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Bachelor's thesis, Business Administration

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**Performance of socially responsible mutual funds in the United States in
2010–2020**

Vastuullisten sijoitusrahastojen menestyminen Yhdysvalloissa 2010–2020

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TIIVISTELMÄ

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Tämän tutkielman tavoitteena on tutkia sosiaalisesti vastuullisten (SRI) sijoitusrahastojen suoriutumista Yhdysvaltojen markkinoilla aikavälillä 2010–2020. Tutkielman tavoitteena on myös tutkia kuinka markkinasuhdanteet vaikuttavat SRI rahastojen menestymiseen.

Tutkimuksessa tarkastellaan 12:ta yhdysvaltalaista sosiaalisesti vastuullisesti toimivaa sijoitusrahastoa. Valitut rahastot sijoittavat suurimman osan varoistaan yhdysvaltalaisiin osakkeisiin. Sosiaalisesti vastuulliset rahastot huomioivat sijoituspäätöksissään ympäristöön, sosiaaliseen vastuullisuuteen ja hyvään hallintatapaan liittyviä tekijöitä. Rahastojen tuottoja vertaillaan S&P 500 Indeksiin. Menestyksen mittareiksi valikoituivat Jensenin alfa, Sharpen luku ja Treynorin luku. Rahastojen menestystä tutkittiin myös periodikohtaisella tasolla jakamalla tarkasteluperiodi lasku- ja nousukausiin. Tutkimus suoritettiin kvantitatiivisena tutkimuksena.

Tutkimustulokset osoittavat, että valitut vastuulliset sijoitusrahastot suoriutuivat pääosin heikommin, kuin markkinaindeksi vuosina 2010–2020. Vain kaksi rahastoa suoriutui tarkasteluperiodilla markkinaindeksiä paremmin. Vastuulliset rahastot näyttävät suoriutuvan hieman paremmin nousukausina, kuin laskukausina. Vastuulliset rahastot näyttävät myös suoriutuvan hieman markkinaindeksiä paremmin vahvojen nousu- ja laskukausien aikaan.

ABSTRACT

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The aim of this thesis is to examine the performance of socially responsible mutual funds in the United States over the period of 2010 to 2020. The study also aims to study how the stages of the business cycle affect the performance of SRI funds.

The study examined 12 SRI mutual funds marketed in the United States. The chosen funds hold most of their assets in U.S. equities. SRI funds consider environmental, social, and governmental issues in investment decision making. The performance of the SRI funds is compared to the S&P 500 Index. Performance indicators used in this study were Jensen's alpha, Sharpe ratio and Treynor ratio. To study the performance in different phases of the business cycle, the research period was divided into economic downturn and growth periods. The study was conducted by quantitative research.

The results of the study indicate that SRI funds tend to underperform the market index in the period of 2010 to 2020. Only two of the studied funds were able outperform the market index on all performance indicators. Socially responsible funds seem to be performing slightly better during growth periods than downturn periods. SRI funds also seem to perform slightly better than the market index during strong downturn and growth periods.

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1. INTRODUCTION

Socially responsible investment (SRI) has been growing rapidly over the past decades. The SRI market is expected to grow and expand worldwide in the future. (Ito, Managi & Matsuda 2013, Renneboog, Ter Horst & Zhang 2008) SRI is a term used to describe investment strategies that consider environmental, social, and ethical criteria in decision making. Issues such as global warming, the Kyoto Protocol and corporate governance have been gaining significant attention by governments and investors, thus increasing the interest in SRI. (Renneboog et al. 2008) The main goal of this study is to examine the performance of SRI mutual funds in the United States.

People are becoming increasingly more concerned about social and environmental issues such as human rights, environmental degradation, pollution, and exploitation of workers. These concerns are widely talked about in media, politics, and scientific setting. Socially responsible investing is a result of these concerns. (Moskowitz & Milton 1997) The United States forum for sustainable and responsible investment states in their annual report, that “investors are considering environmental, social and governance (ESG) factors across \$17 trillion of professionally managed assets.” (US SIF 2020) The growth of socially responsible investing is a result of multiple different factors. One of the fueling forces of this growth is the availability of information which has caused investors to be more educated than ever before. (Schueth 2003)

The economy faced great challenges during 2020 due to the Covid-19 pandemic. The markets experienced extreme volatility and faced the largest recession since the Great Recession. Reports by Morgan Stanley Institute (2021) and Morningstar (2021) state that socially responsible funds and bonds outperformed traditional funds during the turbulent year of 2020. These findings suggest that investing in SRI funds may prove to be more reliable in times of turmoil than investing in conventional funds.

