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The Effect of SRI on Portfolio Performance During Different Market Conditions

Evidence from the U.S. stock market

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ABSTRACT:
Socially responsible investing has been a rapidly growing phenomenon in recent decades. As the awareness of people has grown, they have started to pay more attention on social, ethical and environmental factors when making investment decisions. Investor preferences and psychological biases are increasingly important factors in financial markets. Classical finance assumes that investors are always rational but behavioral finance and socially responsible investing brings a different perspective to the subject as investor's preferences and values become part of the investment process.

The purpose of this thesis is to investigate how the incorporation of socially responsible criteria in investments affect portfolio performance. This thesis takes the time perspective into consideration by examining the performance of portfolios both in general and during market crises. In recent years, the literature around socially responsible investing has increasingly focused on considering different market conditions in performance measurement. However, in the light of previous studies, the results are contradictory. This study seeks to further examine the topic by expanding the sample to also cover the most recent COVID-19 crisis.

The data of this study consist of 102 US-based socially responsible funds (SRI) and 110 US-based conventional funds (non-SRI). The monthly returns of both portfolios are collected from the years of 2006-2021. The study is further divided into three different periods which are the full, crisis and non-crisis periods. The crisis period covers two major market crises, the financial crisis and the market crash caused by COVID-19. The abnormal returns of SRI and non-SRI portfolios are measured using the Capital Asset Pricing Model, the Fama and French three-factor model and the Carhart four-factor model.

The results of the factor models suggest that SRI portfolios underperform their conventional counterparts in the full and non-crisis periods. However, the differences between the results of portfolios are relatively small. In addition, the results support the evidence that SRI portfolios outperform non-SRI portfolios during market crises. Although market crisis alphas are not statistically significant, the results provide the basis for further research and observations on the subject. Overall, investors should not expect abnormal returns by incorporating responsibility criteria in investment processes in the long run.

KEYWORDS: Socially responsible investing, Responsibility, Investment performance, Portfolio theory, Market crises

VAASAN YLIOPISTO
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TIIVISTELMÄ:
Sosiaalisesti vastuullinen sijoittaminen on ollut viime vuosikymmeninä nopeasti kasvava ilmiö. Ihmiset alkavat tietoisuuden lisääntyessä kiinnittää enemmän huomiota sosiaalisiin, eettisiin ja ympäristöllisiin tekijöihin sijoituspäätöksiä tehdessään. Sijoittajien mieltymykset ja psykologiset taipumukset ovat yhä tärkeämpiä tekijöitä rahoitusmarkkinoilla. Klassinen rahoitus olettaa sijoittajien olevan poikkeuksetta rationaalisia toimijoita, mutta käyttäytymiseen perustuva rahoitus ja sosiaalisesti vastuullinen sijoittaminen tuovat aiheeseen toisenlaisen näkökulman, sijoittajien mieltymysten ja arvojen tullessa osaksi sijoitusprosessia.

Tämän tutkimuksen tarkoituksena on selvittää, miten sosiaalisesti vastuullisten kriteerien sisällyttäminen sijoituksiin vaikuttaa salkun tulokseen. Tutkimus ottaa aikanäkökulman huomioon tarkastelemalla salkkujen kehitystä sekä yleisesti että markkinakriisien aikana. Viime vuosina sosiaalisesti vastuullista sijoittamista koskeva kirjallisuus on keskittynyt enenevässä määrin huomioimaan myös erilaiset markkinaolosuhteet suorituskyvyn mittauksessa. Aiemman kirjallisuuden valossa tulokset ovat kuitenkin ristiriitaisia. Tämä tutkimus pyrkii tutkimaan aihetta edelleen laajentamalla otosta kattamaan myös viimeisimmän COVID-19 kriisin.

Tämän tutkimuksen data koostuu 102 sosiaalisesti vastuullisesta ja 110 tavanomaisesta Yhdysvaltain markkinalla toimivasta rahastosta. Molempien rahastojen kuukausittaiset tuotot on kerätty vuosilta 2006-2020. Tutkimus on edelleen jaettu kolmeen eri ajanjaksoon, jotka ovat koko tutkimusjakso, kriisi- ja ei-kriisikausi. Kriisikauteen ajoittuu kaksi suurta markkinakriisiä, finanssikriisi ja COVID-19:n aiheuttama markkinaromahdus. Sosiaalisesti vastuullisten sekä tavanomaisten rahastojen epänormaaleja tuottoja mitataan Capital Asset Pricing -mallilla, Faman ja Frenchin kolmen faktorin mallilla sekä Carhartin neljän faktorin mallilla.

Faktorimallien löydökset tukevat oletusta siitä, että SRI-rahastot tuottavat perinteisiä rahastoja heikommin koko periodilla sekä kriisiajan ulkopuolella mitattuna. Erot rahastojen tulosten välillä ovat kuitenkin suhteellisen pieniä. Lisäksi tulokset osoittavat näyttöä siitä, että SRI-rahastojen tuotot ylittävät tavanomaisten rahastojen tuotot markkinakriisien aikana. Vaikka markkinakriisien aikana mitatut alfat eivät ole tilastollisesti merkitseviä, tulokset tarjoavat pohjan jatkotutkimuksille aiheesta. Yhteenvetona voidaan todeta, että sijoittajien ei tulisi odottaa epänormaaleja tuottoja sisällyttämällä vastuullisuuskriteerejä sijoitusprosesseihin pitkällä aikavälillä.

AVAINSANAT: Sosiaalisesti vastuullinen sijoittaminen, Vastuullisuus, Sijoitusten suorituskyky, Portfolioteoria, Markkinakriisit

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Abbreviations

AUM	Assets Under Management
CAPM	Capital Asset Pricing Model
CSR	Corporate Social Responsibility
EMH	Efficient Market Hypothesis
ESG	Environmental, Social, Governance
GSIR	Global Sustainable Investment Review
HML	High Minus Low
NBER	The National Bureau of Economic Research
SMB	Small Minus Big
SRI	Socially Responsible Investing
US	The United States
US SIF	The US Sustainable and Impact Investing Foundation
WHO	World Health Organization

1 Introduction

Investments that emphasize social responsibility are part of the financial industry that has grown rapidly in recent decades. Socially responsible investing (SRI) refers to an investment approach that considers both financial return objectives and ethical or values-based considerations. It involves selecting investments that align with an investor's social, environmental, or governance criteria, aiming to generate positive impact alongside financial returns. Investors are increasingly aware of environmental issues and incorporate socially responsible functions in their investment decisions. The importance of socially responsible investing increases as investors' awareness and interest in the environment is emphasize. The growth of SRI has been particularly affected by several well-known incidents as new knowledge about global warming and ozone depletion has become available. Also issues with human rights and healthy work environments around the world have had an impact on increasing ethical awareness of investors.

The US SIF Foundation has measured the growth of socially responsible investing and it has increased 25-fold since the first measurement in 1995. The biggest trend in growth started after the year 2012 and in 2020 the value of socially responsible US-domiciled investments was over $ 16 trillion. (US SIF, 2020.) The trend towards socially responsible investing is also evident in the literature, as the number of studies on responsible investing has grown significantly over the past decades.

In recent years, the literature around socially responsible investing has increasingly focused on different market conditions when measuring the performance of SRI portfolios. It is natural that the behavior of investors is also affected by different market conditions. Uncertain conditions further emphasize the already important role of investor's preferences and psychological biases. Socially responsible investing is characterized by the fact that investors are not only seeking to maximize financial returns, but investors can also achieve a lot of mental pleasure or a certain social status when investing in a socially responsible way. Based on this, the investor should not only be seen as a rational actor but different factors affecting investor behavior need also to be considered.

Socially responsible investing differs from conventional type of investing as it applies various investment screens to include or exclude assets based on ecological, social, corporate governance or ethical criteria. Several studies over the past decade have sought to determine whether such behavior has a negative or positive effect on the portfolio performance compared to conventional portfolios. Studies have considered the potential relationship between corporate social and financial performance.

The studies have found either a positive, negative or neutral relationship between socially responsible investing and financial performance. However, the results divide opinions and there is no clear consensus. Hamilton, Jo and Statman (1993), Shank, Manullang and Hill (2005), and Bauer, Koedijk, and Otten (2005) find evidence that there is no statistically significant difference between the performance of socially responsible and conventional portfolios. According to these studies, the incorporation of SRI criteria in investment decisions does not affect portfolio performance.

There are also many studies on the subject indicating that the inclusion of socially responsible criteria in investment decisions leads to either positive or negative outcomes when comparing the performance of these portfolios to the performance of conventional counterparts. For example, Girard, Rahman and Stone (2007) and Renneboog, Ter Horst and Zhang (2008) investigates the topic and find results proving that socially responsible screening increases costs and thus leads to poorer performance of SRI portfolios. The opposite results have been obtained by Barnett and Salomon (2006) and Kempf and Osthoff (2007). According to their research, socially responsible portfolios outperform conventional ones.

After the financial crisis, the literature around the performance of socially responsible portfolios during crisis periods began to increase. SRI portfolios are seen to be less volatile, and more studies have proved consistent results that socially responsible portfolios perform better than conventional portfolios in times of market crisis. The topic has been, for example, studied by Kim, Li and Li (2014), Nofsinger and Varma (2014) and Lins,

Servaes, and Tamayo (2017). Kim, Li and Li (2014) find the relationship between corporate social responsibility and the risk of future stock price crash. According to their research, SRI portfolios have a lower risk of future stock price crash in market crises. Nofsinger and Varma (2014) and Lins et al. (2017) find also consistent evidence in their research that SRI portfolios perform better than their conventional counterparts during market crises.

However, the analysis of different studies must also consider the factors that may affect the results, such as research methods, research period, geographical location and the fact that not all companies are homogenous and their performance is affected by different factors depending on industry, location and size. These factors need to be considered in order to carry out a comprehensive analysis of the performance of SRI portfolios, both in general and in times of crisis.

1.1 Purpose of the study

The purpose of this paper is to investigate how the incorporation of socially responsible criteria in investments affect portfolio performance. This thesis also takes the time perspective into consideration by examining the performance of portfolios both in general and during market crises. This paper brings a holistic and analytical perspective on the subject, addressing not only the previous literature but also the underlying well-known financial theories, and this way seeks to investigate the topic in depth. The hypotheses of this study are analysed through empirical research and the results are reflected in previous literature on the topic. The aim is to examine in more depth the performance of socially responsible portfolios.

As previously stated, the previous literature is not entirely in agreement on how the incorporation of social responsibility in investments affects the portfolio performance in general. However, the first hypothesis of this thesis is based on recent literature that broadly supports the assumption that socially responsible portfolios underperform their

conventional counterparts (Girard, Rahman and Stone, 2007; Renneboog, Ter Horst and Zhang, 2008). Behind this is the perception that including social criteria in the investment strategy increases the cost of the investment and thus affects the total return of the portfolio. The first hypothesis is formed based on this assumption and is as follows:

H_1: Portfolios with high social responsibility underperform conventional portfolios during non-crisis periods.

