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The Performance of Socially Responsible Indices in Market Downturns

Evidence from the financial crisis of 2008 and the COVID-19 Pandemic

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ABSTRACT:
In the spring of 2020, S&P500 experienced the biggest crash in its history due to Covid-19 and the turmoil following the safety measures to stop the spread of the virus. After the long bull market following the financial crisis and ending at the corona crisis investors' focus shifted toward assets with smaller downside risk. While responsible investments have long been seen and marketed as such assets, the matter still lacks consensus. Their possible alphas could be driven by a social phenomenon or the fact that responsible investments tend to have lower volatilities and thus win in bear markets but lose in bull markets.

The purpose of this study is to research, if socially responsible indices (MSCI USA SRI & MSCI USA ESG) outperformed S&P500 overall, during covid-19 or the last financial crisis, and to further answer if these indices could be safe-haven assets during market turmoil. The alphas for the indices are calculated with the capital asset pricing model and Fama & French three-factor model. An event study is further conducted on the crash of S&P500, to capture the effects during the crash.

The study does not find significant alphas on either index during the entire sample period, financial crisis or Covid-19 crisis. Neither did the two indices yield significant abnormal returns during the crash period of spring 2020. Thus, the empiric part suggests that responsible indices did not outperform S&P 500 in times of crisis or overall.

There are two explanations for the results. First, the indices are not different enough from S&P500. Their composition is just too similar for the possible differences to be significant. Second, responsible investments may be performing as well as traditional investments. Further research on the topic is still needed. Possible future topics include emerging markets and fixed income assets.

KEYWORDS: ESG, SRI, Covid, Financial crisis, SRI-indices, socially responsible investing

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1. INTRODUCTION

In the spring of 2020 S&P500 experienced the biggest crash in its history when the value dropped from over 3300 points to barely over 2300 points in less than a month. The crash was due to a global pandemic from the SARS-CoV-2 virus and the following safety measures to stop the spreading of the virus. With over 6 million people dead in March 2022 humanitarian crisis is evident (Worldometers 2022). All countries are affected by the virus and most of them have decided to limit the spread of the virus by closing the economy and distancing people from one another. After multiple rounds of restrictions and waves of infections, the financial consequences of the crisis seem to be stabilized. Reinhart (2020) describes how the policy responses for fighting the virus have varied from locking down a complete region or a country to strict international travel bans and prohibitions on gatherings and events. These policies are affecting both aggregate demand and supply, nationally and internationally. This led to a crash in the stock markets in the spring of 2020.

Investors can see the crisis in higher volatility of asset prices. This higher risk offers opportunities, but many also end up losing money. During bear markets, investors also tend to turn to “safe-haven” assets, like gold. Past decade ever-increasing number of socially responsible investing (SRI) products have emerged. The amount invested in SRI has grown since the financial crisis from under 20 trillion dollars to over 100 trillion dollars in the United States (PRI 2020). Furthermore, these products often have lower volatilities than their non-SRI counterparts. Previous literature shows signs that SRI products might have a lower downside risk than traditional investments and be less correlated with the rest of the market. This means that including socially responsible investments in the portfolio would offer some downside protection in case of a crisis or a crash. On the other hand, their popularity could be driven by a social phenomenon and have nothing to do with superior performance. (Nofsinger & Varma 2014; Broadstock, Chan, Cheng & Wang 2020.)

The growth of socially responsible investing raises the question about the motivation behind it. Is there downside protection? Is it more or less profitable during bull markets than traditional investments? If it is more profitable during crisis times or overall, why so? Is there a reason that can be explained by traditional financial theories or is the possible reason a behavioral one? COVID-19 offers a unique setting to study whether the downside protection is there or not. This thesis focuses on the overall performance and the possible downside protection of socially responsible indices during crisis times. The motivation is discussed in theory, but not tested empirically.

1.1. Purpose of the study

The purpose of this study is to find whether SRI indices (MSCI USA SRI, MSCI USA ESG) outperformed their non-SRI counterparts overall during the COVID-19 early stages or the financial crisis of 2008. The study focuses on the question of whether SRI indices are a safe-haven asset during times of economic turmoil. Academic consensus on the matter is not clear, but numerous studies have found a positive relationship between socially responsible investing and financial performance, especially during times of crisis (Lee & Lu 2021; Eccles, Ionnou & Serafeim 2014; Nofsinger and Varma 2014). The explanations for this phenomenon lie in behavioral finance. Prospect Theory in its part explains how people tend to be loss averse, which in its part explains why the possible downside protection of SRI assets has gained such traction (Kahneman & Tversky 1997). Mental accounting argues that investors have different mental accounts for socially responsible investing and traditional investing (Thaler 2008). Beal, Goyen & Phillips (2015) argue further that traditional financial theories fail to explain the utility function of socially responsible investing, implying that investors simply feel good from doing good. Thus, investors would value SRI assets higher since their utility is higher.

1.2. Research question & hypotheses

The exact research questions of the thesis are: Did SRI indices outperform markets during the full sample period? And did they outperform their counterparts during the financial crisis or early stages of COVID-19? The hypotheses of the study are the following:

H1: SRI/ESG investments did outperform the market during the sample period

The first hypothesis focuses on the overall performance of the indices during the whole sample period. The period starts on October 1, 2007, and ends on January 29, 2021. It includes both the financial crisis and the covid-19 crisis. It also includes the time between the two and as such acts as a natural period for the measurement of overall performance.

H2: SRI/ESG investments did outperform the market during the financial crisis

The second hypothesis focuses solely on the financial crisis. The crisis period starts on September 15, 2008, with the bankruptcy of the Lehman brothers, and ends on March 9, 2009, when S&P 500 reached its low after the crisis. The purpose of this hypothesis is to see whether the indices are outperforming the market index during times of crisis.

H3: SRI/ESG investments did outperform the market during covid-19

The third hypothesis, similarly to the second one focuses on the downside risk protection of SRI indices. The crisis period starts on February 14, 2020, when S&P 500 crashed, and ends on January 29, 2021, when the data ends. The third hypothesis is also tested with a short event study. The event study on the crash goes from February 14, 2020, until March 20, 2020. The study is limited to the United States and conducted with indices. Thus, the results might not be applicable for different SRI assets and portfolios, or SRI assets in different markets.

1.3. Structure of the study

Chapter 2 discusses socially responsible investing. The chapter starts with terminology and a brief discussion on the history and current state of socially responsible investing globally. Continuing, the chapter goes on to different SRI strategies and their descriptions. The key points of the chapter are to understand what SRI consists of what it is today, and how it got there. Chapter 3 lays the theoretical foundation for the study. The theories can be split into two separate parts.

The first theories are necessary for understanding the theory behind SRI, its motivation, and performance, and the second ones are necessary for understanding the empiric part of the study. The first ones include the efficient market hypothesis, portfolio theory, shareholder- and stakeholder models, and behavioral drivers of SRI. Chapter 3 includes a thorough discussion of the theories and how they are linked to SRI.

The second one includes valuation models used in the study. The key point of the chapter is to understand what drives and motivates socially responsible investing and what factors are at play regarding the performance of SRI. Chapter 4 is the literature review. The review goes through the latest studies on the performance of socially responsible investing. Like the hypotheses, the literature review looks at different periods, times of crisis, and times of economic prosperity. The chapter presents studies that find SRI to outperform markets, studies that find it to underperform, and studies that do not find a connection. Downside risk protection & investor motivation is also discussed.

Chapter 5 starts the empirical part of the study and presents the data, where it is obtained, and descriptive statistics of the data. Chapter 5 also describes the methodology used in the study, how the valuation models are used in practice and how an event study is conducted. Chapter 6 discusses the results of the capital asset pricing model, the Fama & French 3 factor model, and the event study. Chapter 7 concludes the thesis and briefly discusses possible topics for future studies.

2. SOCIALLY RESPONSIBLE INVESTING

This chapter goes through the socially responsible investing phenomenon starting with the terminology, going forward to its brief history, and ends with a description of different socially responsible investing strategies. The chapters help to understand where socially responsible investing came from and where it is now. It also briefly describes the different operators in the field, such as the United Nations Principles of Responsible Investment (PRI).

2.1. Term definitions and SRI reporting

Socially responsible investing (SRI) is not a new field in finance. Yet, past two decades it has grown globally into a mainstream phenomenon. The European Sustainable Investment Forum, EUROSIF (2018), and The Forum for Sustainable and Responsible Investment, USSIF (2020) both define SRI to be a long-term-oriented investment approach that integrates environmental, social, and governance (ESG) factors into the investment process. Often ESG- and SRI- investing are used as substitutes similarly. A key difference is that SRI focuses on the social impact of the investment, while ESG on the financial performance, while still fitting the investment in the ESG framework. In a way, ESG is a subset of SRI. In this thesis term socially responsible investing or SRI is preferred and used to describe the entire field.

In 2010, the International Organization for Standardization (ISO) released a set of voluntary standards meant to help companies implement corporate social responsibility CSR. Unlike other ISO standards, ISO 26000 provides guidance rather than requirements because the nature of CSR is more qualitative than quantitative, and its standards cannot be certified. CSR, while used similarly to SRI focuses more on the corporate side, rather than the investor side of social responsibility,

Global Reporting Initiative (GRI) is the independent, international organization and co-operation partner of the UN's Environment Programme (UNEP). GRI helps companies take responsibility for their impacts, by providing them with the global common language to communicate those impacts. Companies are using GRI standards in their sustainability reporting. This reporting is an important tool for investors, who are interested in sustainability matters.

Principles of responsible investing (PRI) encourage investors to use responsible investment to enhance returns and better manage risks. PRI refers to a set of principles institutional investors are encouraged to agree on. These principles drive the investor's investment process in a more responsible direction.

2.2. From niche to mainstream

Socially responsible investing has its roots in different religions. The history of SRI in the United States goes as far as the 18th century when Methodists would not invest in the slave trade, smuggling, tobacco, or gambling. Also, Jews had their views on how to invest, similar to Islamic finance. The Methodist way later transformed into negative screening; an SRI strategy discussed later. Yet, the term socially responsible investing became better known in the 1980s and 1990s. However, the history of SRI goes further back. The first SRI mutual fund was founded in 1970 and was motivated by Vietnam War. The Pax World Balanced Funds' core ideology was to avoid investing in supply chains of Agent Orange, the notorious chemical weapon used in the Vietnam War by the USA on the Vietnamese. The modern environmental movement was born in the same era. (Townsend 2017.)

The SRI investment process was standardized in the 1980s in the USA. The principle was to build a standard portfolio that does not invest in alcohol, tobacco, weapons, gambling, pornography, or nuclear energy. To this day these are the classic avoidance screens, which will be further discussed in the subchapter describing SRI strategies. Another SRI

strategy born in the 1980s was “best in class”, which lead to the born of the first social index, the Domini 400 in the early 1990s. (Townsend 2017.)