Socially responsible mutual funds have been studied widely but many questions are still left unanswered. SRI mutual funds deviate from the markets and the portfolio theory, which raises the question why investors hold SRI mutual funds. SRI mutual funds

may exclude potentially higher-return companies if they do not meet the screening criteria. Research has found that social preferences, social signaling and financial motivation are the most significant factors determining the likelihood of holding SRI mutual funds. (Riedl & Smeets 2017) This study focuses on socially responsible mutual funds because SRI is expected to grow in the coming years because of the ever-growing concern for climate change and other social issues.

1.1. Research objectives and methods

As stated previously the main goal of this thesis is to find out how socially responsible mutual funds have performed in the United States during 2010-2020. The study focuses on the United States because socially responsible investing originates from Europe and North America (Lean, Ang & Smyth 2015). Lean et al. (2015) also found in their research that North American SRI funds outperformed European funds, which is why the United States was chosen as the studied region. The main research question of this study is:

1. *How are socially responsible mutual funds performing in the United States?*

To answer the main question of the study additional sub-questions were answered. This study aims to also find out how SRI mutual funds have performed over the business cycle. While SRI performance has been studied extensively, the effect of business cycle on financial performance has been studied in fewer occasions. Studies have found that SRI funds have performed better during the Covid19 crisis than conventional funds, which partly affected the chosen time period. The sub-questions of this study are:

1. *How have the selected SRI mutual funds performed compared to market portfolio?*
2. *How does the performance of SRI mutual funds vary over the business cycle?*

The study was conducted by quantitative research methods. To answer the research questions 12 SRI mutual funds were studied based on three risk-adjusted performance indicators: Sharpe ratio, Treynor ratio and Jensen's alpha. The average annualized

returns and annualized volatilities are also examined. The chosen time period was divided into economic downturn and growth periods to answer the second sub-question.

1.2. Limitations of the study and theoretical framework

To conduct this study, the pool of funds was limited by setting specific limitations to make the results more comparable. The study was limited to mutual funds marketed in the United States. The study was limited to one region so that the study could focus on creating an encompassing picture of the chosen market. The funds were chosen by the following criteria: the funds must be marketed in the United States, they must have been founded before the year 2010 and over 90 % of all investments must be equity securities. The pool of funds was limited further by only choosing equity funds that hold most of their investments in U.S. equities. The study focuses on mutual funds because they are the largest individual investment type that incorporate ESG factors. (US SIF 2020) The research focuses on the period of 2010 to 2020. This period was chosen as in 2020 the economy faced the worst downturn since the financial crisis in 2008 due to the Covid-19 pandemic. The period was thus deemed appropriate since the study aims to examine how downturns and expansions of the economy affect performance of SRI funds. Data on SRI funds from the US SIF forum were used when choosing the funds for this study. The data will be gathered from Datastream.

The theoretical framework of a study creates the background for the study and gives the reader an idea about the nature of the study. The concept of socially responsible investing and SRI strategies will be introduced first. The theoretical framework of this study consists mainly of previous research on SRI performance and financial theories such as portfolio theory and Capital Asset Pricing Model (CAP-model). Portfolio theory is significant for the study, as it contradicts the view that SRI funds could be profitable for investors. An overview of the chosen performance indicators, Sharpe ratio, Treynor ratio and Jensen's alpha, will also be included in the thesis.

1.3. Structure of the thesis

After the introduction, this thesis will proceed to introduce the subject and create the background of the study. The second part of the thesis will concentrate on socially responsible investing and its strategies. A brief overview of the history of responsible investing will also be provided to create a comprehensive picture of SRI in the United States. In the third part the thesis proceeds to examine the theoretical framework of the study. The study will take a closer look at financial theories such as portfolio theory and CAP model to lay the groundwork of the study. After that previous studies will be examined to create a framework for this thesis. In the fourth part of the thesis the materials used will be introduced. This part contains details on the chosen mutual funds as well as the methods used in the study. The fifth section contains results and analysis of the results. After the results, a summary and conclusions of the study will be presented.

2. SOCIALLY RESPONSIBLE INVESTING

Socially responsible investing is a widely used term, but it is not very precise, as multiple other terms exist, that are used in the same context. Terms such as sustainable investing, ethical investing, green investing, screened investing, and social investing are also used as synonyms for SRI. In the United States the most widely used term is the abbreviation SRI, which is why it will be used in this study. (Kurtz 2005) In this study the term SRI is used for an investment strategy that considers the social, environmental, and ethical aspects of possible investments when making investment decisions. This chapter concentrates on socially responsible investing and its strategies. The chapter also gives insight on SRI in the United States to create the background for the study.