In order to be able to examine the performance of socially responsible portfolios holistically, different market conditions need be taken into consideration in the research. The literature on the performance of socially responsible portfolios began to increase after the financial crisis, and a major part of the previous research focuses on this specific crisis. Studies appear to provide evidence of overperformance of SRI portfolios during market crises (Kim, Li and Li, 2014; Nofsinger & Varma, 2014; Lins, Servaes, and Tamayo, 2017). This can be explained by the fact that in crisis times, the psychological and behavioral factors of investors are highlighted and thus the preference for SRI portfolios is emphasized. Socially responsible portfolios are seen to be less volatile and thus also have a lower risk of stock price crash. (Glode, 2011.) The second hypothesis is built around previous literature and expands the research area, considering not only the financial crisis but also the recent market crisis caused by COVID-19. The second hypothesis is based on these factors and is the following:

H_2: Portfolios with high social responsibility outperform conventional portfolios during market crises.

This thesis aims to provide answers to above mentioned hypotheses through empirical research, focusing on the most recent data and market events. If portfolios with high social responsibility underperform conventional portfolios, the first hypothesis is supported. If socially responsible portfolios outperform conventional portfolios during a market crisis, the second hypothesis is accepted.

1.2 Structure of the study

The structure of the study consists of seven main chapters and is as follows. After the introduction, which leads the reader into the topic and presents the purpose of the study, the responsible investing and its development from history to this day has been presented. Chapter three covers the theoretical background focusing on the most relevant theories regarding financial markets. Efficient markets, portfolio theory and behavioral finance aspect on the topic are discussed in more detail. After the theoretical part, chapter four provides an in-depth look at the various studies and their findings on the subject, in order to compare the results of this thesis with the previous literature. After the literature review, the empirical part of this thesis is coverd. Chapter five introduces the data collection process and opens in detail each method employed in the study to obtain the research results. This is followed by the review of the results from the perspective of all methods used in chapter six. The final part of this thesis concludes the paper.

2 Socially responsible investing

Socially responsible investing or SRI has grown dramatically in recent decades. Consideration of ethical, social and environmental issues in investment decisions has become part of the investment process. (Scholtens & Sievänen, 2012.) The basic idea behind SRI is to consider both financial return as well as societal development. Socially responsible investing is often seen as an activity where personal values and social concerns guide investors in their investment decisions. Its goals are based on environmental issues, human rights, community involvement and personnel relations. Although socially responsible investing has been examined for more than four decades, the definition of the term SRI is still not completely established. Depending on the context also different terms for socially responsible investing are used, such as: “ethical investing,” “green investing,” “sustainable investing,” “responsible investing,” and “values-based investing”. (Berry & Junkus, 2013; US SIF, 2020.)

Investors are motivated by various reasons for socially responsible investing. In general, investors might feel the need to invest their money in a way that supports their personal values and priorities. There can be a strong psychological aspect behind their investment decisions. Socially responsible investing may also be considered in situations where investors feel a strong need to invest in a way that supports and encourage improvements in quality of life. In these situations, investors have the desire to invest their money in a way that can potentially make a difference in society. Socially responsible investing can therefore help investors to act as part of the “social change” in society. (Schueth, 2003.)

The US Sustainable and Impact Investing foundation (US SIF) first measured the amount of responsible investments in 1995. Since then, the amount has been measured annually and most recently in 2020. The figure 1 shows the growth in responsible investments from 1995 to 2020. When the amount of sustainable investments was first measured, it was approximately 639 billion dollars. Since then, the amount has increased 25-fold, bringing the annual growth rate to 14 percent. The figure below demonstrates that the

growth of responsible investments started to accelerate in 2012 and has risen steadily since then. (US SIF, 2020.)

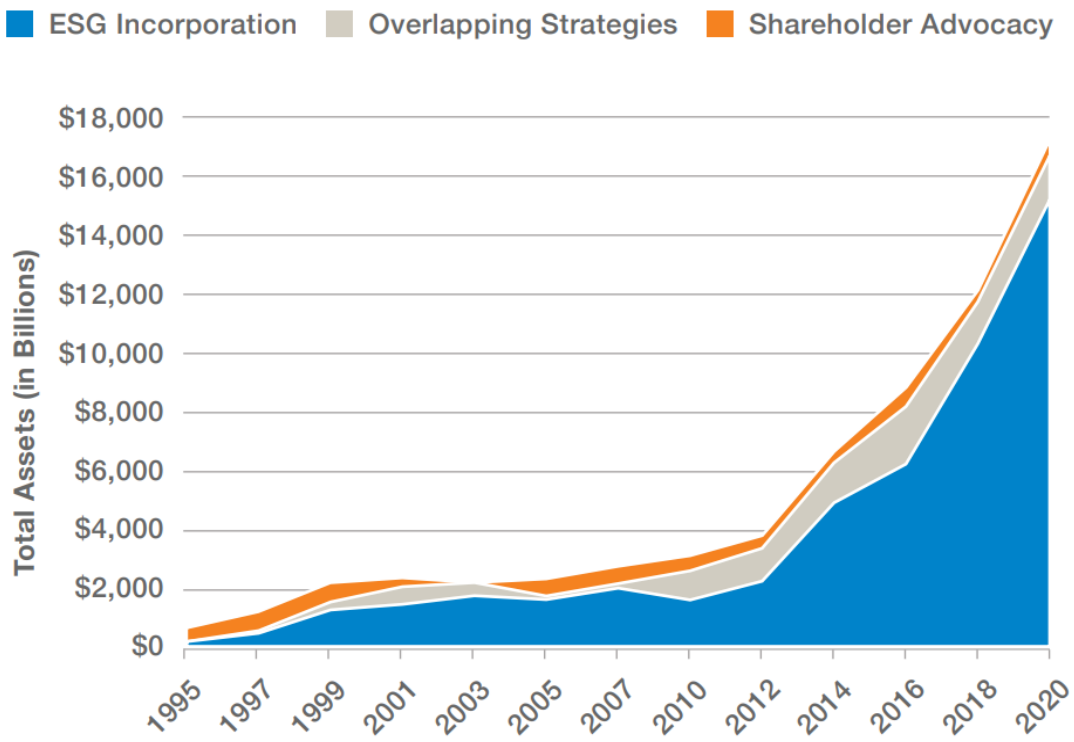

Figure 1. Sustainable and Responsible investing in the US 1995-2020 (US SIF, 2020).

2.1 Development of socially responsible investing

The roots of socially responsible investing go back hundreds of years to the early biblical times when Jewish law enacted many directives on ethical investing. For centuries, religious investors have followed their traditions of peace and non-violence. They have avoided investing in companies that benefit from products developed to kill or enslave other people. The earliest signs of the religious origins of socially responsible investing are still valid as the majority of socially conscious investors broadly avoid “sin stocks”. (Schueth, 2003.)

Although there were signs of socially responsible investing centuries ago, the modern socially responsible investment industry is a relatively young phenomenon. Socially responsible investing started to develop in the 1970s. Faith-based organizations began to believe that their investment activities should reflect their values and that their investments could influence the company's operations. During that time, socially responsible investing was perceived as a fringe activity. The amount of assets managed by SRI and ESG strategies has increased significantly as investors have explored the financial benefits of responsible investing. (PRI, 2016.)

Interest in socially responsible investing grew dramatically in the 1980s as millions of people, churches, universities, states and cities focused their investment strategies with the objective of getting the South African white minority government to dismantle the racist system. Well-known incidents such as Bhopal, Chernobyl and Exxon Valdez also had an impact on increasing awareness as new knowledge about global warming and ozone depletion became available. Issues with human rights and healthy work environments around the world have been ground-breaking factors and have led investors to favour more socially responsible investments. (Schueth, 2003.) The latest factor influencing socially responsible investing is the prevailing corona pandemic. It has highlighted the need to confront social, economic and racial inequality. (US SIF, 2020.)

2.2 Current SRI market

Historical events and the increase in people's awareness have shaped the current market of socially responsible investments. According to the latest Global Sustainable Investment Review (GSIR) which covers the five largest SRI markets, the share of socially responsible investments has grown significantly over the past decades. At the beginning of 2020, the SRI share reached $35.3 trillion covering 35.9% of total assets under management. At the beginning of 2020, 75% of the total value of responsible investments was managed by institutional investors and 25% by retail investors. Although institutional

investors dominate most of the financial market, retail investors' interest in responsible investing has been growing for the past decades. (GSIR, 2020.)

The share of socially responsible investments has continued to grow in most regions, with Canada reaching the highest absolute growth with 48%, followed by the United States with 42% growth in the two-year period of 2018-2020. During the same review period, Europe reported a 13% decline which was mainly due to a change in measurement methodology from which European data is drawn. However, Europe and The United States covered more than 80% of the global SRI market between 2018 and 2020. Figure 2 below breaks down the distribution of global Sustainability assets by review area. (GSIR, 2020.)

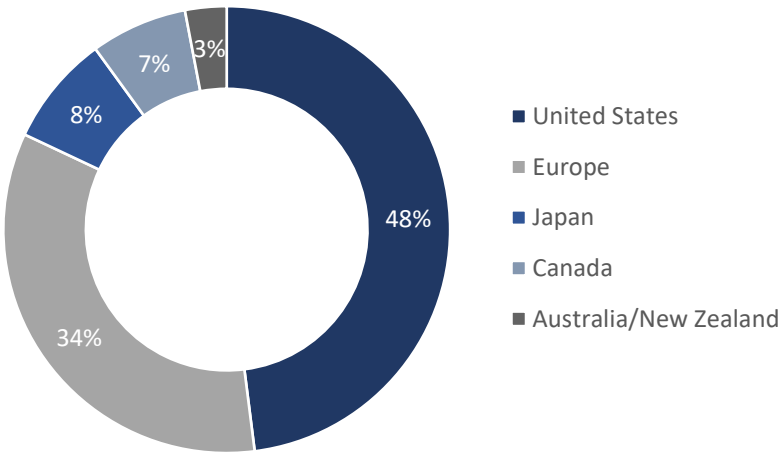

Figure 2. Proportion of global sustainable investing assets by region (GSIR, 2020).

GSIR (2020) examines the share of socially responsible investing also from the perspective of different investment strategies. According to the report, the most common strategy globally is ESG integration, followed by negative screening and corporate engagement. Changes can be seen in the popularity of investment strategies compared to 2018, when negative/exclusionary screening was reported as the most popular strategy globally. However, there are regional differences between the popularity of different

investment strategies and many investment organizations are using a combination of strategies rather than focusing on just one. (GSIR, 2020.)

2.3 SRI strategies

Socially responsible investing is a process where the individual values of investor and societal concerns are integrated into investment decisions. Investors follow these strategies with the aim of achieving financial returns without harming environment and society. There are various socially responsible investing strategies that investors can employ. These strategies can be combined or customized based on individual preferences or specific investment goals. Additionally, SRI strategies continue to evolve as investor demand for sustainable and responsible investing grows. The five commonly used SRI approaches are explained in detail below. (Eurosif, 2021.)