After the ’90s in the early 2000’s SRI's focus started to move more toward analyzing ESG issues. Three main reasons behind this paradigm shift were a debate between fiduciary duty and corporate sustainability, second climate change, and third realization that failing at governance issues was harmful to the markets. Another factor that has helped ESG analysis to grow to the extent it is used today is that the data is available for the analysis. Analyzing company ESG scores from prebuilt data is much simpler than analyzing the social impact of complex supply chains for example. (Townsend 2017.)

One of the turning points in the history of SRI is the start of PRI. In 2005 Kofi Annan, the secretary-general of the United Nations invited the world’s largest institutional investors to develop the principles. The principles were launched in 2006 with 100 signatories. Since then, over 3,000 companies have signed them. (PRI 2020.)

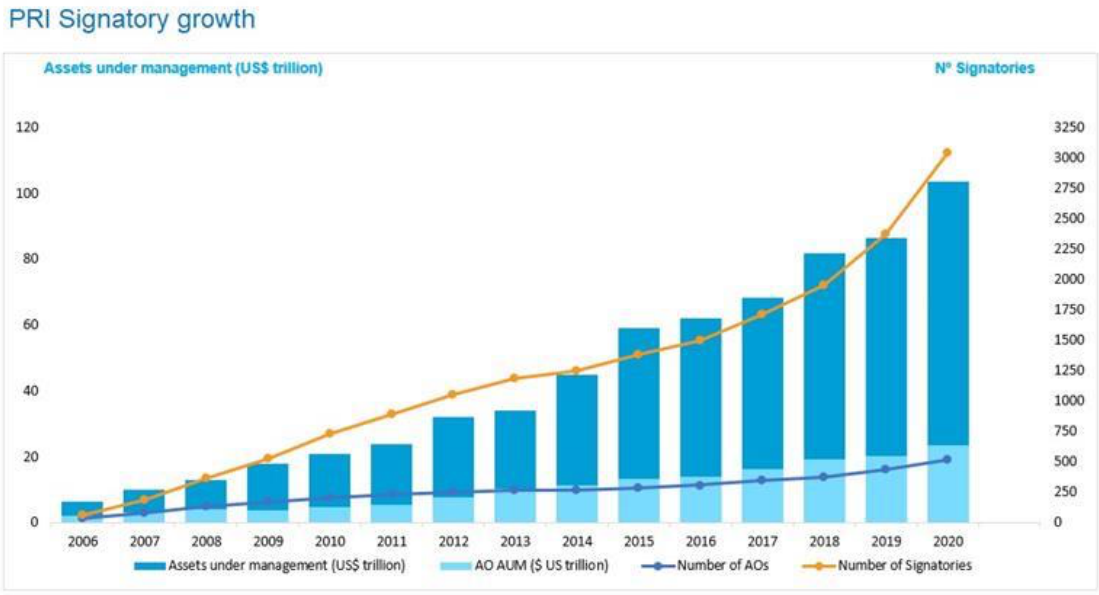

Figure 1 PRI signatory growth (PRI 2020)

The growth of the number of signatories describes well the growth of SRI in general over the past two decades and it can be seen from the graph above. The graph also illustrates the managed SRI assets and their growth in the US. This illustrates the importance of SRI currently. PRI's mission is an efficient and sustainable global financial system. The system is seen as a necessity for long-term value creation. PRI sees that this can be achieved by following the six principles for responsible investing. (PRI 2020.)

The principles are following:

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

The growth of stakeholder concerns about financial social responsibility was further increased due to the 2008 financial crisis. SRI appeared as means to avoid irresponsible governance and reduce the downside risk. At the same time, the amount and quality of analyzable ESG data kept increasing, thus allowing SRI to grow even further. (Puaschunder 2019.)

In 2018 26 % of the professionally managed assets in the US were SRI assets, totaling up to $11.6 trillion. The number of assets had seen a 36 % increase in just two years from 2016. By 2020 the managed assets have already grown to $16.6 trillion with an increase of nearly 43 %, fastened by the covid-19 crisis. (USSIF 2018; USSIF 2020.)

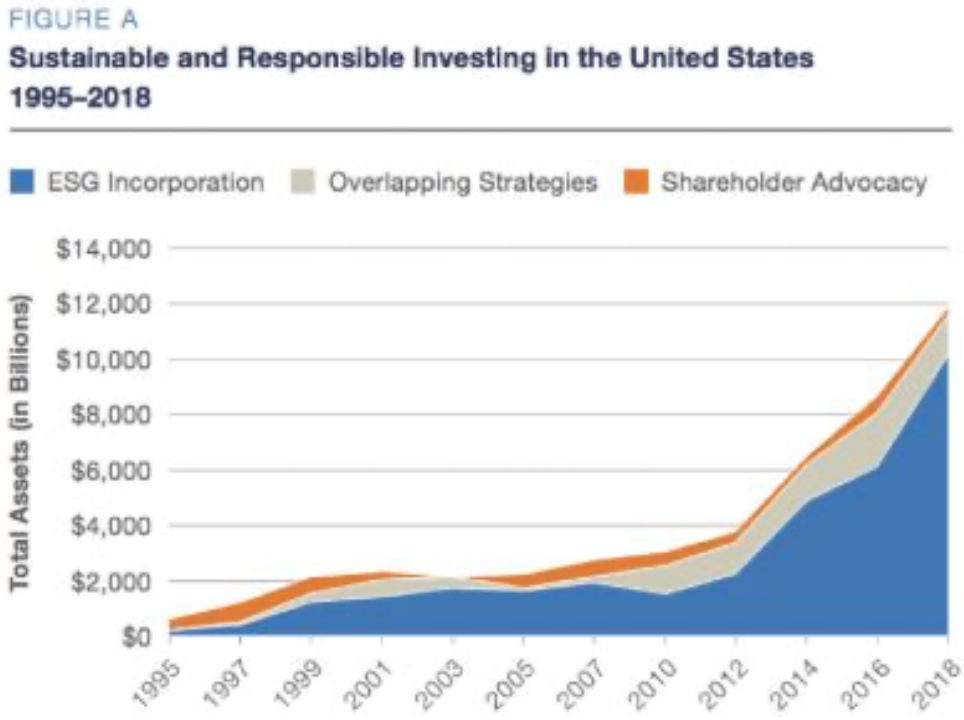

Figure 2 SRI equity growth in the USA (USSIF 2018.)

As seen from the graph above the total amount of SRI assets has grown increasingly since 1995. The growth increased right after the financial crisis of 2008. The growth is mostly from ESG incorporation.

2.3. SRI strategies

This subchapter focuses on describing socially responsible investment strategies. The discussed strategies include social screenings, shareholder activism, and ESG integration. The indices used in the empirical part can include different strategies.

2.3.1. Social screenings

As mentioned earlier the first SRI mutual fund was focused on avoiding investing in the notorious Agent Orange supply chain and the religious movements before that in the 19th century were conducting their investment policies to exclude certain industries.

This remains the core idea behind negative screenings. Investments in the portfolio are screened and some are excluded due to the chosen screening criteria. Usually, this criterion includes involvement in alcohol, tobacco, gambling, weapons, nuclear power, or child labor. The chosen criteria vary on investors' motives and investment goals. (Wallace 2018.)

Historically negative screenings have also been used to enable change in society. For example, they played a role in fighting and defeating apartheid in South Africa. (Wallace 2018). Negative screenings have been and still are the most used SRI strategy. However, in recent years it is the only strategy that has seen a slight decline in the invested amount. (Eurosif 2018).

Figure 3 Growth of negative screenings in Europe (Eurosif 2018)

While the invested amount has seen only a slight decline, the criticism towards negative screenings has been around for a while. De Colle & York (2008) argue that negative

screenings do not help investors to achieve their goals in meeting their values or encourage companies to improve their ESG performance. They base their arguments on the fact that excluding entire industries (for example alcohol) will exclude companies that are acting more responsible than some companies from an industry that is included in the portfolio. They further argue that the screening should be conducted rather on a company than at the industry level. Another strain of criticism focuses on the opportunity costs of negative screenings. Negative screenings limit investors' possible investment universe and thus their options while forming a portfolio.

Positive screening or best-in-class screening turns the screening philosophy around and focuses on screening the potential investments to choose the best ones instead of exclusions. The screening can be conducted for example with ESG scores and financial evaluation, choosing the companies with the best ESG score that pass the evaluation. While negative screening has seen a decline, positive screening has kept growing with the rest of the industry in Europe. (Eurosif 2018.)

2.3.2. Shareholder activism

Shareholder activism or engagement and voting is another widely used SRI strategy. The goal of engagement is for an investor to own enough shares to be able to actively push the company to the desired, responsible direction through voting and engagement. Especially institutional investors are engaging actively in the companies they invest in. Shareholder activism has shown potential to improve ESG performance. Shareholder activists can for example try to change the board of the company or try to transform it towards a more desired direction via M&A by selling a less responsible part of the business. Typically, in the approach the activist screens the company for SRI issues and then sets the objectives, the issues vary depending on the company and include governance, strategy & business-related topics. (Wagemans, van Koppen & Mol 2018.)

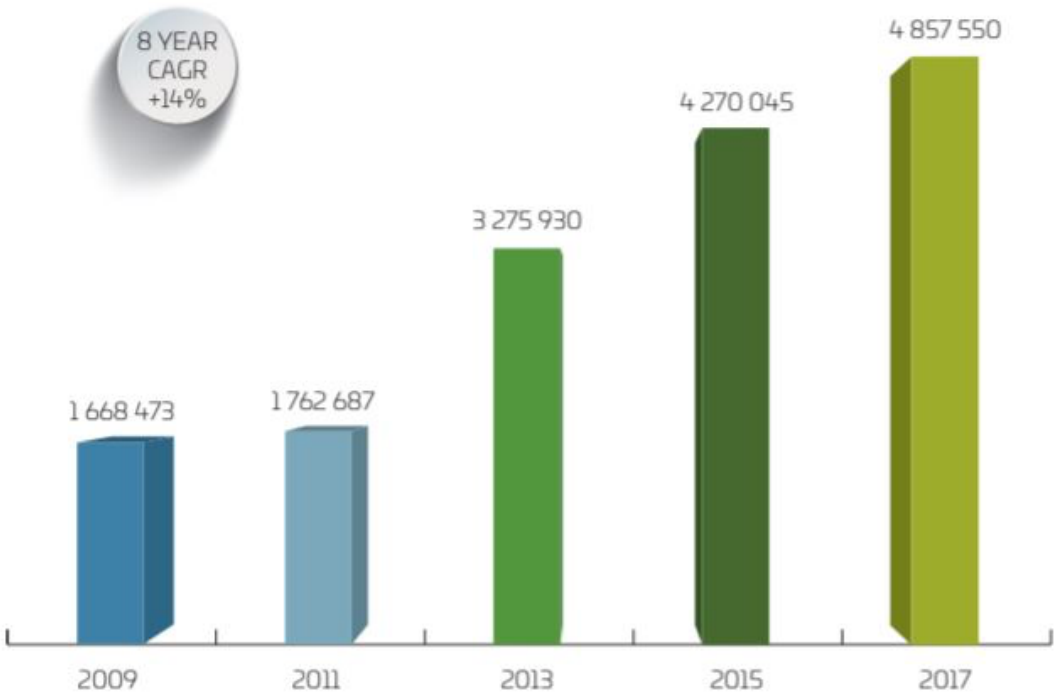

Figure 3 Growth of Shareholder activism in Europe (Eurosif 2018)

Shareholder activism is the most rapidly grown SRI strategy in Europe in the past few years. However, it will not be discussed further, because it is out of the scope of this study. It is not among the strategies used in the SRI indices.