The origins of socially responsible investing can be traced back to as far as the 1700s. However, the starting point of modern SRI investing can be found from the 1960s political climate. Issues such as anti-Vietnam war, civil rights, concerns about cold war and equality for women helped to escalate the interest in social responsibility. During the 1970s and 80s the amount of socially responsible investors rose rapidly. Incidents in the 80s such as Bhopal disaster, Chernobyl nuclear accident and Exxon oil spill resulted in increased attention to the wellbeing of the environment which in turn raised interest in SRI. The final push that solidified the standing of socially responsible investing in the end of the 20th century was the vast amount of information on global warming and ozone depletion and the environment concerns they caused. (Schueth 2003)

SRI investors often fall into two groups, the first one being investors who want to invest in a manner that aligns with their personal values and morals. They are sometimes referred to as “feel good” investors, as their decisions are based on what feels right for them. The other group feels that they must invest in a way that improves and supports the quality of life. They are usually very interested in making a change in the society and the environment. (Schueth 2003)

The modern socially responsible investing phenomenon has resulted from demand for social and political change over the past few decades. (Robinson 2019) The growth of

socially responsible investing is also partly explained by the fact that nowadays investors are more educated than before, and information is easily available for anyone at any time. Better informed investors tend to make more socially responsible decisions in their investments. (Schueth 2003)

2.1. SRI strategies

There are multiple strategies in socially responsible investing. The United States Forum for Sustainable and Responsible Investment (US SIF) states that sustainable investors have traditionally focused on two broad categories: ESG incorporation and shareholder activism. (US SIF 2021) Most SRI mutual funds have curated their own set of social responsibility factors from the following strategies. Figure 1 outlines the strategies used in socially responsible investing.

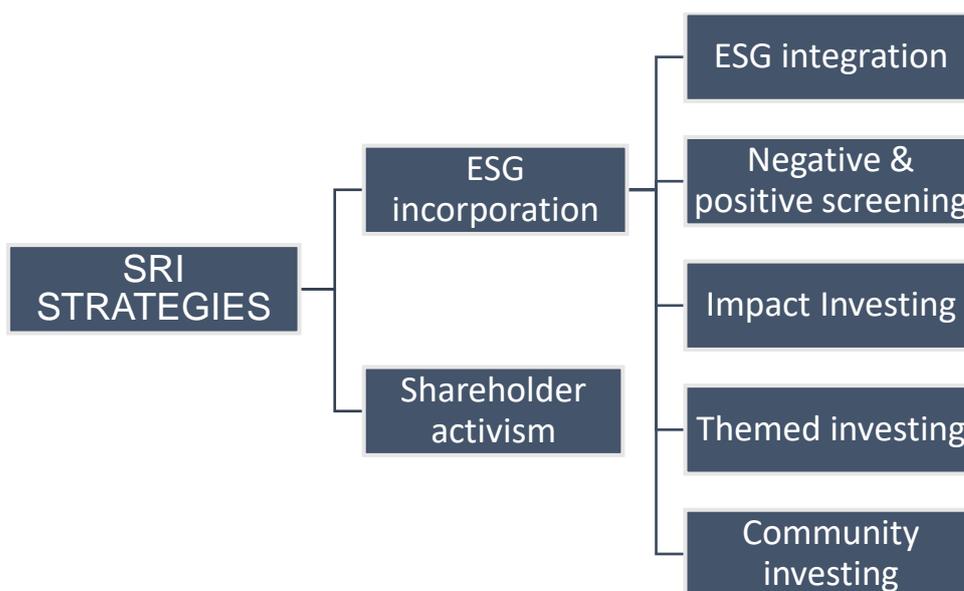


Figure 1. SRI strategies (US SIF 2021)

2.1.1. ESG incorporation

ESG incorporation means that environmental, social and governance criteria are considered in different ways when making investment decisions. ESG incorporation consists of strategies such as positive and negative screening, ESG integration, impact investing, sustainability themed investing and community investing. (US SIF 2021)

ESG integration is the practice of integrating environmental, social and governance criteria in decision making. The practice consists of analyzing and assessing information around ESG criteria. ESG integration does not directly exclude or include prospective investments from the portfolio. (van Duuren, Plantinga & Scholtens 2016) US SIF Foundation's report on US Sustainable and Impact Investing Trends 2020 found that 74% of sustainable investors use ESG integration strategy in their investment decisions. The report states that it was the most used SRI strategy, closely followed by negative screening. (US SIF 2020)

Negative screening is one of the oldest and most used SRI strategies. The US SIF Foundations report found that 69 % of sustainable investors use negative screening as a strategy in their investments. (US SIF 2020) The main function of this strategy is to exclude certain stocks or industries from the investment portfolio. This screening is based on social, environmental, and ethical criteria. Alcohol, tobacco, gambling, and defence industries are typical examples of stocks that may be excluded from a portfolio in negative screening. Issues such as violation of human rights, animal testing and unsustainable production methods are also often considered when screening. After the screening, the portfolio is created. Some SRI funds have set a specific financial threshold that the funds must meet in chosen ethical sectors or they will be screened out of the pool of funds. Suppliers and company branches may also be considered by when negative screens are set in place.(Renneboog et al. 2008)