2.3.1 Social screening

Social screening is well known and widely used SRI strategy, covering majority of all socially responsible investments. Social screening is based on the idea that a portfolio is formed by including or excluding companies based on social or environmental criteria. Investor´s main objective is to find companies who are following socially responsible practices with a positive impact on society. Socially conscious investors seek to identify companies that meet their social criteria and generate the desired financial return. Screening is not a simple process and screening criteria depend on many different factors. (de Colle & York, 2009; Schueth, 2003.)

Social screening can be either positive or negative. In general, negative screening approach is more appropriate and a simple way for filtering out certain companies based on their products or corporate behaviour. Common excluded products are alcohol, tobacco, gambling and guns. A particular company can also be excluded if it is involved in

violations of labor norms such as child labor or sweatshop conditions, or because of co-operating with a special oppressive system. Positive social screening is the opposite approach, in which the investor selects certain industries or companies in the portfolio based on their socially responsible operations. (Berry et al. 2013.)

2.3.1.1 Sin stocks

Sin stocks are the ones that negative screening seeks to exclude from the portfolio. Sin stocks are companies or their products that have undesirable social consequences for society or addictive properties when excessively consumed or used. The most common industries considered as sinful are alcohol, tobacco and gambling. The existence of sin stocks is based on societal norms and perceptions of ethics. Sin stocks are considered as incapable of complying with social norms which is why they are segmented into their own group. Segmentation is based on decisions made by investors not to own stocks that conflict with their value systems. For some investors, avoiding sin stocks is even more important than making money. Sinful industries are generally avoided, especially by institutional investors. (Hong & Kacperczyk, 2009.)

Excluding sin stocks from the investment portfolios of individual investors is simple, as they are free to make their own investment decisions. For institutional investors, the logic is more complicated, as institutional portfolios are managed by asset managers who operate under investment guidelines to achieve the best possible outcome. In this case, the decisions no longer concern an individual person but several investors. Sin stocks that are classified as unethical, and unacceptable are experiencing a large impact on stock prices due to the avoidance of institutional investors. As institutional investors avoid sinful industries, it leads to an increase in the cost of capital for these companies. It indirectly affects stock prices and earnings. This implies that socially responsible investing has an impact on the financial markets and it creates pressure on companies to make their business more responsible. (Hong & Kacperczyk, 2009; Fabozzi, Ma & Oliphant, 2008.)

2.3.2 ESG integration

ESG integration is another SRI strategy that has gained popularity among investors. It integrates environmental, social, and governance factors into traditional financial analysis and decision-making processes. Rather than solely focusing on financial metrics, ESG integration takes into consideration the sustainability and risk profile of a company. This approach recognizes that ESG issues can have a material impact on a company's long-term performance and value. ESG integration involves evaluating companies based on various ESG criteria such as carbon emissions, labor standards, board diversity, and business ethics. By incorporating these factors into investment analysis, investors gain a more comprehensive understanding of a company's overall performance and risks. They can assess how well a company manages its environmental impact, treats its employees, and aligns with ethical principles. This broader perspective enables investors to make more informed investment decisions and identify companies that demonstrate sustainable business practices. (Duuren, Plantinga & Scholtens, 2016.)

ESG integration is gaining popularity as investors recognize that integrating sustainability considerations into their investment strategies can lead to better risk management, improved long-term financial performance, and positive societal impact. By encouraging companies to adopt more sustainable practices, ESG integration also promotes responsible corporate behavior and contributes to the overall shift towards a more sustainable and inclusive global economy. (Duuren, Plantinga & Scholtens, 2016.)

2.3.3 Best in class

The best in class strategy is an approach that involves selecting investments from various industries or sectors based on their relative sustainability performance. The strategy aims to invest in companies that are considered leaders or "best in class" within their respective sectors in terms of environmental, social, and governance (ESG) factors. Rather than excluding entire industries, this strategy focuses on identifying and supporting

companies within each sector that demonstrate strong ESG practices compared to their peers. Investors evaluate companies based on a range of sustainability criteria, including environmental impact, labor standards, supply chain practices, product safety, corporate governance, and more. By investing in these leading companies, investors aim to encourage industry peers to improve their ESG practices and create positive change throughout the sector. (Kempf & Osthoff, 2007.)

The best in class strategy allows investors to align their investments with their sustainability goals while still maintaining diversification within their portfolios. It promotes healthy competition among companies and encourages them to adopt more responsible practices. This strategy recognizes that some sectors may face sustainability challenges, but by investing in the top performers within those sectors, investors can support and promote companies that are making meaningful progress towards sustainability and responsible business practices. (Kempf & Osthoff, 2007.)

2.3.4 Engagement and voting

The engagement and voting strategy is an approach that involves active participation in shareholder engagement and exercising voting rights as a means to influence the behavior and practices of companies. This strategy recognizes that investors have a unique position as shareholders and can leverage their influence to drive positive change in corporate behavior and promote sustainability and responsible practices. Under this strategy, investors engage with companies in dialogues, discussions, and negotiations to raise concerns, advocate for improved sustainability performance, and encourage the adoption of responsible business practices. Engagement can cover a wide range of issues such as climate change, diversity and inclusion, supply chain transparency, labor rights, and more. By actively engaging with companies, investors can foster dialogue and encourage them to take measurable steps towards improved ESG performance. (Eurosif, 2021.)

Additionally, this strategy involves exercising voting rights during shareholder meetings or on specific resolutions. Shareholders can vote in favor of resolutions that align with sustainability goals or express concerns by voting against resolutions that contradict responsible practices. Voting serves as a powerful tool to hold companies accountable and signal investor expectations regarding sustainability and governance matters. By actively engaging and voting, investors can drive positive change, encourage companies to improve their ESG performance, and promote long-term sustainable practices. (Eurosif, 2021.)

2.3.5 Impact investing

In impact investing, investors actively seek out opportunities that align with their chosen impact goals. These goals can range from renewable energy and affordable housing to healthcare and education. The investments are evaluated based on both their potential financial returns and their ability to generate positive and measurable impacts. Impact investors often engage in rigorous due diligence to ensure that their investments contribute to sustainable development and social progress. (Eursif, 2021.)

The impact investing strategy is driven by the belief that capital can be a powerful force for positive change. By directing investments towards solutions to pressing social and environmental issues, impact investors aim to create long-term, sustainable impact and drive systemic change. Impact investing has gained significant momentum in recent years, attracting a wide range of investors who seek to align their financial resources with their values and contribute to building a more inclusive and sustainable world. (Höchstädter & Scheck, 2014.)

2.4 The cost of SRI

Alder and Kritzman (2008) state in their study that investors should assess the costs of socially responsible investing. This will help them find out if it is profitable to narrow down investment options from a perspective of return. Socially responsible investing requires the investor to avoid companies that do not meet socially responsible criteria, even if those companies have better expected return than their socially responsible counterparts. The difference between the returns of socially responsible and conventional portfolios is the price of the socially responsible investing.

Diversification is a key element in creating an optimal portfolio in order to minimize a specific risk. However, the possibility of diversification is always reduced if some conditions are set for the selection of investment targets. Socially responsible investing excludes many industries, companies and products. It also requires dedication and research to find companies that meet the socially responsible criteria. Ultimately it is under the investors responsibility to decide whether the costs of social responsibility are worth it. (Trinks & Scholtens, 2017.)

2.5 SRI and market crises

The previous literature on the topic of the performance of socially responsible portfolios has increasingly focused on different market conditions over the past years. Considering different market conditions when examining the performance of socially responsible portfolios helps to provide a more comprehensive evaluation of their performance. Also, in uncertain market conditions, the role of investor's preferences and psychological biases is emphasized. The financial crisis, in particular, had an impact on the increased amount of research. (Nofsinger & Varma, 2014.) Most of the previous studies focuses specifically on the financial crisis period. What makes the subject particularly interesting is that different market crises vary significantly in nature and their direct comparison is

not justified. This thesis focuses on studying two major crises with very different characteristics, the financial crisis, and the more recent market crisis caused by COVID-19.

The financial crisis was an economic downturn that originated in the United States and had far-reaching global consequences. It was triggered by a combination of factors, including the bursting of the housing bubble, subprime mortgage lending practices, excessive risk-taking by financial institutions, and complex financial products. These factors led to a chain reaction of events, where declining housing prices and increasing defaults on subprime mortgages caused a sharp decline in the value of mortgage-backed securities held by financial institutions, leading to significant losses and a loss of confidence in the financial system. This, in turn, led to a credit crunch as banks became reluctant to lend to each other and to businesses and individuals, exacerbating the economic downturn and causing a worldwide recession that lasted from 2007 to 2009. (Federal Reserve History, 2013.)

The market crisis caused by the COVID-19 pandemic refers to the severe disruption and volatility experienced by financial markets worldwide in response to the outbreak of the coronavirus. The outbreak was reported to the World Health Organization (WHO) in December 2019. On March 2020, the WHO declared the COVID-19 virus to be the cause of the pandemic and restrictions were introduced in many countries to protect citizens. The pandemic's impact on markets was primarily driven by the widespread fear and uncertainty it generated, as the virus rapidly spread across the globe, leading to strict lockdown measures, travel restrictions, and economic shutdowns. These actions significantly disrupted supply chains, reduced consumer demand, and caused a sharp decline in business activity. As a result, stock markets experienced significant sell-offs, bond yields plummeted, and commodity prices dropped sharply. Additionally, investor confidence deteriorated, leading to heightened market volatility and a flight to safe-haven assets. The unprecedented nature of the pandemic and its profound effects on global economies contributed to the market crisis, resulting in significant economic and financial challenges worldwide. (The World Bank, 2022.)

3 Background theories

This chapter discusses the theoretical framework behind the topic. The socially responsible investing is influenced by several financial theories, of which this thesis delves into the most relevant ones. These theories play a significant role in studying the performance of socially responsible portfolios. The first section focuses on the efficient market hypothesis and random walk. The second part of this chapter introduces the portfolio theory, after which the behavioral finance and its role in the field of socially responsible investing is examined in more detail.

3.1 Market efficiency

One of the most well-known and researched theories in the financial world is the market efficiency. The theory of market efficiency is central when explaining the background behind socially responsible investing. The efficient market hypothesis comes into consideration as it has an impact on the phenomenon of socially responsible investing. This section focuses on two well-known and closely related theories about the behavior of stock prices in the market. First, the theory of efficient market and then the random walk is presented.

3.1.1 Efficient markets hypothesis

Eugene Fama was the first to introduce the term “Market Efficiency”. Fama (1970) shows in his study that the market is efficient when all the existing information is reflected on stock prices. According to the efficient market hypothesis, stocks are always traded on the stock exchange at their fair value, which means it is impossible for an investor to buy undervalued shares or sell shares at an overvalued price. This theory indicates that it is impossible for the investor to outperform the market with stock selection or market

timing. The theory assumes that the only way for the investor to achieve higher returns is to invest in riskier properties. (Fama, 1970.)