2.3.3. ESG integration

SRI strategies have seen a paradigm shift in recent years. Money has been flowing from screening strategies to ESG integration and shareholder activism. ESG integration and the other strategies are not mutually exclusive. The strategies can be used simultaneously. ESG integration also overlaps with the other strategies in many areas, thus making it difficult to differentiate it from the other strategies. In ESG integration investor integrates environmental, social, and governance criteria into the investment process. As there are many different investment strategies, there is also a range of techniques to

integrate the ESG criteria into the chosen strategy. Furthermore, the criteria can be implemented in fundamental investment strategies, quantitative strategies, factor strategies, and passive investing strategies.

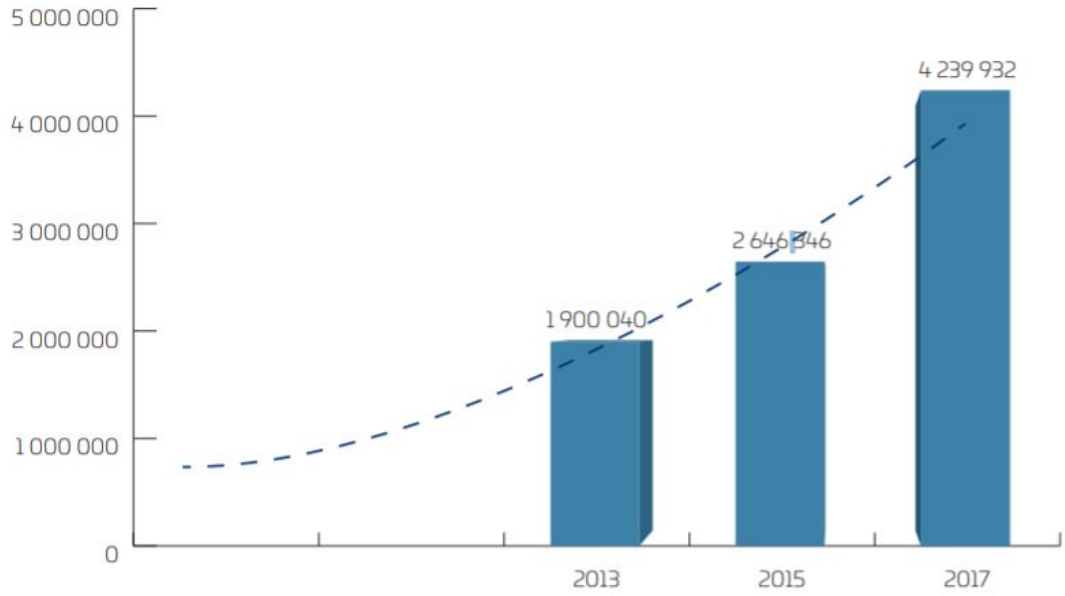

Figure 4 Growth of ESG integration in Europe (Eurosif 2018)

ESG integration is the most rapidly growing SRI strategy alongside shareholder activism currently. The figure above illustrates the growth of ESG integration since 2013. The invested amount into ESG integration has more than doubled between 2013 and 2017. Its popularity can be partly explained by the growing amount of available ESG data to analyze. In conclusion, there is a multitude of different ways to incorporate ESG criteria into the investment process, many of which overlap with the other SRI strategies, thus making it hard to calculate the exact amount of money invested in ESG integration as a strategy. However, the growth rate of ESG integration is expected to be over 100 %. (EUROSIF 2018, PRI 2016.)

3. THEORETICAL BACKGROUND

This chapter focuses on explaining the theoretical background of the thesis. Understanding the efficiency of markets, portfolio theory, shareholder- & stakeholder theories, asset pricing models and behavioral explanations is crucial for understanding the thesis. The chapter also discusses how and why these theories are linked to socially responsible investing in general. The key question behind the theoretic discussion is whether the interest in socially responsible investing is due to its possible profitability (e.g. Unknown risk factor) or whether it is simply because of psychological reasons and human behavior.

3.1. Efficient market hypothesis

The efficient market hypothesis (EMH) was first presented by Fama (1970). The efficiency of the markets generally means how well the asset prices reflect the information about the securities in the markets. When security prices fully reflect all the available information instantly the markets are referred to as efficient and the securities are traded in their true value. Thus, the securities can't be under-, or overvalued and arbitrage opportunities do not exist. However, efficient markets are more of an ideal state rather than reality and thus three forms of market efficiency (weak, semi-strong, and strong) are presented.

In the weak form, the prices only reflect the past information on security prices. The security prices are expected to follow a random walk and thus predicting the future security values is impossible. This means that analysis from past prices does not yield abnormal returns. In the semi-strong form of market efficiency, the prices reflect all publicly available information in addition to the past information on security prices. E.g. IPOs, M&A announcements, and stock exchange releases. In the third, strong form of efficiency, the prices reflect all information on securities. This includes insider information regarding the securities. (Fama 1970.)

Fama (1991) builds upon previous literature on market efficiency and alters the original theory by expanding the three stages and describing how to test market efficiency. The weak form of efficiency is expanded to include more general tests to predict future returns. The test now contains variables e.g., dividend yields and interest rates in addition to price information. However, testing for market efficiency is inseparable from equilibrium pricing as to test for efficiency one must obtain the benchmark security prices with an asset pricing model. This causes a joint hypothesis problem. Testing for market efficiency tests two hypotheses: markets are not efficient or the used model to obtain the true market prices is not correct. If one finds that markets are inefficient, it cannot be said whether it is due to a bad pricing model or the actual inefficiency. The second form of market efficiency (earlier semi-strong form) is changed into event studies. Fama (1991) argues that event studies provide the most reasonable evidence for market efficiency as they show that prices do reflect new public information fast after the information is released. The third, strong form is changed into tests for private information.

EMH, much like other financial theories before behavioral finance expects investors to be rational. Being rational implies, that investors do not have other preferences, except for maximizing profit and minimizing risk. Fama & French (2007) argue that investors are not in agreement on future payoffs on investments. Thus, even rational investors would behave irrationally. Furthermore, some investors think of investments similarly to consumption goods, implying that they do have preferences other than rational ones. These preferences can be for instance related to the social responsibility of the investments. Hwang, Titman & Wang (2015) show that even institutional investors have preferences over the responsibility of their investments. Furthermore, institutional investors influence the invested companies to behave according to their preferences. Cao, Titman, Zhan & Zhang (2018) find that SRI affects the informational efficiency of pricing. Institutions with SRI preferences are less likely to buy underpriced stocks if they have low ESG performance and less likely to sell overpriced stocks that have high ESG performance. This is not fully offset by arbitrageurs and thus contradicts the efficient market hypothesis. Responsibility information could be seen as just another source of information on

future risks and profits. However, Beal, Goycen & Phillips (2005) suggests that there are behavioral aspects to SRI that do not align with EMH, and SRI investors gain non-rational utility from investing in SRI assets. As Fama & French (2007) and Hwang et al. (2015) argue, investors have also non-rational preferences.

3.2. Portfolio theory & SRI motivation

Markowitz (1952) introduced the early version of portfolio theory, which is one of the cornerstones of modern finance and laid a foundation for the modern asset pricing models. Markowitz's (1952) key finding is that portfolio optimization should be based on maximizing profit, and minimizing variance in a well-diversified portfolio, rather than focusing on the individual assets within the portfolio. This later developed into a selection and optimization between risky assets and risk-free assets.

The risk in assets can be separated into two different kinds of risk: systematic risk and unsystematic risk. Systematic risk, the market risk, can't be reduced utilizing diversification. When the whole market goes down, diversification does not help. However, unsystematic risk is something that can be reduced by diversifying the portfolio. Diversifying simply means picking assets with different covariances. Thus, an investor can still have risky assets in the portfolio and reduce the total risk by diversifying. In a well-diversified portfolio, covariances between the assets have a larger effect on the portfolio risk than individual asset variance. (Bodie, Kane & Marcus 2014)

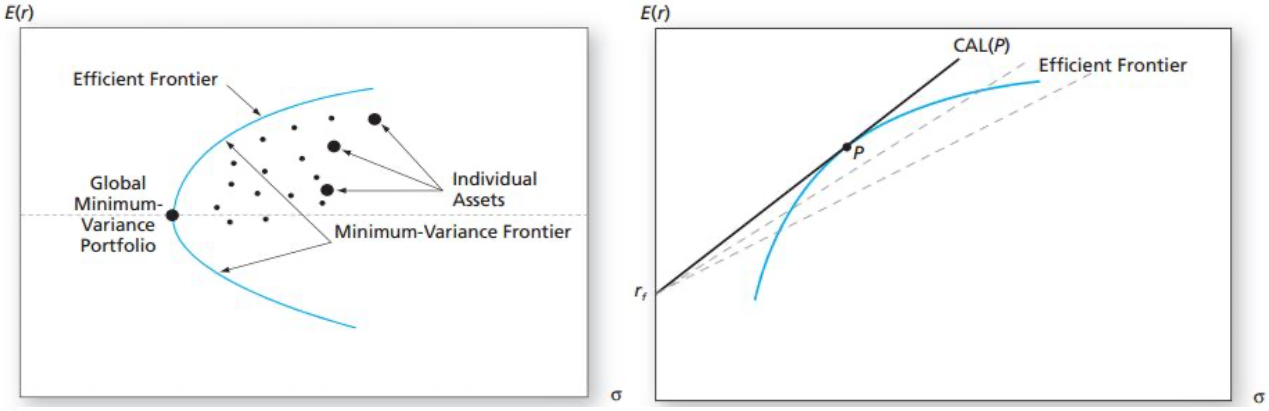

Figure 6 Efficient frontier in portfolio optimization (Bodie et al. 2014)

In both figures, the horizontal axis describes the risk measured as volatility and the vertical axis the expected profit. Portfolio optimization has three steps: first identifying the available risk-return combinations, second optimizing the portfolio by finding the steepest capital allocation line (CAL) by adding the risk-free asset, and third choosing the right mix between a risky portfolio and a risk-free asset for an individual investor.