Positive screening on the other hand screens firms from the opposite perspective. In this strategy only firms that have surpassed specific ESG and CSR (corporate social responsibility) standards are chosen for the portfolio. Positive screens typically include corporate governance, labour relations, the environment, sustainability of investments and the stimulation of cultural diversity. Firms that have invested on issues such as renewable energy usage and community involvement are also often selected in positive screening. (Renneboog et al. 2008)

Impact investing is defined as investments that are targeted on generating positive social and environmental change while generating financial returns. The impact investment market has been growing as SRI has gained more attention. Impact investing addresses challenges in multiple sectors such as renewable energy, conservation, sustainable agriculture as well as affordable and accessible services. (GIIN 2021) However investments that have socially or environmentally positive outcomes (e.g., health, education, and clean energy), but which have been made purely to gain financial profit do not meet the intentionality criteria. Claiming these investments to be impact investing without the proper intentionality has been called green washing of investments. (Barber, Morse & Yasuda 2021)

Themed investing focuses investments on funds that have been curated based on specific themes. According to The European Sustainable Investment Forum (Eurosif) (2021) thematic funds are often focused on specific or multiple issues related to ESG. ESG analysis or screen of investments must be conducted to check whether a specific fund is eligible for this approach of SRI. (Eurosif 2021) Methling and von Nitzsch (2019) created a tri-criterion optimization model for portfolios that considers thematic interest as the third criteria alongside of risk and return. They state that modifications on portfolio optimization must be created to meet the investors' changing preferences. They also predict that themed investing will become more frequent in the near future. (Methling & von Nitzsch 2019)

Community investing is way for investors to allocate their capital on people in low-income and at-risk communities. These people often face difficulties in accessing capital and essential services through conventional means. According to Schueth (2003) a considerable portion of SRI investors allocate a portion of their investments on community investments. These investments include financial institutions that for example provide housing for low-income population or grant financing to small businesses in communities that are facing social and economic disadvantages. (Schueth 2003)

2.1.2. Shareholder activism

Whereas ESG incorporation concentrates on investment decisions and portfolio management, shareholder activism is concentrated on shareholders and their power. According to Guay, Doh and Sinclair (2004) shareholder activism is a “mix of SRI, corporate governance and stakeholder capitalism.” Shareholder activism is one of the most used factors determining social responsibility in the funds chosen for this study.

Shareholder activism takes place when shareholders use the influence and voting rights granted by their equity positions. Shareholder activism can be used to call out for increased transparency, better reporting, or policy changes. Investors with social concerns voice their opinions to influence current policies in the company to create better and more responsible corporate structures and practices. Social shareholder activism tends to focus mainly on environmental and social issues. Shareholders who are driven solely on financial motivations may take similar actions, but they do not fall under social shareholder activism. (King & Gish 2015) When evaluating SRI strategies, it is important to take into consideration the motives behind the actions, as they are the main issue in socially responsible investing.

2.2. SRI in the United States

The Social Investment Forum stated in their Report on Socially Responsible Investing Trends in 1999 that there was nearly 2,2 trillion dollars under professional management in the United States that fell under SRI strategies. Fast forward to the current day this number has grown massively: in 2020 the US SIF forum reported over 17 trillion dollars under professionally managed assets. (US SIF 2020) According to Schueth (2003) the social investment industry grew twice as fast as the overall markets in the period of 1995 to 1999.

Socially responsible investing has recently gained attention specifically in the United States due to school shootings and issues in working conditions in the factories that produce food and goods for U.S. consumption in developing countries. (Schueth 2003) The US SIF (2020) annual report states the most used ESG criteria by institutional

investors and money managers are climate change and carbon emissions, conflict risk, anti-corruption, board issues, sustainable natural resources, and executive pay. Money managers and institutional investors tend to incorporate ESG factors quite evenly across environmental, social, and governmental categories. The largest individual issue considered has been climate change for multiple years. (US SIF 2020)

Forbes released an article in December 2020 predicting that socially responsible investing is likely to gain even more momentum in the coming years because of the U.S. presidential election of 2020. There were concerns in 2016 that the election of President Trump would end up hurting the SRI markets due to the administration enacting barriers and regulations. However, these concerns were not realized as growth in SRI ended up being bigger in the past four years than it was in the previous 12 years. The election of President Biden is expected to make this growth even bigger as the administration has intentions to focus on social issues. The administration has for example communicated that they intend to require public companies to disclose more emissions data and climate change -related financial information. (Bisnoff 2020)

3. THEORETICAL FRAMEWORK

This chapter presents the theoretical framework of the study. The theoretical framework of this study is based on previous research on socially responsible investments and mutual funds. The previous research is mainly focused on the performance of SRI mutual funds. Financial theories such as portfolio theory and Capital Asset Pricing-model will provide a framework for the study. The theories will be considered from the point-of-view of socially responsible investments. The focus of this chapter is on previous research on SRI funds and their performance.