The assumption that information is fully reflected immediately in stock prices is extreme and cannot be assumed to be literally true. Therefore, Fama divided the market into three forms based on their efficiency. These three different forms of market efficiency are weak form, semi-strong form, and strong form. The weak form assumes that today's stock prices only reflect all the information about past prices. When market efficiency is weak, not any kind of technical analysis is useful in investment decisions. Therefore, it is not possible to predict future prices based on past price changes. However, the weak form efficiency assumes that fundamental analysis can be used to find undervalued and overvalued stocks. This allows the investor to make a higher return than the market average. (Fama, 1970.)

Another form of market efficiency is the semi-strong form. When the semi-strong form of efficiency prevails, prices reflect, in addition to historical prices, all publicly available stock information. Public information includes, for example, quarterly reports and announcements of emissions and stock splits. This form of efficiency assumes that stocks react immediately to new public information available, which makes it impossible for investors to benefit from the information to achieve superior returns. This implies that using technical or fundamental analysis as an investment strategy is not beneficial. (Fama, 1970.)

The strong form of market efficiency assumes that market prices reflect all information, both public and private. Strong market efficiency is based on the idea that no investor, including a corporate insider, is capable to achieve above the average market returns. The fulfilment of the strong form market efficiency can be reviewed by examining whether the investor is in possession of the information that is not yet reflected in the stock price. If so, the strong form of market efficiency is not valid. (Fama, 1970.)

3.1.2 Random walk

The theory of random walk is closely related to the previous theory of market efficiency. The random walk theory relies on an assumption that it is impossible for the investor to outperform the market without increasing risk. The theory of random walk brings an approach to financial theory, according to which changes in stock prices are independent of each other. The theory assumes that past trends in stock prices or market, cannot be used to predict future movements. Therefore, the assumption of stocks following random paths, makes stock price forecasting methods unnecessary in the long run. (Fama, 1995.)

If we look at the performance of socially responsible portfolios from the perspective of random walk theory, it could serve as an explanation for the support of the first hypothesis. If stocks do follow the random walk and this theory holds true, different social screens cannot be expected to generate excess returns in the long run. However, it can be said that social screening and reduced diversification incurs additional costs, which in turn could explain the poorer performance of socially responsible portfolios compared to conventional portfolios.

3.2 Portfolio selection

In addition to examining the market efficiency, it is also important to study the behavior of investors. This section introduces the modern portfolio theory and key elements behind the portfolio performance. Modern portfolio theory assumes that investors make always rational decisions, so it is important to highlight the role of behavioral finance in investment decisions as well. Socially responsible investing is closely related to behavioral finance, as investors psychological factors are reflected in investment decisions.

3.2.1 Portfolio theory

The portfolio theory developed by Harry Markowitz is a mathematical framework which allows an investor to maximize the expected return at a given level of risk. The model is used to illustrate the optimal portfolio in terms of risk and expected return. From the perspective of portfolio theory, the performance of an individual investment is not central. More important is the correlation and variance between individual investments. They are important statistical measures as they play a major role in the performance of the entire portfolio. The modern portfolio theory relies on the assumption that by diversifying into different assets with low or negative correlation, it is possible to find the optimal portfolio in terms of return and risk. (Markowitz, 1952.)

The figure below shows the line which is called efficient frontier. The efficient frontier consists of optimal portfolios with the best combinations of return and risk. Individual assets that are below the curve are inefficient. By diversifying, it is possible to reduce the standard deviation and achieve a higher expected return. The lower part of the frontier is also inefficient, as it is possible to reduce the standard deviation and increase the expected return by moving upwards on the line. The basic idea of an efficient frontier is that the most important task of every investor is to strive to allocate their investment assets so that the return-to-risk ratio is as close as possible to an efficient frontier. (Bodie et al., 2014.)

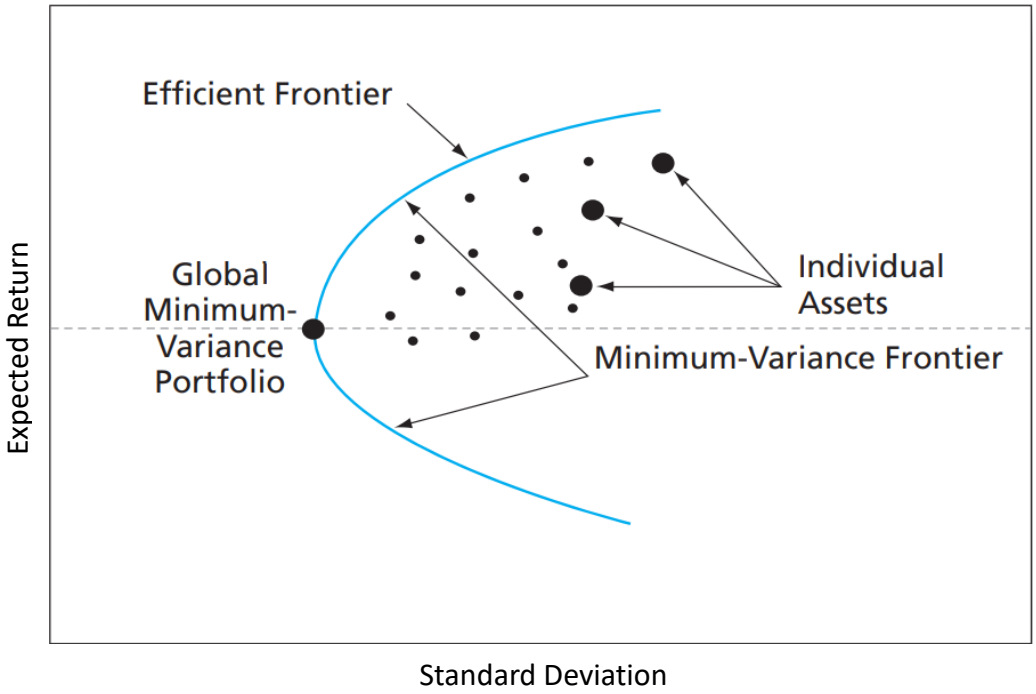

Figure 3. The minimum-variance frontier of risky assets (Bodie et al., 2014).

The theory of an efficient frontier comes into consideration in the analysis of the performance of socially responsible portfolios as socially responsible investing creates certain constraints on the formation of an optimal portfolio. Hence, incorporating social responsibility into investments may not lead to the optimal risk-return ratio, as portfolio selection is limited by sustainability screens. Thus, the portfolio cannot be formed freely based solely on the optimal risk-return ratio. This can lead to a situation where the portfolio carries specific risk which could be avoided with good diversification. This perspective could be one explanator for the support of the first hypothesis that socially responsible portfolios underperform conventional portfolios.

3.2.2 Behavioral finance

Conventional finance theory assumes that investors are rational actors in all their investment decisions. Based on this assumption, investor preferences or psychological factors, have no effect on behavior in decision-making situations. Traditional finance theory sees

investors as a homogeneous group, constantly striving to optimize the risk-return ratio. From that perspective, investors are not affected by cognitive errors and are not confused by frames. Also, they do not feel the pain of regret and never lose the self-control. (Beal, Goyen & Phillips, 2005.)

However, behavioral finance has brought a new perspective to the subject. It is based on theories of psychology and sociology that are introduced into economics. Many studies have evinced that investors do not behave rationally in every situation as conventional financial theory assumes. From the behavioral finance perspective, various biases and psychological aspects play a major role in people's behavior in the financial markets. Psychological factors are considered to affect market outcomes which underlines their importance. Behavioral finance can also be simplified as people´s normal behavior. Thus, normal people are influenced by frames, they make cognitive errors, and sometimes feel the pain of regret and lack of self-control. (Ritter, 2003.)

Behavioral finance brings concepts and evidence from the psychological literature that provide better explanations for various financial phenomena. This newer approach has been brought into the financial economy, as traditional finance theories do not always fully explain everything that happens in the markets. (Beal et al., 2005). Shefrin and Statman (1985) emphasize that cognitive biases and investor emotions undermine conventionally rational considered behavior. This provides an opportunity for different perspectives and interpretations of investor behavior in the financial world.

3.2.2.1 Socially responsible investing

If investors were rational actors according to traditional finance theory, socially responsible investing would be based only on the fact that it allows investors to get higher returns with less risk or higher returns at the same level of risk as conventional investments. However, behavioral finance provides a basis for socially responsible investing, as investors can guide their behavior based on their preferences. These decisions may not always

be the most optimal or rational but they often have a strong psychological impact on the investor. Overall, socially responsible investing aligns financial objectives with ethical values, drives positive change, and can contribute to a more sustainable and inclusive global economy. It enables investors to be proactive in addressing pressing societal and environmental challenges while seeking financial returns. Socially responsible investing is a type of behavior that has grown in importance over the last decades. (Glac, 2009.)

Beal, Goyen and Phillips (2005) present three potential reasons why investors invest socially responsibly from the perspective of traditional finance theory as well as ethical investment literature. These explanations are superior financial returns, non-wealth returns and contribution to social change. These motivational factors are not unambiguous or exhaustive, but they help to better understand the choices made by socially responsible investors. The relationship between socially responsible investing and financial performance has been extensively studied in the academic literature and will be discussed in more detail in the next section.

Socially responsible investing often offers investors more than just a financial return. Non-wealth motivations are the most likely reason for the demand for the most successful ethical funds. Investors are willing to pay higher transaction costs for socially responsible investments if they receive an incremental benefit from ethical branding. Increased benefit is a psychic benefit that combines financial return as well as benefit. The amount of socially responsible investing that investors follow depends on the marginal costs and benefits of socially responsible investing. (Auger, Burke, Devinney & Louviere, 2003.)

The last one of the three motivators for socially responsible investing is the objective of achieving social change. Investors driven by this motivator feel that they receive a psychic return indirectly from the company´s socially responsible operations. This motivator makes investors feel the desire to influence companies and they are most likely targeting to large companies with specific issues. Shareholder activism has increased in recent years and has also led to significant outcomes. By investing in the socially responsible

company or fund, the investor can achieve, in addition to financial return, mental pleasure or a certain social status. (Cullis, Lewis & Winnett, 1992.)

4 Prior empirical evidence

Socially responsible investing is a relatively new phenomenon in the financial markets but still numerous studies have been conducted on the subject. Studies seek to investigate the relationship between corporate social and financial performance. There are various hypotheses and perspectives in the literature on how the incorporation of social responsibility in investment decisions affects portfolio performance. The results are not completely consistent and may differ significantly.

The performance of socially responsible portfolios can be approached from different perspectives. One way is to examine the performance of sustainability stock index. These sustainability stock indexes are the basis for some socially responsible investment funds. Another approach is to compare the risk-adjusted returns of socially responsible funds with those of conventional funds. The third approach is to analyze synthetic SRI portfolios based on corporate sustainability assessments. This eliminates the ability of fund managers of actively managed mutual funds to influence financial performance. (Mollet & Ziegler, 2014.)