The first step starts with calculating the global minimum variance portfolio (figure on the left). It is the portfolio with the lowest available volatility for the targeted expected return. The global minimum variance portfolio lies on the minimum variance frontier. The efficient frontier starts from the global minimum variance portfolio and is above it. It includes all the efficient combinations of risky assets that yield the best reward with a minimal amount of volatility. As seen from the graph the individual assets lie on the right side of the efficient frontier and are thus inefficient alone in a portfolio. For the second part, the risk-free asset is involved. The combination with the highest Sharpe ratio (below) has the steepest CAL. This optimal portfolio is the tangent for the efficient frontier as seen in the graph on the right. Last, in the third step, the optimal portfolio and the risk-free asset are weighted to the desired level of risk. (Bodie et. al. 2014)

$$Sharpe\ ratio = \frac{r_p - r_f}{\sigma_p} \quad (1)$$

Where:

r_p = expected portfolio return

r_f = risk free return

σ_p = Portfolio volatility

One of the key elements of the modern portfolio theory is the importance of diversification. Intuitively, it can be thought that adding socially responsible investing criteria to the investment process leads to the shrinking of the possible investing universe. This

lower amount of possible investments should lead to less diversification and a suboptimal portfolio. However, Hickman, Teets & Kohls (1999) argue that while socially responsible investments might have a lower return, they are less correlated with the market. Thus, adding them to the portfolio, increases the overall profit, especially in market downturns. The diversification is a result of different covariances, rather than adding a multitude of highly correlated stocks to the portfolio. Traditional investments tend to have a higher correlation with the market than socially responsible investments. This implies that adding SRI investments to the portfolio would increase the diversification benefits rather than reduce them. This, however, means that the portfolio does not consist only of SRI investments.

Pedersen, Fitzgibbons & Pomorski (2020) add ESG ratios to portfolio theory. Their model is characterized by an ESG-efficient frontier. Working similarly to Markowitz's (1952) portfolio theory it shows the highest attainable Sharpe ratio for each ESG level. This allows the investor to consider the desired ESG-level in the portfolio optimization process. It also works as an easy method to research the cost or benefit of ESG investing by comparing the Sharpe ratios on different ESG-levels. Pedersen et al. (2020) find that the highest Sharpe ratio is found by using a relatively high ESG-level and increasing the ESG level does not reduce Sharpe-ratio drastically. Implying that investors' ethical goals can be achieved at a relatively small cost. They further find that screening for low ESG stocks reduces the Sharpe ratio, contradicting the argument of Hickman et al. (1999).

To conclude, SRI does not fully fit into the framework of Markowitz's (1952) portfolio theory. While some academics argue that SRI investments are not as correlated with traditional investments and thus increase the diversification benefits (Hickman et al. 1999), others argue that limiting the investment universe lowers the maximum Sharpe ratio (Pedersen et al. 2020). This implies that ethical investors should look more into investment strategies that are not limiting the investment universe, such as shareholder

activism, rather than negative screenings. Portfolio theory and efficient market hypothesis both fail to understand investor motivation behind SRI, as they expect investors to be completely rational profit maximizers.

3.3. Shareholder- and stakeholder theory

Shareholder- and stakeholder theory discuss a corporation's responsibility regarding the society the corporation operates in. According to shareholder theory, the responsibility is limited to the shareholders and the shareholders have their responsibility towards the society, while stakeholder theory argues that corporations have responsibilities towards all stakeholders on their own. Shareholder theory is one of the footholds of modern corporate finance theory. The theory was presented by Friedman (1970) and follows the ideology of Friedman (1962). The key takeaway is that corporation's duty is to maximize the profits of its shareholders. This can be derived from the idea that shareholders who are maximizing profits would force a change on the directors and executives or change their owned shares if the corporation would not be maximizing shareholder profits. Furthermore, this would drive all corporations to maximize shareholder profits to ensure their financing and for the executives to do shareholders' bidding. Another way to look at profit maximization is that shareholders can choose to participate in what they deem worthy with the profit, leaving the choice to participate to the shareholders, rather than the executives of the corporation. This does not limit shareholders' options to act responsibly. Friedman (1970) further argues that only a person, not a corporation can have a social responsibility, indicating that shareholders have their responsibility and executives and workers have theirs, but a corporation cannot have social responsibility.

Stakeholder theory, on the other hand, argues that a corporation should consider all its stakeholders and create value for all of them, instead of just the shareholders. There are multiple definitions for stakeholders in the literature, but Freeman (2014) defines stakeholders as "any group or individual that can affect or is affected by the achievement of a corporation's purpose". This definition in other words includes all parties that affect or

are affected by a corporation's actions. Stakeholder theory argues that these effects need to be accounted for. Furthermore, to do so a corporation must understand its stakeholders and their values and mission and have a strategy. After understanding these, a corporation can understand the relationships with the different stakeholders. After analyzing the relationships, the ideas can be applied to new structures, processes, and business functions. (Freeman 2014.)

Stakeholder theory is much closer to corporate social responsibility than shareholder theory, as it sees a responsibility to be something that a corporation has towards all its stakeholders, not just towards the shareholders. Freeman & Dmytriyev (2017) discusses the relationship between stakeholder management, corporate social responsibility, and financial performance. In academic literature, the two concepts are sometimes assumed to be competing views, complementary, or one is seen to be a subset of the other. According to Freeman et al. (2017), they are two different concepts that are partly overlapping. Both incorporate social interests into business and see businesses as something that is embedded into society. The difference is that corporate social responsibility focuses on the corporation's relationship with the society at large, while stakeholder theory focuses on all different stakeholders and different relationships. This is further demonstrated in the figure on the next page.

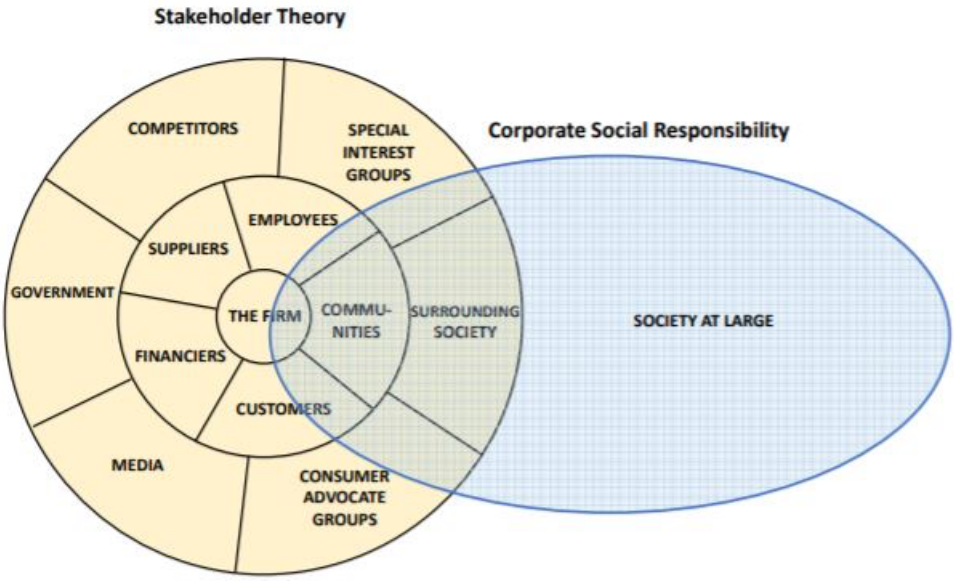

Figure 5 Stakeholder theory - Corporate social responsibility (Freeman et al. 2017)

Another difference can be seen in the perspectives from which stakeholder theory and corporate social responsibility look at the business. Stakeholder theory focuses more on the company itself and its immediate stakeholders, while corporate social responsibility looks more into society at large, and the company in it. In conclusion, the difference is mostly in point of view. (Freeman et al. 2017.)

As stated previously, stakeholder theory brings the discussion between shareholder- and stakeholder theory much closer to corporate social responsibility and with it socially responsible investing. Corporate social responsibility discusses responsibility as a whole, rather than through the scope of investing. However, the paradigm shift from businesses' duty to maximize shareholder wealth to businesses' duty toward all stakeholders raises the question if the other is financially more efficient. Does a company that follows stakeholder theory rather than shareholder theory do better or worse financially? There are multiple similarities in the question as there are between traditional investing and socially responsible investing. Is one more profitable than the other? This is further discussed in the literature review.

In conclusion, the shift from shareholder view towards stakeholder view is linked with the growing interest in socially responsible investing and overall corporate social responsibility. Both are part of a larger discussion about responsibility issues in the corporate world.

3.4. Asset pricing models

Portfolio theory made modern asset pricing models possible and as stated earlier the research on market efficiency is inseparable from asset pricing to test EMH, asset pricing model has to be used. This subchapter focuses on the capital asset pricing model (CAPM) and Fama & French's (1993) 3- and 5-factor models. The models are widely used in finance by practitioners and researchers alike. CAPM and the 3-factor model are used in the empiric part of the thesis.

3.4.1. The capital asset pricing model

Sharpe (1964), Lintner (1965), and Mossin (1966) all built on Markowitz's (1952) portfolio optimization model to increase the understanding of equilibrium expected returns in capital markets. Their work was later named the capital asset pricing model (CAPM). If all the investors share a similar investment universe, have the same risk-free rate, and optimize their portfolios according to portfolio theory, their capital allocation lines would be the same. Furthermore, the investors would all invest in the same portfolio with the same weights for the risky assets in the portfolio. This implies that the market portfolio would share these weights and every investor would invest in this market portfolio. Thus, the CAL of the investors will also be the capital market line (CML).

The CAPM expects that individual security risk premium is determined by its contribution to market portfolio risk. This can be calculated from a covariance matrix used to calculate market portfolio variance by summing all the covariance terms of the asset's column in the matrix. Continuing, the market price of risk can be calculated by dividing the market risk premium by market variance. The price of risk must be similar among all of the assets in the market. Otherwise, investors would shift to the assets with a higher reward-to-risk ratio. Thus, the market price of risk and individual asset price of risk must be the same. This leads to the equation shown below. On the left side is the individual stock price of risk and on the right is the market price of risk. (Bodie et al. 2014.)