3.1. Previous studies on SRI mutual fund performance

Previous research has been unable to reach a consensus on the performance of SRI mutual funds. Previous studies on social and financial performance of SRI funds have resulted in mixed results, with some studies suggesting that SRI funds perform as well as unscreened funds, some saying they perform better and some showing they perform worse. (Barnett & Salomon 2006)

Moskowitz (1972) was one of the first researchers to propose that socially responsible investments could be profitable for investors. He suggested that companies should take social issues into consideration to succeed in the long run (Moskowitz 1972). Earlier ideas on portfolio performance were largely based on the modern portfolio theory that suggests that the investment pool should not be limited for any reason. Moskowitz was an important contributor for SRI research and today The Moskowitz price is awarded yearly for outstanding research made on sustainable and responsible investing (Northwestern Kellogg 2021).

Researchers have found that European and North American SRI outperformed the market benchmark. (Ito et al. 2013, Lean et al. 2015) However according to Barnett and Salomon (2006) critics have argued that some SRI funds have sacrificed the social performance of funds in order to increase their financial performance.

Paul (2017) studied the effect of the business cycle on SRI fund performance. The study was conducted by creating a “fund of funds” of 10 SRI funds in the United States and examining their performance over the period of 1991-2009. The results of the study support the hypothesis that SRI funds perform as well as conventional funds. However, the study found that SRI mutual funds tend to perform slightly better in economical contractions. The results also suggest that SRI funds carry smaller risk than conventional funds. The results challenge the SRI critics as their criticism is based on the portfolio theory which argues that adding screening makes the portfolio riskier. (Paul 2017)

Hamilton, Jo and Statman (Hamilton, Jo et al. 1993) studied SRI fund performance and found that ESG factors do not have a significant effect on the profits. Statman (2000) continued studying SRI and conducted a study on The Domini Social Index, SRI mutual funds and the S&P 500 Index. The Domini Social Index (DSI) is comprised of stocks of socially responsible companies that was modeled on the S&P 500 Index in 1990. The study found that the DSI performed as well as the S&P 500 Index. The mutual funds chosen for the study performed slightly better than the S&P 500 Index, but the difference was not significant. (Statman 2000)

Statman and Glushkov (Statman & Glushkov 2009) formed three hypotheses on SRI fund performance: *Doing Good but Not Well*, *Doing Good While Doing Well* and *No Effect*. The first hypothesis states that the expected returns of SRI stocks are lower than the expected returns of conventional stocks. Statman and Glushkov state that this may be the case if the benefits of socially responsible action are lower than their costs and investors are aware of this. In the second hypothesis the expected returns of SRI stocks are higher than the returns of conventional stocks. The hypothesis may come true if managers and investors are underestimating the benefits of socially responsible actions or are overestimating the costs. The third hypothesis on the other hand states that there is no considerable difference between the expected returns of SRI stocks and conventional stocks. This hypothesis may come true if socially responsible actions of a company have no cost or if the benefits of actions are equal to the costs. Statman and Glushkov’s study found that SRI stocks performed better than conventional stocks

in the period 1992-2007. The results of the study support the “doing good while doing well” hypothesis. (Statman & Glushkov 2009)

Revelli and Viviani (2015) found in their meta-analysis, that there is no considerable cost or benefit in SRI. Their meta-analysis consisted of 85 studies and 190 experiments on SRI fund performance to examine whether including socially responsible criteria to portfolio management can create financial gain. The data was collected from all over the world in the period 1972-2012. The study also considered different dimensions of socially responsible investing, such as financial performance measures, markets, thematic approaches, and journal impact. The results of the study showed that there was no relationship between performance and ESG criteria. However, they suggest that the focus in SRI debate should be in real extra-financial gain of SRI. (Revelli & Viviani 2015) The results of Revelli and Viviani challenge the idea that adding more screens to portfolio management decreases the performance as suggested by Markowitz's portfolio theory.

Barnett and Salomon (2006) studied how financial and social performance link within SRI mutual funds and how this heterogeneity affects the results. Barnett and Salomon's research considered how social and financial performance correlates *within* SRI funds to bring some clarity to the previous mixed results. The results showed a curvilinear relationship between profits and number of social screens in socially responsible funds. The study shows that highest profits can be achieved at the lowest and highest levels of social responsibility. The profits hit their lowest points at the mid-point of social responsibility. (Barnett & Salomon 2006) The study suggests that as more screens are applied the better investments are chosen for the portfolio. The study also suggests that previous research results may be mixed because of fund maturity and the number of screens used.