There are three different hypotheses discussed in the literature about the effects of socially responsible investing on portfolio performance. Some studies are based on the hypothesis that SRI stocks are not mispriced because corporate sustainability performance and social responsibility are properly priced by the stock market. This assumption is based on the assumption of traditional finance theory of efficient capital markets. Another common theory and approach to the subject is that socially responsible investors increase stock prices of high sustainability companies above their fundamental value, making SRI stocks overpriced. In this case, the expected returns of socially responsible stocks are lower than returns of conventional stocks. The last set of literature states that the expected return of SRI stocks is higher than those of their conventional counterparts if a high sustainability performance of companies is associated with a higher financial performance without the stocks being underpriced by investors. (Mollet & Ziegler, 2014.)

4.1 The performance of SRI portfolios during non-crisis period

The performance of socially responsible portfolios has been extensively studied in the literature. The studies are divided into different subheadings according to their results. Studies that show no significant relationship between social responsibility and portfolio performance, and studies that show either a positive or negative relationship are presented in more detail.

4.1.1 No significant effect

Some studies have found that there is no statistically significant difference between the performance of socially responsible and conventional portfolios. These studies believe that the incorporation of SRI criteria in investments will not lead to underperformance or overperformance of these portfolios. Such results have been obtained from studies by Hamilton, Jo and Statman (1993), Shank, Manul-lang and Hill (2005), and Bauer, Koedijk, and Otten (2005).

Hamilton, Jo and Statman (1993) examine the performance of 32 SRI funds and compared the results obtained with the performance of 320 randomly selected non-SRI funds. The time horizon used in the study is 1981-1990 and the entire material is selected from the US stock market. The study uses a model in which CAPM-based Jensen alpha is measured by a value-weighted NYSE index. The study confirms the hypothesis that there are no statistically significant differences in the performance of SRI funds and non-SRI funds. According to this study, investors can expect the same outcome of socially responsible funds and conventional funds. Furthermore, responsibility factors have no effect on the firm's cost of capital.

Shank, Manullang and Hill (2005) support the findings of Hamilton, Jo and Statman (1993) that there are no statistically significant differences in the performance of socially responsible mutual funds compared to conventional funds when using both three- and

five-year reference periods. Neither follow-up period results in significant overperformance or underperformance. According to Shank et al. (2005) and Hamilton and Statman (1993), market forces do not price socially responsible characteristics in the short run because these characteristics are included in the market risk premium of the CAPM. However, the study of Shank et al. (2005) show significant statistical results in the long run. According to result of the study, the Jensen´s alpha of the portfolio of 11 socially responsible stocks is positive and significant. This means that the long-term performance of these socially responsible companies is better than the overall market.

Unlike previous studies, Bauer, Koedijk, and Otten (2005) bring a different perspective on the subject in terms of research methods. The study analyzes 103 ethical funds using an international database. Bauer et al. (2005) focus on the performance and investment style of ethical funds. Previous studies used a simple model to determine performance, but Bauer et al. (2005) approach research data using a multifactor model to achieve more detailed results. In addition to the traditional CAPM, the study concentrates on the Carhart four-factor model. Research indicates that ethical mutual funds underperformed conventional funds in the early 1990s but produced average risk-adjusted returns over the period 1998-2001. Researchers believe this phenomenon is possibly due to the learning process of ethical funds.

4.1.2 Negative effect

Numerous studies have found evidence that socially responsible investing increases the costs that affect the overall return on investment. This perspective on the subject sees a negative correlation between the social responsibility and financial performance of the portfolio. Such results have been obtained, for example, by Girard, Rahman and Stone (2007) and Renneboog, Ter Horst and Zhang (2008).

Girard et al. (2007) seek to determine the real costs of socially responsible funds, using the monthly returns of the 116 SRI Funds. The database is selected from the US stock

market and the period is from 1984 to 2003. According to the research results, socially responsible funds underperform their benchmark index. Girard et al. (2007) bring out the perspective of whether at least part of the total cost is only due to poor portfolio management skills. The research evidence relies on the assumption that the performance of funds can be divided into economic and social performance. Girard et al. (2007) find evidence on the effects of poor selectivity, net selectivity, and market timing ability of SRI fund managers on the fund's poor performance relative to the benchmark index.

Renneboog, Ter Horst and Zhang (2008) examine the risk and return characteristics of socially responsible funds. The study uses a database of 440 SRI funds from the United States, the United Kingdom, continental Europe, and the Asia-Pacific region. CAPM and FF3 factors are used as a research method to measure past performance. The study highlights the role of ethical, environmental and social factors in the formation of stock prices. The basic idea of the study is that investors are willing to pay a higher price for SRI funds because they experience such a great aversion to the behavior of companies that are not socially responsible. The study finds that SRI screening has a significant impact on the fund´s risk-adjusted returns, making SRI funds perform approximately 5% worse than non-SRI portfolios.

4.1.3 Positive effect

Certain studies find evidence that socially responsible investing can lead to abnormal returns which differ significantly from previous studies. These studies are based on an assumption, that there is a positive correlation between corporate social responsibility and the financial performance of a portfolio. Below is a deeper review of studies of Barnett and Salomon (2006) and Kempf and Osthoff (2007) on the subject.

Barnett and Salomon (2006) test the relationship between social and financial performance. The study uses the CAPM as a research method to calculate risk-adjust returns. From the perspective of the modern portfolio theory, investors are rewarded only on the

basis of systematic risk and assuming that all companies are homogeneous, socially responsible investing can only undermine financial performance. However, the study notes that according to stakeholder theory, some firms may be significantly better financial performers than others because of their socially responsible characteristics. Barnett and Salomon (2006) state that social screening can help identify these companies. Although social screening reduces investment options, it can still lead to increased economic performance, as the positive return from screening covers the losses of reduced diversification.

Kempf and Osthoff (2007) investigate whether investors incorporating socially responsible screens into their investment processes are able to increase portfolio performance. They examine separately the effects of negative, positive, and best-in-class screening on portfolio performance. The study was conducted using stocks from the S&P 500 and the DS 400 for the period 1992-2004. Researchers use the Carhart model in their study to measure portfolio performance. The study provides evidence that investors can achieve significant abnormal returns by following a simple long-short strategy. However, this is only accomplished through a positive or best-in-class screening, not when using a negative screening. The best-in-class screening typically leads to the highest alpha and the result is significant even after considering transaction costs. According to the study, investors have an opportunity to benefit from SRI ratings and use them to achieve abnormal returns.

4.2 The performance of SRI portfolios during market crises

As many studies have found, incorporating a socially responsible perspective into investment decisions increases the overall cost of the portfolio. Therefore, the question arises as to why socially responsible investing has grown in popularity so strongly in recent decades. In addition to previously highlighted perspectives such as increased social awareness among investors and other psychological and preference factors, research has highlighted the view that socially responsible funds would perform better than

conventional funds, especially in times of crisis. Studies that have investigated this topic and to which this thesis takes a deeper focus are examined by Kim, Li and Li (2014), Nofsinger and Varma (2014) and Lins, Servaes, and Tamayo (2017).

4.2.1 Positive effect

Kim et al. (2014) examine the relationship between corporate social responsibility and the risk of future stock price crash. They use two periods of stock market booms (1995-1999 and 2003-2007) during the investigations, both of which were followed by a burst period. The study uses weekly stock returns and corporate social responsibility ratings. According to the study, socially responsible companies, at the level of high transparent financial reporting, have lower risks of stock price crash in market crises. Researchers particularly find a significant negative correlation between the performance of corporate social responsibility and the risk of stock price crash when other factors affecting the risk of stock price crashes, such as differences in investor opinion, past returns, company size and accounting opaqueness, are also considered. The study also states that the results are affected by the company's governance and ownership structure. Companies must therefore not be seen as a homogeneous group in terms of results.

Nofsinger and Varma (2014) investigate the performance of socially responsible funds at two different time points. They identified 240 US socially responsible funds and compared their returns to a similar set of conventional funds in both market crisis (2007-2009) and non-crisis times. Researchers use the CAPM, Fama and French three-factor model and Carhart four-factor model as research methods to calculate annual returns. According to results, conventional funds outperform approximately 0.67-0.95% socially responsible funds during the non-crisis period. However, research shows that in times of crisis, SRI funds outperform around 1.61-1.70% conventional funds annually. The study highlights various factors to explain the outperformance of SRI funds in times of market crisis. Researchers state that the overperformance is due to positive screening, which creates a positive alpha during periods of market crises for SRI funds. Also, socially

responsible funds, on average, include younger and smaller firms as well as more profitable and less volatile companies, than conventional funds.

Lins et al. (2017) find similar results in their study as Nofsinger and Varma (2014). They examined the performance of 1,673 nonfinancial companies using corporate social responsibility data during the 2008-2009 financial crisis. The researchers found evidence that the stock returns of socially responsible companies were significantly higher than those companies with low social responsibility. According to the study, the importance of social capital built through corporate social responsibility is strengthened in times of crisis, when the importance of trust is emphasized. Researchers also find that excess returns were higher for firms located in areas where investors are more trusting. According to the study, there were no differences between socially responsible and conventional stock returns during the post-crisis recovery period, so the outperformance was specifically related to the crisis period. The authors argue that the most significant driver of outperformance is the trust of investors for socially responsible companies in times of crisis when they value the social capital of high social responsibility firms.

5 Data and methodology

This chapter focuses on the empirical part of the thesis to examine the performance of SRI portfolios and their benchmarks. Previous literature widely utilizes different asset pricing models to measure the performance of portfolios, which is why this paper also uses the same methods. The first part introduces the data used to conduct the research and gives the overall description of the data collection process. The second part of the chapter presents the selected methodology and the empirical models employed.

5.1 Data description

In order to examine the performance of socially responsible funds, the research data has to be collected. The data of this study is obtained from the Refinitiv Datastream, previously known as Thomson Reuters Eikon database. The closing price values of both SRI funds and their counterparts has been collected and analyzed. Previous literature on the topic is broadly focused on examining the performance of socially responsible portfolios during the years from 2000 to 2010. This thesis focuses on more recent data, forming a research period that last 16 years, from 1.1.2006 to 31.12.2021. The examined period includes two major crises which are the financial crisis and the market crisis caused by COVID-19. The sample data consists of equity funds from the US market.

Table 1 below presents the portfolio characteristics of both portfolios under analyzis. The additional information about assets under management (AUM) and expense ratios was collected from the Morningstar mutual fund database. The table shows that the average age of SRI funds is younger than their conventional counterparts. Responsible funds also have less assets under management and higher expense ratios than non-SRI funds. This is in line with studies by Bauer et al. (2005) and Geczy, Stambaugh & Levin (2021) that examine the performance of SRI and non-SRI portfolios. According to both studies, SRI funds are smaller in size and have higher expense ratios than non-SRI funds.