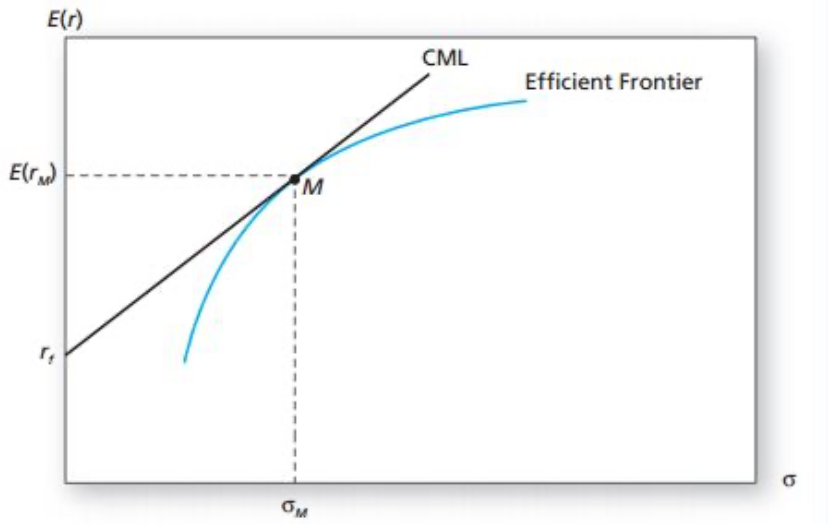

Figure 6 Capital market line (Bodie et al. 2014)

$$\frac{E(R_s)}{Cov(R_s, R_M)} = \frac{E(R_M)}{\sigma_M^2} \tag{2}$$

To obtain the risk premium ($E(R_s)$) for the individual stock the formula can be rearranged to:

$$E(R_s) = \frac{Cov(R_s, R_M)}{\sigma_M^2} E(R_M) \tag{3}$$

Where$\frac{Cov(R_S,R_M)}{\sigma_M^2}$ shows how much the individual stock contributes to the total variance of the market portfolio. In CAPM this ratio is more commonly called beta and the equation can be transformed to its final form. (Bodie et al. 2014.)

$$E(R_s) = r_f + \beta_s\left[E(R_M) - r_f\right] \tag{4}$$

Where,

$E(R_s)$ = CAPM expected return on a single stock

r_f = Risk-free rate

β_s = Beta of the stock

$E(R_M)$ = Expected return on the market portfolio

The beta of the market portfolio is 1. The individual asset betas move around it and reflect how the stock behaves related to the market portfolio. An aggressive stock has a beta higher than 1 and a defensive stock has a beta less than 1. The graph below illustrates the expected return – beta relationship in CAPM. All the stocks can be placed on the security market line (SML). The slope of SML is the risk premium of the market portfolio.

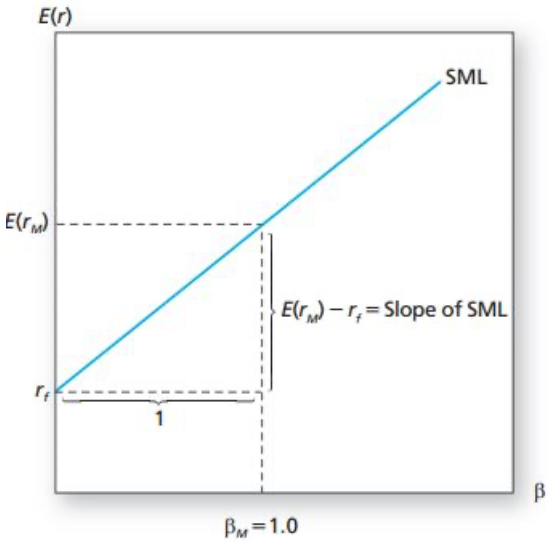

Figure 7 Security market line of CAPM (Bodie et al. 2014)

CAPM has faced criticism. Most of the criticism is focused on the underlying assumptions of the model. Bodie et al (2014) list the assumptions as follows:

1. Individual behavior of investors
    a. Investors are rational, mean-variance optimizers
    b. Their planning horizon is a single period
    c. Homogenous expectations
2. Market structure
    a. All assets are publicly held and traded, short positions are allowed, and everyone can lend and borrow at the risk-free rate
    b. All information is publicly available
    c. No taxes
    d. No transaction costs

Assumptions are split into two separate categories, the first one being individual behavior and the second perfect markets. Many of the assumptions can be proven wrong, from rational investors to perfect markets. This leads to different portfolios for different investors and is against the CAPM. The question, however, is whether the faultiness of these assumptions affects the model statistically enough. The problems have led to the development of many statistically more precise models. However, Understanding CAPM is still more than vital to understanding its extensions. (Bodie et al 2014.)

CAPM offers us another way to calculate the risk-reward ratio, like the Sharpe ratio. In Traynor-ratio the risk is measured with beta instead of volatility like it was with Sharpe -ratio. The two ratios are interpreted similarly. A higher ratio indicates that the investment has yielded more reward compared to its riskiness and thus performed better. (Bodie et al 2014.)

$$Traynor\ ratio = \frac{r_p - r_f}{\beta_p} \quad (5)$$

Where,

r_p = expected portfolio return

r_f = risk free return

β_p = Portfolio beta

In the Traynor ratio, the excess return of the portfolio is divided by its beta. Traynor- and Sharpe-ratio both offer a simple tool for research. Both ratios are calculated for the indices in the study later in the thesis.

3.4.2. Factor models

Fama & French (1993) three-factor model is widely used especially in financial research. The model builds on the idea that not all systemic risk can be described by a single factor like it is in the CAPM model. Thus, adding factors yields more accurate security prices. The chosen factors have been tested empirically to proxy systemic risk. The model adds small minus big (SMB) and high minus low (HML) factors on top of CAPM beta. SMB is the difference between an excess return of a portfolio with small stocks and a portfolio with large stocks. HML similarly, the difference with high- and low book to market ratio. While these two are not relevant to risk factors themselves they are expected to proxy for unknown relevant variables and empirically both are relevant.

$$R_{it} = \alpha + \beta_{iM} R_{Mt} + \beta_{iSMB} SMB_t + \beta_{iHML} HML_t + e_{it} \quad (6)$$

Where,

R_{it} = Expected return on stock i at time t

α = Alpha

$\beta_{iM} R_{Mt}$ = CAPM beta

$\beta_{iSMB} SMB_t$ = Small minus big

$\beta_{iHML} HML_t$ = High minus low

Other widely used factor models include the Carhart 4-factor model and Fama & French 5-factor model. The 4-factor model adds the momentum factor on top of the Fama & French 3 factors (Carhart 1997). Furthermore, the 5-factor model adds profitability and investment factors to the old 3-factor model (Fama & French 2015). The 5-factor model misses the momentum factor from the Carhart model.

3.5. Behavioral explanations for socially responsible investing

As stated earlier classic financial theories like EMH, portfolio theory, and CAPM fail in many ways to explain the growth of socially responsible investing. Where the classic financial theories fail behavioral finance relaxes the assumption of rational investors and suggests that investors' decision-making process is much more complex than just maximizing the profit-risk ratio. For example, Kahneman & Tversky (1997) finds that investors are valuing losses and gains differently. This phenomenon is called the prospect theory. A loss of $5 feels worse than a gain of $5 feels good. In other words, people are more sensitive to losses than they are to gains. This could partly explain investors' interest in SRI as a safe-haven asset, and even explain why some investors would be ready to pay a margin for the lower downside risk. This, however, has not been researched.

Thaler (2008) discusses how consumers make choices in their mental accounting systems, and how these systems are far from the classic rational economically thinking consumers.

The argument is that people treat money differently according to the source of the money or, where it's spent on. For example, an executive is more likely to spend the bonus money than save it, compared to the salary. Mental accounting can be split into multiple different behavioral traps humans tend to fall into, some of which can also influence the motivation around socially responsible investing. Investors can for example have different mental accounts for responsible investing and traditional investing and thus even accept lower profits from responsible investing.

Furthermore, Beal, et al. (2005) argue that traditional financial theories cannot explain investor behavior when it comes to SRI. Not all investors are simply following the mean-variance optimization. Something else is driving their decision-making. They sum up three possible motivations: financial returns, non-wealth returns, and social change.

Financial returns alone do not explain the motivation for socially responsible investing. While they are amongst the most studied subject in the field of SRI there still is no consensus whether socially responsible investments yield better or worse returns than the market. It can be concluded that if the financial returns are similar to the market, they alone do not explain the motivation to invest socially responsibly. This implies that socially responsible investments yield non-wealth returns to the investor, or something else is driving their motivation to invest. Non-wealth return can be seen as a psychological reward, a felt utility from investing to responsible investment. The third motivation is social change. The difference between non-wealth returns and social change is that investors who aim for social change are actively trying to change something. Non-wealth returns can be associated with all SRI investments, while social change is more linked to shareholder activism. However, the utility of social change is psychological, more than concrete change. Thus, it is close to non-wealth returns. This means that these investors are motivated by all three factors. (Beal et. al. 2005.)

Beal et. al. (2005) finds three different ways to approach the psychological rewards of investing ethically. First treating the rewards as equivalent to a gambler's fun of participation, second by including the level of ethicality to the investor's utility function, and

third by treating the rewards as any other means of happiness or well-being derived from other activities.

The fun of participation means that the investor feels more utility from participating than he would feel only from the financial return alone. The felt utility is not affected by the outcome of the investment. An important implication of this approach is that the investor feels more utility the smaller the investment. (Beal et. al. 2005.) The investor's utility function typically includes expected return and risk. The utility function can be described as a formula as follows:

$$U = f(E_R \sigma_R) \tag{7}$$

Where,
$U =$ Utility
$E_R =$Expected return
$\sigma_R =$Standard deviation

The classic utility function assumes that investors are maximizing their profits regarding risk. However, as already stated investors have different motivations. Adding the level of ethicalness to the equation helps explain the behavior of investors investing in SRI. (Beal et al 2005.)

$$U = f(E_R \sigma_R e) \tag{8}$$

Adding ethicalness to the equation means that the investor does not only maximize the profit but also the level of ethicalness of the investment affects the felt utility. This model implies that an investor whose utility function includes the level of ethicalness is ready to get less profit for the same amount of risk if the investment is ethical. The flexibility

of the model also allows for an investor to be uninterested in return or risk. For such an investor-only the ethicalness of the investment matters. (Beal et al 2005.)

Beal et al (2005) argue that also the tools used for happiness research can be applied to SRI. Happiness researchers use experienced utility instead of classic utility as seen in traditional economics. These methods are closer to psychology than finance and thus not discussed any further in this thesis. However, they can be of great use for modeling ethical investor behavior.

In conclusion, behavioral finance offers a framework to study and explain the phenomena traditional finance struggles to explain. Regarding socially responsible investing, understanding both classic theories and possible behavioral explanations is crucial. The chapter discussed how different financial theories could explain the interest in socially responsible investing. However, one of the most important questions - whether socially responsible investing is more profitable or less profitable than traditional investing - will be discussed in the literature review following this chapter.