Renneboog et al. (2008) found that SRI funds in the United States underperform the market benchmark portfolios. The study included the majority of SRI funds over the world. (Renneboog, Horst & Zhang 2007) Jones et al. (Jones, Laan, Frost & Loftus 2008) studied 89 SRI funds in Australia and found similar results: SRI funds significantly under-perform the market. They criticized previous research SRI performance

as they feel that the studies have methodological problems such as small sample sizes and inconsistent time frames. Trinks and Scholtens (2017) found in their study that negative screening of the investment universe may reduce financial performance. They also state that investing in stocks that would not pass socially responsible criteria can generate additional risk-adjusted returns (Trinks & Scholtens 2017).

3.2. Modern portfolio theory

Modern portfolio theory is a mathematical framework for compiling a portfolio first introduced by Harry Markowitz (1952). The purpose of the theory is to maximise expected returns for a given level of risk, to make the portfolio as profitable as possible. According to Markowitz it is possible to reduce the risk of a portfolio through diversification. The risk in a diversified portfolio can be lower than the risk of holding any individual stock in the portfolio. Diversification can be achieved by incorporating different types of assets, diversifying geographically and industrially. The less correlated the investments are the smaller is the level of risk the portfolio carries. Markowitz (Markowitz 1952) also found that a portfolio's level of risk and expected returns are at an optimum when the portfolio is at the efficient frontier.

According to Kurtz (2005) many of the critics of SRI base their criticism on the portfolio theory. They argue that restricting the investment universe for any reason will lead to a suboptimal portfolio that will not be able to maximise profits. However, these arguments have been challenged as socially responsible benchmarks have been able to compete in performance with conventional benchmarks. (Kurtz 2005) Studies have found that SRI mutual funds can outperform conventional funds or there is no significant difference between the performance between funds, which challenges the conclusions of portfolio theory.

Gasser (2017) created a modification of the original portfolio theory model which allows investors to incorporate social responsibility measures in the model. The results of the study found that incorporating social responsibility limits to investment decisions did reduce the financial gains of investors but resulted in higher social responsibility ratings. (Gasser 2017)

3.3. Capital Asset Pricing Model

Capital Asset Pricing model (CAPM) was developed by William Sharpe, John Lintner and Jan Moss in the 1960s. The CAPM is based on Markowitz's portfolio theory. CAPM is used to describe the relationship between expected returns and the risk of the investment. The model looks to maximize the return of every share in the portfolio. The model is widely used to calculate the risk and return of investments. The model considers systematic risk and unsystematic risk of an investment. (Población García 2017)

The CAP-model is significant for the study, as Jensen's alpha was chosen as a performance indicator for the study. Jensen's alpha represents the average returns of a chosen portfolio compared to the prediction of the CAP-model. The beta used in these performance indicators reflects the systematic risk of the investment. The beta is also known as the risk premium of the investment. (Vishwanath 2009)

4. RESEARCH METHODS AND DATA

This chapter goes through data gathering methods and limitations of the study. The chapter also introduces the research methods used in the study. The study was conducted by quantitative research. To conduct this research 12 SRI mutual funds are examined during the period of 1.1.2010 to 31.12.2020. The mutual funds were chosen based on information on the US SIF forum and Morningstar. Logarithmic daily returns were used to conduct the empirical tests. The values of the funds are dividend adjusted. The study does not consider possible fees associated with fund ownership such as subscription and redemption fees. The data on the SRI funds and market index were gathered from Datastream.

4.1. SRI mutual funds

Twelve SRI funds were chosen to conduct this study. The SRI funds were selected using multiple different criteria. The chosen funds had to be socially responsible funds marketed in the United States. All the funds invest over 90% of their assets to equities. The funds were limited further by region by only choosing funds with over 90% of investments directed to U.S. equities. These limitations were used to keep the focus in the United States, as previous research has found that SRI funds in the US perform better than the funds in Europe (Lean et al. 2015). Balanced funds and bonds were excluded from the study to make the results more comparable.

Information from the US SIF forum and Morningstar were used in determining which funds were selected from the pool of SRI funds. The portfolio contains funds of different types and sizes to diversify the portfolio. The funds use an array of different screening methods to reach their socially responsible standards. The most frequently used screens in this pool of funds were negative screens on tobacco and alcohol, positive screens on ESG factors and shareholder activism. Table 1 includes the studied funds, their tickers and inception months. All chosen funds have existed for the entirety of the studied period, which exposes the study survivorship bias. Mutual funds tend to disappear if they perform poorly. If a study only contains funds that have existed over the whole studied period, the performance may be overestimated and thus the results may

indicate towards false conclusions. (Linnainmaa 2013) This must be considered when examining the results of the study.