The data collection process and the content of both SRI and conventional samples are explained in more detail in the following subsections.

Characteristics	Number of funds	Mean total net assets in millions ($)	Mean total expense ratio %	Mean fund age in years
SRI portfolio (1)	102	998.37	1.05	25.2
Non-SRI portfolio (2)	110	2849.16	1.01	31.4
(1) - (2)		-1850.79	0.04	-6.2

Table 1. Portfolio characteristics.

5.1.1 The socially responsible portfolio

The research sample has been selected based on the criterion that they have existed throughout the entire research period. The set of SRI funds has been collected using various keywords such as "responsible", "ESG", "SRI", "Sustainable", "ethical" and "social" to identify responsible funds from among active funds in the US market. The research sample is also limited to cover only equity funds, which excludes, for example, fixed-income funds and funds that combine different asset classes. After filtering the data by removing duplicates and non-equity funds, the final filtered sample consists of 102 SRI funds.

5.1.2 The benchmark

In order to be able to compare the performance of socially responsible portfolios with conventional or non-SRI portfolios, the benchmark needs be set. The selection of the benchmark must be performed carefully as it has a direct impact on the research results. As Cremes, Petäjistö and Zitzewitz (2012) state in their research, inefficient selection of the benchmark may cause bias that weakens the reliability of the results. For this reason,

the benchmark portfolio needs to be chosen to correspond as closely as possible to the research sample of SRI funds.

There are numerous conventional funds in the US market, from which a sample has been filtered to match the group of SRI portfolios as closely as possible. As with SRI funds, only equity funds have been identified among the conventional benchmark funds. In addition, the selection of non-SRI portfolios has been made with the aim of forming as diversified set of funds as possible. Therefore, the sample of non-SRI portfolios under the investigation representing companies of different industries and sizes for example. The filtered set of conventional funds contain 110 non-SRI funds. In addition to the sample of non-SRI funds, the S&P 500 index has also been used as a benchmark in the empirical part, to represent the overall performance of the market.

5.1.3 Different market conditions

Previous literature broadly divides market conditions roughly into non-crisis and crisis periods based on expansion and recession metrics. Periods of crisis are often seen as large declines in the stock market (Nofsinger & Varma, 2014). This thesis also examines the performance of the portfolios from the perspective of this division. The research focuses on the time from 2006 to 2021 and The National Bureau of Economic Research (2022) identifies two recessions for this period. Table 2 below shows the economic cycles during the study period. Two major crises during this period are the financial crisis and the market crisis caused by COVID-19. The recession caused by the financial crisis extends from December 2007 to June 2009, lasting a total of 19 months. The more recent market recession occurred when the effects of the COVID-19 crisis hit the US market lasting from February 2020 to April 2020. (The National Bureau of Economic Research, 2023.)

US business cycles according to NBER	
Cycle phase	Number of months
January 2006 - November 2007 (Non-crisis)	23
December 2007 - June 2009 (Crisis)	19
July 2009 - January 2020 (Non-crisis)	127
February 2020 - April 2020 (Crisis)	3
May 2020 – December 2021 (Non-crisis)	20

Table 2. US business cycles in 2006-2021 (NBER, 2023).

The research period in this thesis consists of three cycles which are the full period, crisis and non-crisis periods. The difference in nature of the two crises under the investigation makes the research particularly interesting. The COVID-19 crisis differs from many market crises as it originated from factors outside the economy, the effects of which caused the market crash. By taking into consideration two crises with such different characteristics, more comprehensive results are obtained. It also enables the analysis of the impact of the nature of crises on the research results.

5.2 Methodology

Methods used to evaluate and measure SRI fund performance have evolved over the past few decades. Earliest studies often utilize a single factor model, such as the Capital Asset Pricing Model (CAPM), to measure portfolio performance. Later, multi-factor models have been favored because they also take into consideration the size, book-to-market and momentum factors. As an example, Fama and French three-factor model and Carhart four-factor model introduce a slightly expanded approach of Capital Asset Pricing Model to assessing the performance of SRI funds. (Renneboog, Horst & Zhang, 2008.)

This thesis uses several different methods to analyze the performance of SRI funds and their counterparts. The results are first examined through descriptive statistics, after which the risk-adjusted returns of both SRI and conventional portfolios are examined from the perspective of single-factor and multifactor models. The use of several methods in this research ensures the achievement of comprehensive and reliable results and enables the comparison of data obtained from different methods. These methods and their formation are explained in more detail below.

5.2.1 Capital Asset Pricing Model

The Capital Asset Pricing Model is a key part of the modern financial economics developed by William Sharpe and John Lintner. The CAPM is built on the Harry Markowitz´s theory of portfolio selection. This model turns the statement into testable prediction by identifying an efficient portfolio. This capital market equilibrium model seeks to represent the interaction between the risk and return of an investment. CAPM is used for pricing securities as well as calculating the expected return on asset when both risk and cost of capital are noticed. The CAPM is calculated using the formula below (Fama & French, 2004.):

$$E(R_i) = R_f + \beta_i\,[\mathrm{E}(\mathrm{R_m}) - R_f] \qquad (1)$$

Where $E(R_i)$ = Expected return of investment

R_f = Risk-free rate

β_i = Beta of the investment

$E(R_m)$ = Expected market return

Bodie, Kane and Markus (2014) introduce a few simplified assumptions that need to be made to take advantage of the model. These assumptions include simplifications related

to both economic environment and investor behavior. These assumptions are listed as follows (Bodie et al., 2014):

1. There is perfect competition in the economy.
2. No taxes or transaction costs exist.
3. Investors only trade publicly available assets and are able to borrow or lend at a common risk-free rate.
4. All investors have the same holding period.
5. All investors behave rationally and homogenously.

Despite the fact that the Capital Asset Pricing model was first introduced decades ago, it is still applicable in real life. The model is often used as a tool to estimate the cost of capital for a company or to measure portfolio performance. (Elton, Gruber, Das and Hlavka, 1993.)

5.2.2 Fama and French three-factor model

The Fama and French three-factor model is a pricing model developed by Eugene Fama and Kenneth French that extends the Capital Asset Pricing Model presented above by adding size risk and value risk factors to the market risk factor. This model offers an alternative approach where the price of an asset depends on the sensitivity of its return to market movements and two other portfolios replicating additional risk factors. (Fama, 1993.) The Fama and French three-factor model can be calculated as follows:

$$R_{it} - R_{ft} = \alpha_i + \beta_1 (R_{mt} - R_{ft}) + \beta_2 SMB + \beta_3 HML + \varepsilon_{it} \qquad (2)$$

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

α_i = Securities risk premium

$(R_{mt} - R_{ft})$ = Excess return on the market portfolio

$\beta_{1,2,3}$ = Factor coefficients

SMB = Size premium (small minus big)

HML = Value premium (high minus low)

ε_{it} = Abnormal return

SMB and HML factors bring to the model the perspective that value and small-cap stocks regularly outperform markets. By incorporating these two variables into the model, it adjusts for this outperforming tendency. SMB is the average return for the small portfolios (Small Value, Small Neutral and Small Growth) minus the average return for the big portfolios (Big Value, Big Neutral and Big Growth). HML is the average return for the value portfolios (Small Value and Big Value) minus the average return for the growth portfolios (Small Growth and Big Growth). (Fama, 1993.)

5.2.3 Carhart four-factor model

Carhart four-factor model proposed by Mark Carhart (1997) extends the Fama and French three-factor model with a momentum factor (MOM). Momentum is a phenomenon that upward trend securities tend to continue to rise and downward trend securities tend to continue to decline when looking at the previous 3-12 months. This model is developed for pricing assets and it is also often used to investigate the performance of socially responsible portfolios. The Carhart model is estimated as follows:

$$R_{it} - R_{ft} = \alpha_1 + \beta_1(R_{mt} - R_{ft}) + \beta_2 SMB + \beta_3 HML + \beta_4 MOM + \varepsilon_{it} \quad (3)$$

The factors of the formula are explained above under the Fama and French three factor model with the exception of the MOM factor. MOM is the average of the high return portfolios (Small High and Big High) minus the average of the low return portfolios (Small Low and Big Low). (Carhart, 1997.)

6 Empirical analysis

This chapter presents the results from the empirical analysis aiming to answer the question of how socially responsible portfolios perform compared to their conventional counterparts. The analysis is conducted and results introduced based on data and different research methods introduced in the previous chapter. The results are presented separately from the perspective of each method and research period. First, descriptive statistics on socially responsible and benchmark portfolios are presented. Second, the results are introduced in more detail from the perspective of the CAPM, Fama and French three-factor and Carhart four-factor models.

6.1 Descriptive statistics

Table 1 below shows the descriptive statistics for the sample. It contains the average, median, minimum and maximum monthly returns and the standard deviation as well as sample variance for both SRI and non-SRI portfolios. In addition, the S&P 500 index average monthly returns are shown in the table to represent the market. Descriptive statistics are calculated for four cycles separately, dividing the investigated period into the full period, non-crisis, Global financial crisis and COVID-19 crisis periods. Both crises are presented separately to be able to observe the effects of their different characteristics on the results. All the returns are expressed as percentages.

Full period

Portfolio	Mean monthly return	Median monthly return	Max. monthly return	Min. monthly return	Standard Deviation	Sample variance
SRI	0.40	1.09	11.53	-17.82	4.53	0.21
Non-SRI	0.50	1.10	24.01	-18.93	4.98	0.25
S&P 500	0.78	1.26	12.68	-16.94	4.32	0.19

Non-crisis period

Portfolio	Mean monthly return	Median monthly return	Max. monthly return	Min. monthly return	Standard Deviation	Sample variance
SRI	0.81	1.19	11.53	-13.68	3.90	0.15
Non-SRI	0.98	1.30	24.01	-14.86	4.32	0.19
S&P 500	1.25	1.53	12.68	-9.18	3.60	0.13

Global financial crisis

Portfolio	Mean monthly return	Median monthly return	Max. monthly return	Min. monthly return	Standard Deviation	Sample variance
SRI	-2.24	-1.44	9.85	-17.82	7.26	0.53
Non-SRI	-2.80	-1.89	10.56	-18.93	7.64	0.58
S&P 500	-2.37	-0.92	9.39	-16.94	7.11	0.51

COVID-19 crisis

Portfolio	Mean monthly return	Median monthly return	Max. monthly return	Min. monthly return	Standard Deviation	Sample variance
SRI	-9.71	-9.71	-6.48	-12.95	4.57	0.21
Non-SRI	-11.39	-11.39	-7.89	-14.90	4.96	0.25
S&P 500	-10.46	-10.46	-8.41	-12.51	2.90	0.08

Table 3. Descriptive statistics.

Table 3 evidence that both SRI and Non-SRI portfolios as well as the S&P 500 produce positive returns when reviewing the full research period. Based on descriptive statistics, non-SRI portfolios generate higher returns on average than SRI portfolios. The median returns, on the other hand, are relatively high compared the average returns of portfolios. Also, the minimum and maximum returns vary significantly throughout the full

period which indicates that the market is quite volatile. The average monthly return of socially responsible portfolios is 0.40%, while conventional funds have returned around 0.50% between 2006 and 2021.