4. LITERATURE REVIEW

Despite numerous studies on the performance of SRI, a clear consensus on the matter is still missing. The conclusions of the studies can be split into three. First, a negative relationship (Renneboog, Jenke & Chendi 2008; Nofsinger and Varma 2014). This implies that SRI and financial performance are negatively related, i.e. SRI fund would underperform a similar traditional fund. Second, positive relationship (Lee & Lu 2021; Eccles, Ionnou & Serafeim 2014; Nofsinger and Varma 2014; Broadstock, Chan, Cheng & Wang 2020; Engelhardt, Ekkenga, & Posch 2021) and third, unrelated (Folger-Laronde, Pashang, Feor & ElAlfy 2020; Mollet & Ziegler 2014; Auer & Schuhmacher 2016; Statman 2000; Schröder 2004). Many studies also focus on studying the performance of bear-, or bull markets (Folger-Laronde et al. 2020; Nofsinger & Varma 2014; Syed 2017; Lee & Lu 2021; Broadstock, Chan, Cheng & Wang 2020; Engelhardt, Ekkenga, & Posch 2021). The literature review also further discusses the motivation behind investing responsibly (Hartzmark & Sussman 2019; Ferriani & Natoli 2020).

4.1. Negative & positive SRI – financial performance relationship

Renneboog et al. (2008) found a negative relationship between SRI and financial performance. The study was conducted on all SRI funds globally. According to their study, there is a price for being an ethical investor. The funds in many countries underperformed the benchmark index by 2.2 % to 6.5 % However, when measuring risk-adjusted returns the results are mostly insignificant. Interestingly, Nofsinger et al. (2014) find that the relationship between SRI and financial performance differs in bear- and bull markets. They find in their study that SRI outperforms the market during times of crisis but underperforms during non-crisis periods. This implies, that downside protection exists, and investors can seek protection from SRI assets during times of turmoil.

Multiple studies find a positive relationship between SRI, or corporate social responsibility, and financial performance. Eccles et al. (2014) study how corporate culture towards sustainability affects company performance. They find that a highly incorporated culture towards sustainability increases company performance in the long run. To conduct the study, they had a matched sample of 180 companies, split into a group with high sustainability culture, and another group with low or nonexistent sustainability culture. The group with incorporated high sustainability culture outperformed the other group significantly, both in stock market performance and accounting performance.

Syed (2017) also finds a positive relationship between SRI and financial performance during market downturns, similar to Nofsinger and Varma (2014) in French and UK markets. Syed (2017) further argues that there is a positive, but insignificant relationship between SRI and performance in the same markets during non-crisis periods. Syed (2017) findings further support the argument toward downside risk protection.

Lee & Lu's (2021) findings are in line with Nofsinger et al. (2014) & Syed (2017). They find that during the heaviest crash from Covid-19 all companies experienced negative abnormal returns, but companies that had committed to corporate social responsibility had significantly less negative abnormal returns than their less responsible counterparts. They were more resilient to the shock. However, after the shock, the performance was not different.

Broadstock, Chan, Cheng & Wang (2020) discovered that a high ESG portfolio outperformed a low ESG portfolio during the market crash of covid-19 in China. The study focuses on event windows of three-, five- and eleven days centering on Feb 3rd, 2020. During this period Chinese stock market crashed due to lockdown. According to their study high, ESG rated portfolio was less traded and suffered less financially during the event window than its low ESG counterpart. Interestingly the dimensions of ESG E and G were positively correlated with financial performance and S negatively. Their study further

proves that SRI offers downside risk protection during times of financial turmoil. Engelhardt, Ekkenga, & Posch (2021), on the other hand, found that high ESG-rated companies had higher abnormal returns around the covid-19 crisis in Europe. They also find that S was the driver of their results, opposite to Broadstock, Chan, Cheng & Wang (2020).

Singh (2020) discusses Covid-19 and SRI investments. He finds that investors are aware of the possible downside protection, and more interestingly part of the superior performance during a crisis might be because of the previous findings. As investors move towards SRI during times of crisis it increases the demand for SRI products and thus increases their prices, which increases the observed performance. This also implies that as the crisis fades and the money starts flowing back to other investments, the value of SRI decreases, and the observed performance is reduced. Interestingly, Nofsinger et al. (2014) found earlier that investors are aware of the possible downside protection and are actively also seeking it.

4.2. Indifferent performance

Many studies also find that SRI performance is not different from traditional investments. Mollet et al. (2014) study SRI stock market performance. Their study considers both US and European stock markets and the performance is measured by the Carhart 4-factor model. The main result of the study is that the abnormal returns on SRI are insignificant. This implies that there is no cost to SRI, but neither is there a financial benefit to it. Auer et al. (2016) find that the relationship differs globally. In their study, the relationship is nonexistent in Asia and USA, but in Europe, SRI underperforms the markets. Statman (2000) has similar findings from US Markets from 1990-to 1998. The study argues that there is no performance difference between SRI and traditional investments.

Folger-Laronde, Pashang, Feor & ElAlfy (2020) find similar results as Mollet et al. (2014). Their study focuses on exchange-traded funds (ETF) during the covid-19 crisis. The study finds that the funds with higher Eco-fund ratings did not outperform the lower-rated

funds during the crisis. However, the authors address transparency issues with the Eco-fund rating. It is unclear, whether investing in one red-flag company leads to the lowest Eco-fund rating for the fund or should there be multiple unethical investments. 23 % of the funds in the sample had the lowest Eco-fund rating.

4.3. Studies on investor motivation

The three following studies also discuss the investor motivation for SRI. Hartzmark & Sussman (2019) find evidence that the presentation of a new SRI ranking system for mutual funds affects the in and outflows of the funds. The study focuses on the launch of the Morningstar Sustainability Rating in 2016. Investors acted only on the globe rating (much like traditional ranking with stars, 1 is extremely bad 5 extremely good), while they ignored the other two metrics. The mutual funds with 5 globes experienced significant inflows, while funds with one globe experienced outflows. The effect was focused on the extremes of 1 and 5 globes. However, the study found that higher-rated mutual funds did not outperform their lower-rated counterparts in performance. This proves that investors value sustainability even though it might not show in performance. The study further analyzes why investors value sustainability and find three possible motives. First, institutional investors value sustainability due to constraints. Second, investors view sustainability as an indicator of future performance and third, investors have non-pecuniary reasons for sustainable investing.

Ferriani & Natoli (2020) also find that ESG factors affect the investment fund flows of mutual funds. They find that in the early stages of covid-19 investors preferred low ESG-risk funds over high ESG-risk funds. From the ESG dimensions, the environmental risk was the top concern among the investors. This is in line with Hartzmark & Sussman (2019) and possible motives for SRI. The study uses the same but improved globe rating system by Morningstar as Hartzmark & Sussman (2019).

Selmi, Hammoudeh, Errami & Wohar (2021) study whether the anxiety caused by the covid-19 has affected investor interest in SRI. They test investor sentiment (the anxiety) by proxying it from Twitter tweets and testing it on the performance of indices that meet the chosen SRI criteria. They find that the pandemic-related anxiety and fear have caused investors to reward responsible companies. They also find that responsible companies tend to act on investor anxiety more often than their less responsible counterparts. The study interestingly gives a possible behavioral explanation for SRI's success during times of crisis.

As the literature review suggests, the matter lacks consensus. However, a small line of evidence does suggest that socially responsible investments are performing better than traditional investments during market downturns. This could be explained by behavioral reasons and their demand during these times. Friede, Busch & Bassen (2015) discusses the ESG – financial performance relationship in a form of a review study. The study combines 2,200 individual studies and finds that around 90 % of the studies find a nonnegative relationship. Most of the studies find a positive relationship, turning the scales towards a positive SRI – financial performance relation.

5. DATA AND METHODOLOGY

This chapter presents the data and the methodology used in the study. The chapter starts with the description of the chosen indices, their specifics, and how the indices are constructed. Then the chapter goes on to descriptive statistics and continues to thoroughly explain the conducted methodology.

5.1. Data

Data of the thesis consists of 4 indices (MSCI USA SRI, MSCI USA ESG, S&P 500, and MSCI world index) and Fama & French factors. The indices were picked to reflect different SRI approaches and according to available data. Index data is from datastream and Fama & French factors are from Kenneth R. French data library.

MSCI USA SRI index is based on its parent index MSCI USA. The index includes large and mid-cap stocks from US markets. The index is constructed by both exclusions and a best-in-class selection. The process starts with excluding securities involved in nuclear power, tobacco, alcohol, gambling, military weapon, civilian weapons, GMOs, thermal coal, and adult entertainment. After the exclusions, the best-in-class process is applied to the remaining securities. The index targets similar sector and region weights to its parent index to limit the systematic risk caused by the best-in-class selection. The selection aims to include companies with the highest ESG ratings to make up to 25 % of the market capitalization in each sector and region. (MSCI 2021.)

MSCI USA ESG leaders index is constructed by applying a best-in-class selection to companies in the regional (USA) index from the MSCI world index. Compared to the MSCI USA SRI index it focuses more on the best-in-class selection than exclusions. Only alcohol, gambling, tobacco, nuclear power, and weapons are excluded. Companies that are not previously part of MSCI ESG indices must have an MSCI ESG rating of “BB” or better and an MSCI ESG Controversies score of 3 or better to be included. (MSCI 2021.)

S&P 500 is widely considered to proxy for the US equity market. Thus, the index is chosen to proxy the market in this thesis as well. S&P 500 index consists of 500 big companies from US markets. To be eligible for listing the company must be listed in an exchange in the US. The constituents are selected from S&P total market index. The index is weighted by float-adjusted market capitalization. (S&P Global 2021.)

MSCI world index is used in the last part of the study to compare S&P 500 with MSCI USA SRI and MSCI USA ESG leaders. The index consists of large and mid-cap companies across 23 developed markets and covers approximately 85 % of the market capitalization in each country. As such it proxies the global developed equity market. (MSCI 2021.)

Data frequency is daily, excluding non-trading days. The index data is transformed with logarithmic transformation to present the daily change in the index value. The data starts on October 1, 2007, and ends on January 29, 2021. It is split into four different periods. The first period is the whole sample, the second financial crisis, the third corona crisis, and the fourth is the crash in the S&P 500 in the spring of 2020. The financial crisis period starts on September 15, 2008, when Lehman Brothers went bankrupt, and ends on March 9, 2009, when S&P 500 reached its low during the crisis. Corona crisis period starts on February 14, 2020, when S&P 500 crashed, and ends on January 29, 2021, when the data ends. The event study on the crash goes from February 14, 2020, until March 20, 2020.

Table 1 Descriptive statistics

	Mean	Median	STD	Skewness	Kurtosis	min	max	Obs.
S&P 500	0.00026	0.00069	0.01331	-0.548	12.822	-0.128	0.110	3357
MSCI USA SRI	0.00031	0.00060	0.01313	-0.467	12.167	-0.130	0.098	3357
MSCI USA ESG LEADERS	0.00026	0.00060	0.01336	-0.615	12.885	-0.129	0.105	3357

As can be seen from the table above all three indices are quite similar in their descriptive statistics. MSCI USA SRI has a slightly higher mean return (0.00031), but S&P 500 median is higher. MSCI USA SRI profits have the lowest standard deviation (0.01313). Interestingly it also has the lowest minimum and maximum daily change in its value. The entire period consists of 3,357 observations. The correlation between the two indices is extremely high.