Table 1. Socially Responsible Funds

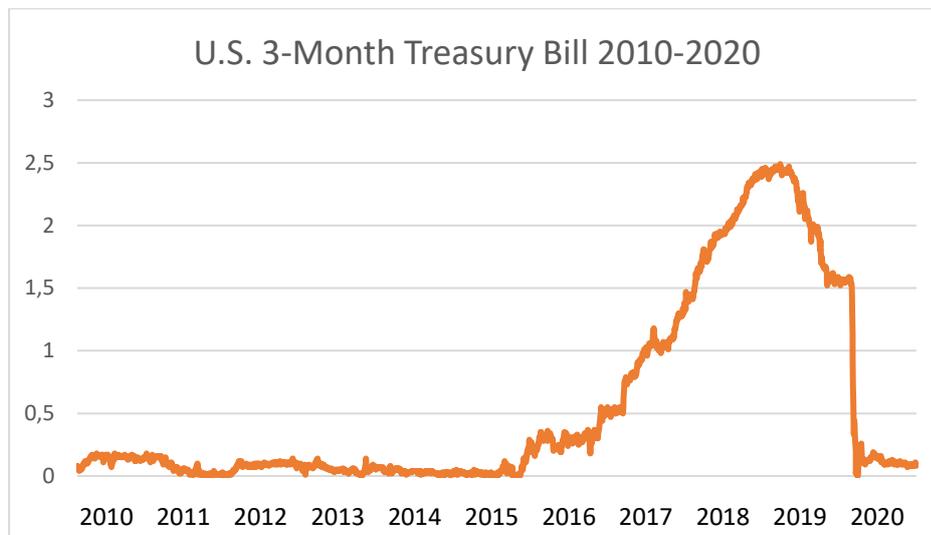
Fund name	Ticker	Inception month
Baywood Socially Responsible Fund	BVSIX	1/2005
Calvert Capital Accumulation Fund A	CCAFX	10/1994
Calvert Equity Portfolio A	CSIEX	8/1987
Green Century Equity	GCEQX	6/1991
Neuberger Berman Socially Responsive A	NRAAX	5/2009
Parnassus Endeavor Fund	PARWX	4/2005
Parnassus Mid Cap Fund	PARMX	4/2005
Pax ESG Beta Quality Fund – Institutional Investor	PWGIX	4/2007
Pax Small Cap Fund – Institutional Class	PXSIX	3/2008
Praxis Growth Index Fund A	MGNDX	4/2007
TIAA-CREF Social Choice Equity Institutional	TISCX	6/1999
Walden Equity Fund	WSEFX	6/1999

4.2. Benchmark index & risk-free returns

The selected funds are compared to a chosen benchmark index. The benchmark index selected for this study is S&P 500 Index that includes 500 large US companies. The index covers approximately 80% of available market capitalization and it is widely regarded as one of the best benchmark indexes for the US market. (Statman 2000) The Index contains stocks from multiple fields with the top three sectors being information technology, health care and consumer discretionary. (S&P Dow Jones Indices 2021)

The three-month U.S. treasury bill is used as the risk-free rate for United States in this study. Treasury bills are often used as the risk-free rate in the United States by academics and practitioners. Short-term treasury bills have the lowest market risk over 10 years, and they have the lowest inflation risk. (Mukherji 2011) Figure 3 illustrates the development of the risk-free rate in the period of 2010-2020.

Figure 2. U.S. 3-month Treasury Bill rate development



4.3. Research methods

Three indicators of performance were used to conduct this study. The indicators chosen were Sharpe ratio, Treynor ratio and Jensen's alpha. To answer the second sub-question a business cycle analysis was performed on the chosen SRI funds. The study used daily returns of the chosen funds to conduct the empirical research. Logarithmic transformations were made for the returns so the data would be more normally distributed. The logarithmic transformations were made by the following formula:

$$r_t = \ln \left(\frac{P_t}{P_{t-1}} \right) \quad (1)$$

Where

r_t = Logarithmic return

P_t = Price at time t

P_{t-1} = Price at time $t - 1$

To calculate average annualized returns the daily logarithmic returns were multiplied by 252, which is the number of trading days in a year. The annualized volatility was also calculated with the logarithmic daily returns by multiplying the volatility with the square root of 252.

4.3.1. Performance indicators

Sharpe ratio was developed by William Sharpe (Sharpe 1966) to measure the risk-adjusted performance of a portfolio. The ratio is calculated by subtracting the risk-free rate from the return rate of a given portfolio and dividing the result by the standard deviation of the portfolio. The ratio is used to consider whether a portfolio's performance is profitable when the risk it carries is considered. The higher the Sharpe's ratio is for a given portfolio the better its risk-adjusted performance has been. A low Sharpe ratio can indicate that a portfolio may be overly risky, even if its performance has been good. (Vishwanath 2009) The Sharpe ratio can be written as follows:

$$\text{Sharpe ratio} = \frac{R_p - R_f}{\sigma_p} \quad (2)$$

Where $R_p = \text{Return of portfolio}$
 $R_f = \text{Risk - free rate}$
 $\sigma_p = \text{Standard deviation of the portfolio}$

