/10.1002/mde.2772>

## Appendices

### Appendix 1. Summary of literature review

<b>Performance of socially responsible funds</b>			
<b>The author(s)</b>	<b>Study period</b>	<b>Methods</b>	<b>Key findings</b>
Hamilton, Jo and Statman 1993	1981-1990 (US)	CAPM	Performance Socially responsible funds is not statistically different compared to conventional funds
Bauer, Koedijk and Otten 2004	1990-2001 (US)	CAPM, Carhart 4-factor model	Ethical funds improve their performance across study period. Overall, no statistically significant differences between ethical and conventional funds
Renneboog, Ten horst and Zhang 2008b	1991-2003 (US)	CAPM, Carhart 4-factor model	Socially responsible funds underperform domestic benchmarks. Responsible funds underperform conventional funds with risk-adjusted returns but not with fund alphas.
El Ghouli and Karoui 2016	2003-2011 (US)	Carhart FFC	CSR have negative impact on risk-adjusted returns. High CSR-score funds underperform low CSR-score funds.
Statman 2000	1990-1998 (US)	Raw returns, Risk-adjusted returns, Beta, Alpha and modified Sharpe ratio	DIS index outperform S&P500 measured by raw returns but underperform with risk-adjusted returns. DIS index have higher beta but generate higher alpha compared S&P 500. Socially responsible funds underperform both indices but outperform conventional funds
Belghitar, Clark and Deshmukh 2017	2001-2010 (US)	Sharpe, Treynor, Jensen's alpha, CAPM, Carhart 4-factor and MCSD	Investors do not lose anything by investing responsible, but results higher return distribution. Investors can increase their expected utility by reducing responsible investments and purchasing more conventional

<b>Performance of socially responsible strategies</b>			
<b>The Author(s)</b>	<b>Study period</b>	<b>Methods</b>	<b>Key findings</b>
Kempf and Osthoff. 2007	1992-2004 (US)	Carhart 4-factor model	Higher socially responsible rating lead higher abnormal returns. Best-in-class or positive screening can generate higher abnormal returns than negative screening.
Lesser, Röble and Walkshäusl. 2016	2000-2012 (Worldwide)	Carhart 4-factor, Quality factor and q-theory factor model	Three investment strategies perform similarly than markets and their conventional counterparts during uncertain times. During non-crisis times, strategies tend to underperform compared with market and conventional peers.
Becht, Franks, Mayer and Rossi. 2010	1998-2004 (UK)	Stock price movements before and after shareholder activism	Fund interventions increased the abnormal return on shares by 3.9 to 5.3 per cent. Interventions raised ROA and market value, as well as lowered average number of headcount.
Barber, Morse and Yasuda. 2021	1995-2004 (Worldwide)	IRR	Impact funds underperform traditional funds. Impact investors are willing to accept 2.5 – 3.7 lower IRR compared with traditional investors.

<b>Performance of socially responsible investing during different market conditions</b>			
<b>The author(s)</b>	<b>Study period</b>	<b>Methods</b>	<b>Key findings</b>
Nofsinger and Varma (2014)	2000-2011 (US)	CAPM, Fama and French 3-factor and Carhart 4-factor	Conventional funds outperform socially responsible funds in non-crisis times. In times of crisis, socially responsible funds outperform conventional ones. Key drivers of performance in times of crisis were shareholder activism and consideration of ESG issues.
Leite and Cortez (2015)	2001-2012 (Europe)	Fama and French 3-factor and Carhart 4-factor	Socially responsible funds underperform during times outside of crisis, but have slightly better performance during times of crisis. Positive screening yields better returns than negative screening.
Soler-Dominguez and Matallin-Saez (2015)	2013-2020 (US)	Fama and French 3-factor and Carhart 4-factor	The VICEX fund outperforms socially responsible funds in expansion cycles, but performs weaker during the recession. Overall, after looking at the full sample period, the VICEX fund outperforms socially responsible funds by 6.5%.
Belghitar, Clark and Deshmukh (2017)	2001-2010 (UK)	Fama and French 3-factor, Carhart 4-factor and MCSD	In normal times, socially responsible funds perform better than traditional funds, but conversely, underperform in times of crisis. The key factor in the success of the funds is the management company.
Matallin-Saez, Soler-Dominguez, Mingo-Lopez and Tortosa-Ausina (2018)	2000-2017 (US)	Fama and French 3-factor and Carhart 4-factor	Conventional funds outperform during expansion periods. During recessionary periods socially responsible funds improve their performance considerably and perform better than traditional funds. On investment styles, value funds seemed to perform better than others.



<b>Performance of socially responsible investing during different market conditions</b>			
<b>(Continued)</b>			
<b>The author(s)</b>	<b>Study period</b>	<b>Methods</b>	<b>Key findings</b>
Henke (2016)	2001-2014 (US/Europe)	Five-factor model	Socially responsible bond funds outperform conventional assets throughout the sample period. Performance is better even in crisis and non-crisis periods. As a rule, the driver overperformance is mainly due to the exclusion of low ESG-rated issuers.
Wu, Lodorfos, Dean and Gioulmpaxiotis (2017)	2004-2011 (UK)	Jensen's alpha and Sharpe ratio	Socially responsible funds perform better during crisis and pre and post-crisis periods. Socially responsible funds recover faster from crisis than conventional funds.
Badía, Ferruz and Cortez (2020)	2005-2014 (worldwide)	Fama and French six-factor model	Global socially responsible portfolio outperform conventional portfolio. In other countries, results vary during both the study period and bull and bear markets, indicating that differences between countries may be due to country factors or cultural considerations that cause performance variation.
Lean and Piz-zutilo (2021)	2007-2017 (worldwide)	Fama and French 3-factor and Carhart 4-factor	Performance between socially responsible and traditional indices varies across countries and market conditions. Overall, socially responsible indices perform better throughout the sample period and crisis periods, while in non-crisis times conventional indices show slightly better performance