5.2. Methodology

The methodology of the study follows closely the methodology used in previous studies, such as Nofsinger & Varma (2014). Performance of the indices during the different periods is measured by the capital asset pricing model and Fama & French 3 factor model. Sharpe and Traynor's ratios are also calculated for a risk-adjusted metric. As one of the main goals of the study is to find whether SRI indices offer downside risk compared to traditional indices, the second part of the study focuses on the market crash of the corona crisis in the spring of 2020. This part of the study follows the event study methodology used in Pandey & Kumari (2021).

In the first part of the study, the changes in daily values of the indices are calculated as log changes. For CAPM and Fama & French 3 factor model S&P 500 index is used as a benchmark market index, the other two indexes are regressed against S&P 500.

In the second part, the exact event window is set to start on February 14, 2020, and end on March 20, 2020. The first date was the S&P500 high before the crash and the second

was the bottom. The estimation period is 90 days before the event window starts. Once again S&P 500 is the benchmark index or the market index. The event study methodology starts with the estimation. The estimated or expected returns are calculated with a single factor OLS regression from the 90 days before the crash.

$$ER_{it} = \alpha + \beta R_{mt} \quad (9)$$

Where,
ER_{it} is the expected return
α is the intercept
β is the slope coefficient
R_{mt} is the return of the benchmark index

After the estimation, the daily abnormal returns are calculated simply as a difference between the actual return of the index and the estimated return from the OLS regression. The returns are calculated for every day in the event window separately.

$$AR_{it} = R_{it} - ER_{it} \quad (10)$$

Where,
AR_{it} is the abnormal return of the index at time t
R_{it} is the actual return of the index at time t
ER_{it} is the expected return at time t

Cumulated abnormal returns (CAR) are calculated as the sum of all daily abnormal returns during the event period. After calculating the daily abnormal returns a T-test is conducted to test the daily returns for statistical significance. If the T-test gives multiple significant outcomes the event has affected the abnormal returns.

As the literature review clearly states the results of the previous studies are mixed. It is hard to expect the results to go one way or another. However, the hypothesis is that SRI

indices will yield a positive and statistically significant alpha during market turmoil, as a small line of previous literature suggests. The same effect could persist in the event study and be seen in positive and statistically significant abnormal returns during the crash. Furthermore, Sharpe- and Traynor ratios should be higher for the SRI indices during the crisis periods, than they are for the whole sample period.

6. EMPIRICAL RESULTS

This chapter starts with the presentation of the empirical results of the thesis and continues to conclusions, ending with suggestions for further studies. The empiric results are presented in tables starting with Sharpe and Traynor ratios, going forward to CAPM, and ending with the 3-factor model and the event study. As stated earlier, risk-adjusted ratios, the CAPM, and the 3-factor model are split into different timeframes. The results are briefly interpreted after each table and a thorough analysis of the results follows when all tables have been presented.

Table 2 Sharpe ratios

	Full sample	**Financial crisis**	**Corona Crisis**
S&P 500	0.0181	-0.140	0.017
MSCI USA SRI	0.0215	-0.151	0.029
MSCI USA ESG LEADERS	0.0180	-0.143	0.016

Table 2 presents the results of Sharpe ratios to all three indices. The results are calculated for the whole sample, financial crisis, and corona crisis. Sharpe ratio represents the relation between the excess return of the index and its volatility during the timeframe. The higher the ratio the better the risk-adjusted return. In the full sample period, S&P 500 and MSCI USA ESG Leaders indices had almost the same ratio 0.0181 and 0.0180 respectively. MSCI USA SRI had a higher ratio of 0.0215 for the full sample. During the financial crisis, all the ratios were negative due to every index dropping in value. Interestingly MSCI USA SRI index had the worst Sharpe (-0.151) during the crisis. Once again S&P 500 and MSCI USA ESG Leaders had almost similar ratios. Unlike the financial crisis, during the corona crisis, all ratios are positive. Not only all ratios are positive but close to the ratios of the full sample.

Table 3 Traynor ratios

	Full sample	**Financial crisis**	**Corona Crisis**
S&P 500	0.0002	-0.0051	0.0004
MSCI USA SRI	0.0003	-0.0056	0.0006
MSCI USA ESG LEADERS	0.0002	-0.0053	0.0004

Table 3 presents the Traynor ratios to the three indices. As with Sharpe ratios, the results are calculated for the full sample, financial crisis, and corona crisis separately. Traynor ratios represent the relation between the excess return of the asset and its beta. As such it is also a measure of risk-adjusted return along with the Sharpe ratio, their difference being how the risk is observed. Much like with the Sharpe ratio, the values are positive for the full sample. S&P 500 and MSCI USA ESG Leaders have an identical ratio (0.00024), while MSCI USA SRI has a slightly higher ratio of 0.00029. During the Financial crisis, every index has a negative Traynor ratio. Like with the Sharpe ratio, MSCI USA SRI has a lower ratio (-0.00556) than the other two indices. During the corona crisis, all the ratios were positive and MSCI USA SRI had the highest ratio (0.00065)

Table 4 Capital asset pricing model

Full Sample	**α**	**β**	R^2
MSCI USA SRI	0.00005	0.974***	0.975
	(0.17239)	(<0.000001)	
MSCI USA ESG Leaders	0.00000	0.994***	0.980
	(0.97390)	(<0.000001)	
Financial Crisis			
MSCI USA SRI	-0.00043	0.933***	0.984
	(0.29485)	(<0.000001)	
MSCI USA ESG Leaders	-0.00022	0.984***	0.956
	(0.75290)	(<0.000001)	
Corona Crisis			
MSCI USA SRI	0.00026	1.011***	0.981
	(0.20156)	(<0.000001)	
MSCI USA ESG Leaders	-0.00002	1.005***	0.993
	(0.84766)	(<0.000001)	

The table presents the regression results of the Capital asset pricing model. P-values in parentheses under the results. *** = significant at 1 % level, ** = significant at 5 % level and * = significant at 10 % level. < indicates that the p-value is smaller than the number in the parentheses.

Table 4 presents the capital asset pricing model regression results. The results are calculated for both indices (MSCI USA SRI & MSCI USA ESG Leaders) for all three time periods (full sample period, financial crisis, and corona crisis) separately. S&P 500 is the benchmark index the other two indices are regressed against.

During the full sample period both indices yielded a positive, but insignificant alpha. Thus, they didn't outperform or underperform S&P 500. Both indices have a beta that is significant at the 1 % level and high $\boldsymbol{R^2}$. Betas are under, but close to 1 (0.974440 and 0.994333), which indicates that the indices follow S&P 500 closely, but experience slightly fewer movements than the market in general.

During the financial crisis, both indices have a negative, but insignificant alpha, and thus the indices did not out- or underperform S&P500 during the crisis. Betas are again highly significant at the 1 % level, but lower (0.933023 and 0.984440) than during the full sample. During the financial crisis, the indices experienced fewer movements compared to S&P500 than during the full sample. Furthermore, during the corona crisis, alphas were positive for MSCI USA SRI and negative for MSCI USA ESG Leaders. However, both are insignificant and thus the indices did not out- or underperform S&P 500. Betas were again close to 1 (1.011468 and 1.004865) and both significant at the 1 % level.

Table 5 Fama & French 3 factor model

Full Sample	**α**	**β Rmt-Rf**	**β SMB**	**β HML**	R^2
MSCI USA SRI	0.00007*	0.978***	0.023***	-0.019***	0.976
	(0.0573)	(<0.00001)	(0.00005)	(0.00003)	
MSCI ESG USA Leaders	0.00002	0.992***	0.0491***	0.0017	0.981
	(0.48282)	(<0.00001)	(<0.00001)	(0.67648)	
Financial Crisis					
MSCI USA SRI	-0.0002	0.918***	0.0627**	0.090***	0.986
	(0.543)	(<0.00001)	(0.0433)	(0.0003)	
MSCI USA ESG Leaders	-0.00008	0.988***	0.0878	0.027	0.957
	(0.908)	(<0.00001)	(0.124)	(0.542)	
Corona Crisis					
MSCI USA SRI	0.0001	1.031***	0.033	-0.094***	0.985
	(0.445)	(<0.00001)	(0.108)	(<0.00001)	
MSCI USA ESG Leaders	-0.00005	1.006***	0.026*	-0.007	0.993
	(0.699)	(<0.00001)	(0.051)	(0.355)	

The table presents the regression results of the Fama & French 3-factor model. P-values in parentheses under the results. *** = significant at 1 % level, ** = significant at 5 % level and * = significant at 10 % level. < indicates that the p-value is smaller than the number in the parentheses.

Table 5 presents the Fama & French 3-factor model regression results. Like with CAPM the results are calculated for both indices (MSCI USA SRI & MSCI USA ESG Leaders) and for all three time periods (full sample period, financial crisis, and corona crisis). S&P 500 is the benchmark index.

During the full sample period, both indices yielded a positive alpha. However, only MSRI USA SRI alpha (0.00007) was significant at the 10 % level, indicating that the MSCI USA SRI index outperformed the market index slightly during the full sample period. All the betas for both indices except for the high minus low for MSCI ESG Leaders are statistically significant at the 1 % level. Like with CAPM the beta for sensitivity to a market index is close (0.97759 and 0.99243, respectively), but under 1 for both indices, indicating that the indices have followed the market index closely.

During the financial crisis, both indices yielded a negative, but insignificant alpha and thus did not out- or underperform the market. All the betas for MSCI USA SRI are positive and significant at 1 % or 5 % levels. As with CAPM beta of sensitivity to the market is lower during the crisis than during the whole sample. Indicating that MSCI USA SRI follows the market index less during this period than it normally does. MSCI USA ESG Leaders beta of sensitivity to market is significant at the 1 % level, while the other two factors are insignificant.

For the latest period, the corona crisis MSCI USA SRI has a positive alpha and MSCI USA ESG Leaders has a small negative alpha, but both are insignificant. Indicating that there is no out- or underperformance compared to the market index. Alike with CAPM, the betas to the sensitivity to market are highly significant at 1 % level and interestingly also higher for the corona crisis than the two other periods.

The last part of the empiric study focuses on the crash of 2020 at the start of the corona crisis. An event study is conducted to look for abnormal returns in the MSCI USA SRI index and MSCI USA ESG leaders index.