Based on descriptive statistics, significant revenue fluctuations can be observed depending on market conditions. Both financial crisis and COVID-19 crisis periods produce considerable negative returns, while during the non-crisis period the portfolio returns remain positive on average. When comparing the financial crisis and the COVID-19 crisis periods, the market collapse caused by the latter crisis has been significantly greater for both portfolios. The average monthly returns are -2.24% for SRI portfolios and -2.80% for conventional ones while the corresponding numbers during the COVID-19 crisis are -9.71% for SRI and -11.39% for conventional portfolios. Overall, descriptive statistics support the results of previous studies in the assumption that socially responsible portfolios underperform their conventional counterparts in general but outperform during crisis periods.

Figure 4 below shows the cumulative returns of both SRI and non-SRI portfolios during the full research period from beginning of 2006 to the end of 2021. In addition, the cumulative returns of the S&P 500 index are presented to illustrate the performance of both portfolios compared to the market. As the graph shows, the cumulative returns have been somewhat at the same level for all three portfolios until 2011. After this the differences between portfolios start to be noticed. From 2011 onwards, the returns of non-SRI portfolios are on average slightly higher than SRI portfolios, while the S&P 500 index beats both active portfolios in terms of cumulative returns. There are also two dips that can be observed in the curve, the first of which represents the financial crisis and the second market collapse is caused by COVID-19.

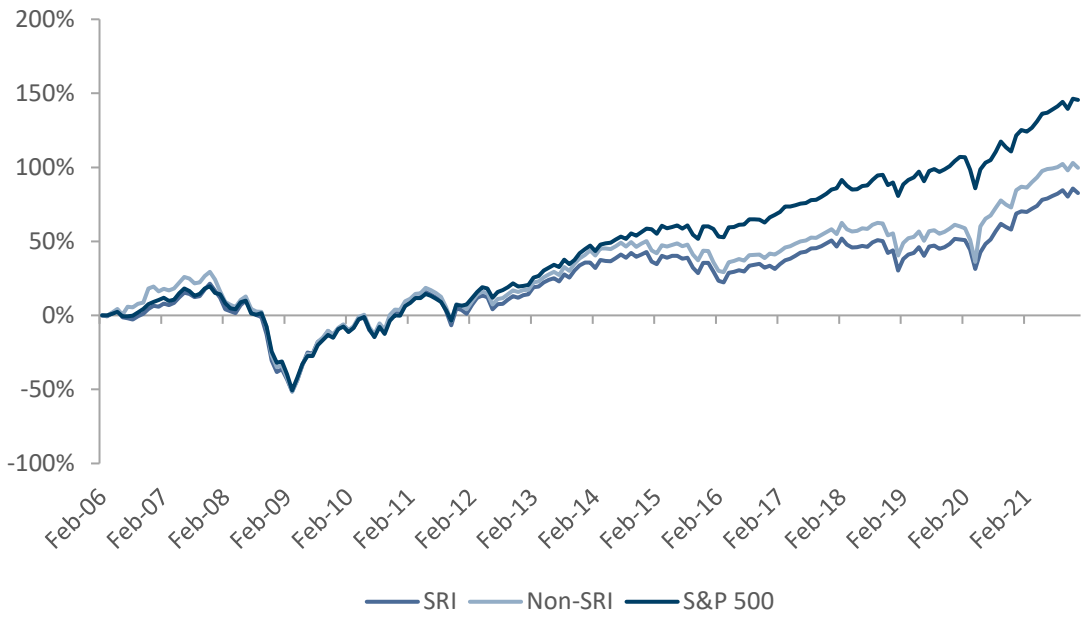

Figure 4. Cumulative returns of SRI and non-SRI portfolios (Jan 2006 - Dec 2021).

6.2 Factor models

The results of all three factor models used in the study are presented below in their own subheadings. With these models, it is possible to investigate the performance of portfolios at a deeper level, taking into consideration the effects of different variables on the performance. All three models present the results for both SRI and non-SRI portfolios. In addition, this thesis uses similar approach as Nofinger and Varma (2014), forming an additional difference portfolio based on the SRI and non-SRI portfolios. The aim of this is to further analyze and compare the results at an even deeper level.

Tables 4, 5 and 6 show the results from the Capital Asset Pricing Model, Fama and French three-factor model and Carhart four-factor model, respectively. The results are presented from the perspective of three different periods, the full research period, non-crisis and crisis periods. The panels represent the different time cycles used in the research. All alphas obtained through factor models are average monthly risk-adjusted returns and expressed as percent in the tables. The stars next to the numbers illustrate the

significance levels as follows: *** significant at 1% level, ** significant at 5% level, * significant at 10% level. Also, t-ratios are shown in brackets below the alfas.

6.2.1 Results from the Capital Asset Pricing Model

Table 4 shows the results from the Capital Asset Pricing Model. The risk-adjusted returns are calculated for both SRI and conventional portfolios in different market conditions. The single-factor results are obtained using the S&P 500 index as a benchmark. Panel A presents the CAPM results for the full research period. The results indicate that both portfolios underperform after controlling for market risk. The monthly alphas for SRI and non-SRI portfolios are -0.38% and -0.35%, respectively. This indicates that the non-SRI portfolio outperforms the SRI in the long run. Both alphas are highly significant at the 1% critical level. The positive betas of 0.99 for SRI portfolio and 1.08 for non-SRI portfolio suggest that both portfolios have a strong positive relationship with the market. When considering the R-square, both portfolios are equally sensitive to market returns at the 0.88 level.

Panel B shows the CAPM results focusing on the non-crisis period. In line with the results in Panel A, both SRI and non-SRI portfolios get negative risk-adjusted alphas at the 1% significance level. The difference between the SRI and Non-SRI portfolios reveals a slightly larger difference in alpha compared to Panel A. The monthly alpha for SRI (-0.44%) is still lower than non-SRI (-0.37%), indicating potential outperformance of conventional portfolio. In contrast to the results of Panel A, in non-crisis period, the non-SRI portfolio is slightly more sensitive to the market factor at a level of 0.83 than the SRI portfolio with a corresponding level of 0.85. The beta gets a positive value for both SRI (0.99) and non-SRI (1.09) portfolios at the 0.01 significance level, implying a positive relationship with the market. The R-squared difference suggests a higher explanatory power for the SRI portfolio.

The results from Panel A and Panel B support the efficient market hypothesis, assuming that active investment strategies are unlikely to consistently outperform passive strategies like index investing, where investors simply aim to replicate the overall market performance. In addition, the long-term alphas are negative in majority of studies, examining the performance of SRI and non-SRI portfolios (Nofsinger & Varma, 2014). The results are in line with the studies by Girard et al. (2007) and Renneboog et al. (2008), among others, which find evidence that SRI portfolios underperform their conventional counterparts in the long run.

Panel C focuses on the market crisis period and the results show that the SRI portfolio generates the positive alpha (0.08%), while the non-SRI alpha still gets the negative value (-0.02%). This indicates that non-SRI portfolio performs worse than SRI portfolio during crisis times. This is in line with the previous literature on the topic that broadly support the assumption that SRI portfolios outperform conventional ones during market downturns. Nofsinger and Varma (2014) and Lins et al. (2017), for example, find evidence that SRI perform better than non-SRI in crisis times. However, neither of the crisis alphas is statistically significant. Instead, the market factor gets a statistically significant value at the 0.01 critical level. The beta for both portfolios is 1.00 and the R-square difference is -0.01, indicating a slightly higher explanatory power for the non-SRI portfolio.

Overall, the results from the Capital Asset Pricing Model suggest that both portfolios underperform the market in full and non-crisis periods. The results from Panel A and Panel B evidence that the SRI tend to perform worse than the non-SRI portfolio in the long run. However, the differences in alphas of portfolios are relatively small. Panel C indicates that the SRI portfolio potentially outperforms the market and non-SRI portfolio in market crises. However, the crisis time alphas do not get the statistically significant values.

Panel A: Full period			
Portfolio	**α**	**β Mkt**	**R^2 adj.**
SRI (1)	-0.38***	0.99***	0.88
	[-3.26]	[37.38]	
Non-SRI (2)	-0.35***	1.08***	0.88
	[-2.67]	[36.12]	
(1) - (2)	-0.03	-0.09	0.00
	[-0.29]	[-4.31]	
Panel B: Non-crisis period			
Portfolio	**α**	**β Mkt**	**R^2 adj.**
SRI (1)	-0.44***	0.99***	0.85
	[-3.60]	[30.93]	
Non-SRI (2)	-0.37***	1.09***	0.83
	[-2.64]	[29.14]	
(1) - (2)	-0.06	-0.10***	0.02
	[-0.60]	[-3.63]	
Panel C: Crisis period			
Portfolio	**α**	**β Mkt**	**R^2 adj.**
SRI (1)	0.08	1.00***	0.92
	[0.25]	[15.28]	
Non-SRI (2)	-0.02	1.00***	0.93
	[-0.68]	[16.41]	
(1) - (2)	0.10	-0.00	-0.01
	[4.83]	[-0.57]	

*The p-value significant at the 10% significance level
**The p-value significant at the 5% significance level
***The p-value significant at the 1% significance level

Table 4. Regression results from the CAPM.

6.2.2 Results from the Fama and French three-factor model

Table 5 below shows the result from the Fama and French three-factor model using the benchmark of the S&P 500 as a market factor. In addition to the previous single-factor model, this model takes into consideration also the value and size factors in besides the market factor. As in previous model, Panel A evidence that both SRI and non-SRI

portfolios generate negative and significant monthly alphas over the full study period, indicating a negative excess returns compared to the market. The SRI alpha (-0.39%) is slightly lower compared to the non-SRI (-0.37%) which suggest the outperformance of the conventional portfolio. Both portfolios have a positive and significant relationship with the market according to the market factors.

Panel B shows again that during non-crisis period, both portfolios get negative statistically significant alphas at the 1% critical level. As in the previous model, SRI portfolio gets a lower monthly alpha than the non-SRI portfolio, indicating potential outperformance of the non-SRI portfolio during normal market condition. However, the negative alphas of SRI (-0.39%) and non-SRI (-0.37%), evidence that both portfolios underperform the market. The positive betas suggest a positive relationship with the market. Contrary to the results of Panel A, the beta is statistically significant at the level of 0.01 for both portfolios. Panel B evidence that the SRI portfolio gets a statistically significant negative value for HML factor. This indicates a slightly negative exposure to value stocks.

Panel C evidence that both portfolios get negative alphas as in previous panels, indicating underperformance compared to the market. The SRI (-0.01%) gets slightly less negative alpha than the non-SRI portfolio (-0.12%). However, as in the previous CAPM, neither of these alphas obtain a statistically significant value. The difference portfolio, in turn, shows a positive statistically significant alpha (0.10%), implying that the SRI portfolio potentially performs better than the non-SRI during crisis periods. The beta gets the positive value of 1.07 and is statistically significant at the 1% critical level for both SRI and non-SRI portfolios. In addition, the HML factor gets a negative and statistically significant value for both portfolios, which means that the sample is more exposed to growth stocks.