Table 6 MSCI USA SRI Abnormal returns

day	Return	Abnormal return	T-value	Car
0	0.50 %	0.29 %	0.85	0.29 %
1	0.04 %	0.30 %	0.86	0.59 %
2	0.55 %	0.07 %	0.20	0.66 %
3	-0.37 %	-0.03 %	-0.07	0.63 %
4	-1.12 %	-0.11 %	-0.32	0.52 %
5	-3.37 %	-0.06 %	-0.16	0.46 %
6	-2.71 %	0.27 %	0.78	0.73 %
7	-0.25 %	0.10 %	0.28	0.83 %
8	-4.87 %	-0.48 %	-1.38	0.35 %
9	-0.78 %	0.01 %	0.02	0.36 %
10	4.69 %	0.26 %	0.77	0.63 %
11	-2.62 %	0.14 %	0.41	0.77 %
12	4.11 %	0.04 %	0.12	0.81 %
13	-3.23 %	0.12 %	0.34	0.93 %
14	-1.93 %	-0.27 %	-0.79	0.65 %
15	-8.15 %	-0.44 %	-1.29	0.21 %
16	4.96 %	0.22 %	0.63	0.43 %
17	-4.95 %	-0.07 %	-0.21	0.35 %
18	-9.93 %	-0.18 %	-0.51	0.18 %
19	9.19 %	0.48 %	1.39	0.66 %
20	-12.97 %	-0.50 %	-1.46	0.15 %
21	6.70 %	0.98 %	**2.84*** **	1.13 %
22	-5.27 %	-0.09 %	-0.26	1.04 %
23	0.91 %	0.43 %	1.23	1.47 %
24	-4.95 %	-0.64 %	**-1.85***	0.83 %

The table presents the results of the event study on the MSCI USA SRI index. Asterisks present the significance of the abnormal returns. *** = significant at 1 % level, ** = significant at 5 % level and * = significant at 10 % level.

Table 6 presents the results of the event study for MSCI USA SRI during the 24-day crash, starting on February 14, 2020. As S&P 500 index dropped heavily during the event window, expected returns are mostly negative. OLS regression beta for MSCI USA SRI from the estimation period is 0.978247087 and alpha 0.000251242. The expected returns vary from -12.4624 % to 8.7128 %. S&P 500 was experiencing heavy daily movements during the crash, but the movements were not only negative.

The daily abnormal returns vary from -0.6385 % to 0.9814 %. Out of 24 days, 14 daily abnormal returns are positive and 10 are negative. Generally, the daily abnormal returns are not far from 0, which can be seen from the relatively low corresponding T-values. MSCI USA SRI yields 0.8284 % of positive cumulative abnormal returns during the crash. However, only one day out of 24 these abnormal returns are statistically significant at the 1 % level. On day 24 the return is significant at the 10 % level, but it is negative.

Positive CAR would indicate that MSCI USA SRI did better than S&P 500 during the market crash, but since only one of the 24 abnormal returns is positive and statistically significant the CAR does not prove the outperformance.

Table 7 MSCI USA ESG Leaders Abnormal returns

day	Expected return	Abnormal return	T-value	Car
0	0.39 %	0.19 %	0.95	0.19 %
1	-0.21 %	0.06 %	0.31	0.26 %
2	0.50 %	0.03 %	0.16	0.29 %
3	-0.27 %	0.08 %	0.40	0.37 %
4	-1.04 %	-0.03 %	-0.16	0.34 %
5	-3.32 %	-0.04 %	-0.21	0.30 %
6	-2.90 %	0.05 %	0.25	0.35 %
7	-0.49 %	-0.14 %	-0.67	0.21 %
8	-4.64 %	-0.29 %	-1.41	-0.08 %
9	-0.76 %	0.02 %	0.11	-0.05 %
10	4.43 %	0.07 %	0.32	0.01 %
11	-2.76 %	-0.02 %	-0.12	-0.01 %
12	4.05 %	0.04 %	0.22	0.03 %
13	-3.37 %	-0.05 %	-0.24	-0.02 %
14	-1.80 %	-0.15 %	-0.75	-0.17 %
15	-8.08 %	-0.47 %	**-2.29****	-0.64 %
16	4.77 %	0.10 %	0.48	-0.54 %
17	-5.07 %	-0.25 %	-1.21	-0.79 %
18	-9.81 %	-0.17 %	-0.85	-0.96 %
19	8.65 %	0.06 %	0.32	-0.89 %
20	-12.92 %	-0.61 %	**-3.00*****	-1.50 %
21	5.78 %	0.15 %	0.72	-1.36 %
22	-5.55 %	-0.43 %	**-2.11****	-1.78 %
23	0.64 %	0.17 %	0.84	-1.61 %
24	-4.50 %	-0.23 %	-1.14	-1.84 %

The table presents the results of the event study on the MSCI USA ESG leader's index. Asterisks present the significance of the abnormal returns. *** = significant at 1 % level, ** = significant at 5 % level and * = significant at 10 % level.

Table 7 presents the results of the event study for MSCI USA ESG Leaders during the crash of 2020. OLS regression beta used in the estimation of expected returns for MSCI USA ESG Leaders is 0.965741121 and alpha 0.000133724. Both are obtained from the 90-day estimation period before the crash, similarly to the previous table. The expected returns vary from -12.3145 % to 8.5900 % As the beta is close to one the expected returns are also close to the actual S&P 500 returns.

The abnormal returns vary from -0.6104 % to 0.1939 %. Likewise, with MSCI SRI USA, the daily abnormal returns are generally not far from 0, which can be seen from the T-values. Out of 24 daily abnormal returns, 12 are positive and 12 negative. However, MSCI USA ESG Leaders has only one daily abnormal return that is significant at the 1 % level (-0.6104 %) and two that are significant at the 5 % level (-0.4659 % and -0.4281 %). All three are negative. MSCI USA ESG Leaders also has a negative cumulative abnormal return of -1.8438 % during the crash.

Negative cumulative abnormal return and the statistically significant daily negative abnormal returns indicate that the MSCI USA ESG Leaders index underperformed S&P 500 during the crash. However, only three out of 24 abnormal returns are statistically significant, so the results are not straightforward.

To conclude, MSCI USA SRI has a higher Sharpe- and Traynor ratio during the full sample and corona crisis, however, it has a lower ratio during the financial crisis than the two other indices. According to these ratios, it yielded more reward compared to its riskiness than S&P 500, except during the financial crisis. The same cannot be said about the MSCI USA ESG Leaders index, which has almost similar ratios to S&P 500 during all periods. The capital asset pricing model has highly significant betas, but alphas are not statistically significant for either index on any of the three periods. Thus, according to CAPM the indices did not out- or underperform S&P 500. According to Fama & French 3-factor model, MSCI USA SRI has a small positive significant alpha for the whole sample, but the rest of the alphas for both indices are insignificant, confirming the results from CAPM.

Betas, however, are again highly significant at the 1 % level and close to one, indicating that the market index influences both indices heavily. Both models had high $\boldsymbol{R^2}$, thus they explained the variation in the indices well.

The event study has a positive CAR for MSCI USA SRI, but the daily positive abnormal returns are insignificant except for one day. MSCI USA ESG Leaders on the contrary have a negative CAR with three negative significant abnormal returns. Indicating that the index did worse compared to S&P 500 during the crash than it normally does. However, with few significant abnormal returns, the conclusions are not solid.

7. CONCLUSIONS

While the history of socially responsible investing goes as far as the 18th century, it has experienced rapid growth in the last few decades. The growth has been influenced by cultural changes and the popularity of related issues, such as climate change, health, and ethical issues. Due to the growth of SRI, research on the topic has also increased vastly. The focus of this thesis is to find whether socially responsible indices have outperformed their traditional counterparts, especially during times of crisis. The topic was influenced by the coronavirus pandemic, which offered a new, unique setting to research the matter. This chapter discusses how the empiric results of the thesis align with previous literature, what conclusions can be drawn from them and where to look in the future.

As discussed in the literature review the connection between socially responsible investing and financial performance remains unclear. Some studies find a positive correlation, negative correlation, and studies that do not find a difference. Some studies have distinguished a positive connection during times of crisis, while others have not. The hypotheses of this study were split into three. First, whether SRI indices outperformed their traditional counterparts during the full sample period from 1.10.2007 until 29.1.2021, second whether they outperformed during the financial crisis, and third, similarly during covid-19. The first hypothesis is focused on overall performance, while the second and third are on the performance during times of crisis.

The empiric testing of the study consisted of a capital asset pricing model, Fama & French 3-factor model, and an event study. The models were conducted on the MSCI USA SRI index and MSCI USA ESG Leaders index. S&P 500 was used as a benchmark index for both indices.

The capital asset pricing model didn't yield statistically significant alphas for any period. The 3-factor model yielded a small and significant alpha only for the whole sample period. The crisis periods had both insignificant alphas. Furthermore, the event study

yielded mixed results. Most of the abnormal returns were statistically insignificant, while the MSCI USA ESG Leaders index had few statistically significant, but negative abnormal returns.

Overall, the empiric results of the thesis were mixed. None of the zero hypotheses can be declined and according to the models, socially responsible indices did not differ statistically from S&P 500 in the long run, during financial crisis or corona crisis. This goes in line with studies from Mollet & Ziegler 2014, Auer & Schuhmacher 2016, Statman 2000 and Schröder 2004.

Reasons behind the mixed results can be hypothesized. First, socially responsible investments may simply not outperform the markets, even during times of crisis. The hype around socially responsible investing might be driven completely by a social phenomenon and have nothing to do with superior financial performance. Second, researching indices has its downsides. As the empiric part clearly shows both researched indices are extremely closely following S&P 500 and are highly correlated with it. This can be seen from the CAPM betas and market betas from Fama & French 3-factor model that are all close to 1 and all significant at the 1 % level. The fact that SRI indices are excluding some companies simply does not make them different enough from S&P 500 to make a statistical difference in performance. Third, the Covid-19 crisis never turned into a large-scale financial crisis. The crash in the spring of 2020 turned around quickly mostly due to the money the Federal Reserve and central banks are pushing out to the markets. As the downturn was short, it can be argued that a proper crisis was averted, thus making the possible downside protection of the socially responsible investments irrelevant outside the short crash.

For practitioners in finance, this thesis implies that the performance of socially responsible indices and traditional indices aren’t too different. If an investor seeks for example downside protection by investing in SRI assets, investing in an index that’s composition is mostly familiar to its parent index will not cut it, and one should look for other options.

Even though the superior financial performance of socially responsible investments remains unproven and unclear, the interest in the phenomenon does not seem to decline. The crash of covid-19 offers a unique setting to research the downside risk and a similar study could be conducted with mutual funds or SRI portfolios. SRI research has also focused on the western world and stocks. As the field keeps growing, more research could be conducted on emerging markets and fixed income SRI assets. More research could also be conducted on the motivation behind socially responsible investing to better understand what drives the phenomenon. An interesting topic would also be to research the socially responsible indices themselves, whether they f are more responsible than their counterparts since - as stated earlier - they are similar in composition and follow the market index closely.

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