In summary, both SRI and non-SRI portfolios underperform the market in all periods under review. When comparing the performance of portfolios, the results show statistically significant evidence that the SRI portfolio underperforms the non-SRI portfolio in full and

non-crisis periods. However, as in previous model, the differences between alphas are not major. During crisis times, in turn, the SRI performs better than the non-SRI portfolio although only the difference portfolio shows statistically significant evidence of outperformance.

Panel A: Full period					
Portfolio	**α**	**β Mkt**	**SMB**	**HML**	**R^2 adj.**
SRI (1)	-0.39***	0.99***	0.04	-0.05	0.88
	[-3.39]	[37.37]	[0.87]	[-1.26]	
Non-SRI (2)	-0.37***	1.08***	0.00	-0.09**	0.87
	[-2.84]	[36.34]	[-0.09]	[-2.07]	
(1) - (2)	-0.02	0.09***	0.05	0.04	0.01
	[-0.24]	[-4.33]	[1.20]	[1.32]	
Panel B: Non-crisis period					
Portfolio	**α**	**β Mkt**	**SMB**	**HML**	**R^2 adj.**
SRI (1)	-0.43***	0.97***	0.16***	-0.13***	0.86
	[-4.56]	[32.30]	[-0.02]	[-2.85]	
Non-SRI (2)	-0.35***	1.06***	0.20***	-0.06	0.85
	[-3.26]	[29.30]	[0.41]	[-0.82]	
(1) - (2)	-0.08	-0.09***	-0.04	-0.06	0.02
	[-0.69]	[-3.16]	[-0.55]	[-2.01]	
Panel C: Crisis period					
Portfolio	**α**	**β Mkt**	**SMB**	**HML**	**R^2 adj.**
SRI (1)	-0.01	1.07***	0.09	-0.21**	0.93
	[-0.03]	[14.02]	[0.45]	[-2.13]	
Non-SRI (2)	-0.12	1.07***	0.1	-0.22**	0.93
	[-1.16]	[13.54]	[0.05]	[-0.70]	
(1) - (2)	0.10***	0.00	-0.06	0.00	0.00
	[4.77]	[-1.04]	[-0.55]	[1.60]	

*The p-value significant at the 10% significance level
**The p-value significant at the 5% significance level
***The p-value significant at the 1% significance level

Table 5. Regression results from the three-factor model.

6.2.3 Results from the Carhart four-factor model

Table 6 presents the results from the Carhart four-factor model with the S&P 500 as a market factor. This model extends the previously covered three-factor model by adding the momentum (MOM) factor under consideration. Panel A provides the risk-adjusted returns for both portfolios during the full research period. The results evidence that the monthly alphas for both portfolios are once again negative and statistically significant at the 1% critical level. As in previous models, the SRI (-0.39%) gets a lower monthly alpha compared to the non-SRI (-0.35%), indicating that the conventional portfolios perform better in the long run. The difference portfolio gets a negative beta (-0.80), indicating a slightly stronger positive relationship with the market for the non-SRI portfolio. The value factor coefficient is significant and negative for the non-SRI portfolio, which evidence that the sample is more exposed to growth stocks.

Panel B shows that the difference between the SRI and non-SRI alphas is slightly more noticeable than in Panel A. The SRI (-0.43%) and the non-SRI (-0.34%) alphas are both negative and statistically significant. The lower alpha of SRI implies that the non-SRI portfolio potentially outperforms the SRI portfolio during normal market conditions. This is in line with the previous results of CAPM and three-factor model. The beta gets a positive and statistically significant value for both portfolios and the difference of -0.08 indicates a slightly stronger positive relationship with the market for the non-SRI portfolio. In addition, the SMB factor coefficient shows positive and significant values for both SRI and non-SRI, implying that portfolios are more weighted towards small-cap stocks. The HML factor coefficient is negative and significant only for SRI portfolio indicating a negative exposure to value strategies.

Panel C shows that in times of market crises, the monthly alpha for SRI is -0.17% while non-SRI portfolio gets the value of -0.29%. Again, negative alphas indicate the underperformance of both portfolios compared to the market. Considering the difference between portfolios, the alpha gets a positive value, implying that the SRI portfolio outperforms the non-SRI portfolio during crisis periods. However, as in the previous two models,

neither of these alphas is statistically significant. The beta for the market factor gets the same positive value for both portfolios with the significance level of 1%. The adjusted R-square is 0.93 for SRI and 0.94 for non-SRI portfolio in crisis times.

Overall, the results are broadly consistent with the findings from two previous factor models as they show that both portfolios underperform the market in all periods. In addition, the results evidence that the SRI portfolio performs worse than the non-SRI portfolio in full and non-crisis periods but outperforms during the crisis period. However, the crisis time alphas are still not statistically significant measured by the Fama and French four-factor model.

Panel A: Full period						
Portfolio	**α**	**β Mkt**	**SMB**	**HML**	**MOM**	**R^2 adj.**
SRI (1)	-0.39***	0.99***	0.04	-0.05	0.00	0.88
	[-3.37]	[34.47]	[0.86]	[-1.26]	[-0.04]	
Non-SRI (2)	-0.35***	1.07***	-0.01	-0.09**	-0.03	0.87
	[-2.77]	[33.26]	[-0.17]	[-2.11]	[-0.95]	
(1) - (2)	-0.04	-0.80***	0.05	0.04	0.03	0.01
	[-0.33]	[-3.53]	[1.30]	[1.37]	[1.27]	
Panel B: Non-crisis period						
Portfolio	**α**	**β Mkt**	**SMB**	**HML**	**MOM**	**R^2 adj.**
SRI (1)	-0.43***	0.97***	0.16***	-0.15***	-0.02	0.86
	[-3.65]	[29.80]	[3.34]	[-3.07]	[-0.60]	
Non-SRI (2)	-0.34**	1.06***	0.20***	-0.08	-0.04	0.84
	[-2.45]	[27.36]	[3.43]	[-1.42]	[-0.88]	
(1) - (2)	-0.08	-0.08***	-0.02	-0.07	0.01	0.08
	[-0.74]	[-2.95]	[-0.55]	[-1.58]	[0.43]	
Panel C: Crisis period						
Portfolio	**α**	**β Mkt**	**SMB**	**HML**	**MOM**	**R^2 adj.**
SRI (1)	-0.17	1.04***	0.08	-0.23**	-0.04	0.93
	[-0.32]	[11.75]	[-0.38]	[-2.22]	[-0.76]	
Non-SRI (2)	-0.29	1.04***	0.08	-0.24**	-0.05	0.94
	[-0.54]	[11.59	[0.39]	[-2.28]	[-0.84]	
(1) - (2)	0.12***	0.00	0.00	-0.01*	0.01*	0.01
	[5.89]	[0.12]	[-0.41]	[2.31]	[2.38]	

*The p-value significant at the 10% significance level
**The p-value significant at the 5% significance level
***The p-value significant at the 1% significance level

Table 6. Regression results from the four-factor model.

7 Conclusions

This thesis examines the performance of socially responsible portfolios compared to the performance of their conventional counterparts. The performance of SRI portfolios has been studied both at a general level and during market crisis periods between the years of 2006-2021. This is implemented using two different hypotheses. This thesis includes relevant background theories that has the effect on the formation of different outcomes. In addition, previous literature on the subject has been presented and the results of other studies opened. This thesis is based on the empirical research, the results of which have been analyzed and compared to previous literature on the subject.

The results show that the cumulative returns of SRI portfolio underperform compared to the returns of non-SRI portfolio and the S&P 500 index. When comparing the performance of SRI portfolio in different market conditions, the results support previous literature on the subject. During normal market conditions, non-SRI portfolio gets higher monthly returns than SRI portfolio but still underperforms the S&P 500 index. Instead, during the financial crisis and COVID-19 crisis periods, SRI portfolio beats both the non-SRI and S&P 500 when considering the average monthly returns.

When estimating the risk-adjusted returns for the full research period based on factor models, the monthly alphas of SRI and non-SRI portfolios range from -0.39% to -0.38% and from -0.37% to -0.35%, respectively. The results from all three factor models are statistically significant. Considering the risk-adjusted returns for the non-crisis period, all models result in statistically significant alphas for both portfolios. SRI alphas range from -0.43% to -0.44%, while non-SRI alphas range from -0.37% to -0.34%. When examining the crisis period, the results are no longer statistically significant for neither portfolio. However, the SRI and non-SRI alphas range from -0.17% to 0.08% and -0.29% to -0.02%, respectively.

The first hypothesis of this study assumed that socially responsible portfolios underperform compared to conventional portfolios during normal market conditions. The results

show evidence that socially responsible portfolios perform worse than conventional portfolios in full and non-crisis periods. The results get highly statistically significant alphas from all factor models. Although the results of previous literature on the topic are not consistent, many studies find evidence that SRI portfolios underperform compared to thesis conventional counterparts in normal market conditions. This can be explained by the efficient market hypothesis, which suggests that financial markets are highly efficient and it is difficult, if not impossible, to consistently achieve superior returns through active investment strategies. Based on the empirical results, this thesis supports the first hypothesis and is in line with many previous studies.

The second hypothesis of the study stated that socially responsible portfolios outperform during market crisis periods. The risk-adjusted alphas indicate that socially responsible portfolios perform better compared to their conventional counterparts during market crises but are not statistically significant when measured by any model. As analyzed in previous studies on the subject, the second hypothesis is strongly supported. Studies and data available indicate that socially responsible portfolios are more stable in times of market crisis and therefore outperform conventional portfolios. Socially responsible portfolios are seen to be less volatile and thus also have a lower risk of stock price crash. The preference for socially responsible portfolios has been explained by the emphasis on the psychological and behavioral factors of investors in times of market crisis. Although market crisis alphas are not statistically significant, the results provide the basis for further research and observations on the subject.

The practical conclusion of this thesis is that the investor should not expect to achieve excess returns by incorporating responsibility criteria in investments in the long term. However, the consideration of responsibility factor has become part of the investment process and business operations and none of the participants in the financial sector cannot ignore the topic. Embracing sustainability in company operations is not only beneficial for the environment and society, but it also brings about tangible benefits such as

cost savings, enhanced reputation, regulatory compliance, stakeholder satisfaction, and long-term resilience.

For further research, it would be interesting to study how the market crisis caused by Russia-Ukraine war has affected the performance of socially responsible portfolios. Many previous studies rely on data collected from the financial crisis period, so adding more diverse data into studies could lead to even more comprehensive results. However, it will take time to obtain reliable information as it is still such a recent phenomenon. Also, the research could be expanded by examining the impact of social responsibility on the performance of single companies instead of portfolios. This would emphasize the role of individual companies in responsibility issues.

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