The Sharpe ratio faces challenges when excess returns ($R_p - R_f$) become negative. Negative excess returns may distort the results of Sharpe ratio and thus reduce the reliability of the measure. Sharpe ratio may end up penalizing funds with lower volatility even though they are in reality better investments. To combat this issue Israelsen created a modified formula for Sharpe ratio. In this modification the denominator is raised to the power of excess returns divided by absolute value of excess returns. (Israelsen 2005) The Israelsen modification will be used in this research when examining the Sharpe ratios of downturn periods, as excess returns are negative during these periods. The modification by Israelsen can be written out as follows:

$$\text{Modified Sharpe} = \frac{ER}{\sigma\left(\frac{ER}{|ER|}\right)} \quad (3)$$

Where $ER = \text{Excess return of portfolio}$
 $|ER| = \text{Absolute value of excess return}$
 $\sigma_p = \text{Standard deviation of the portfolio}$

Treynor ratio was developed by Jack Treynor. Treynor ratio measures whether the investment is outperforming the average returns on market. It is calculated by subtracting the risk-free rate from the return of the portfolio and dividing the result by the beta of the portfolio. Treynor ratio is very similar to Sharpe ratio; the only difference is that standard deviation is replaced by the beta of the portfolio. Beta represents the systematic risk of a portfolio. (Vishwanath 2009) The Treynor ratio can be written as follows:

$$\text{Treynor ratio} = \frac{R_p - R_f}{\beta_p} \quad (4)$$

Where $R_p = \text{Return of the portfolio}$
 $R_f = \text{Risk - free rate}$
 $\beta_p = \text{Beta of the portfolio}$

Jensen's alpha is a risk-adjusted performance measure of a portfolio. It represents the average return of a portfolio compared to the one predicted by the CAP-model, given the portfolio's beta and the average market return. Jensen's alpha is used as a measure of performance because not only the actual performance but also the risk of a portfolio must be examined. If Jensen's alpha gets a positive value, the portfolio is performing better than the markets and is earning excess returns. (Vishwanath 2009) Jensen's alpha can be written as follows:

$$\text{Jensen's alpha} = R_p - [R_f + \beta_p(R_m - R_f)] \quad (5)$$

Where $R_p = \text{Return of the portfolio}$
 $R_f = \text{Risk - free rate}$
 $\beta_p = \text{Beta of the portfolio}$
 $R_m = \text{Expected market return}$

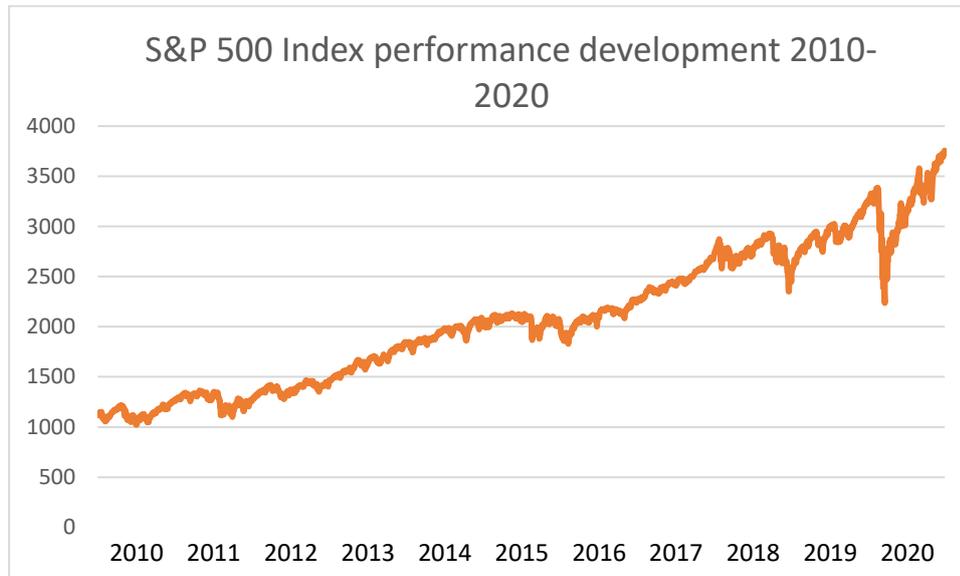
The beta used in Jensen's alpha and Treynor ratio can be estimated by regressing the past returns of a fund on the returns of the market over some time period. Beta measures the tendency of the returns of a security to move in line with the stock market. (Vishwanath 2009) Linear regression is data analysis model, that is used to investigate the relationship between one dependant variable and one or more independent variables. In this study, linear regression analysis is used to calculate Jensen's alpha and betas for the study. To find out the alphas and betas of the SRI funds a linear regression is performed on the returns of the funds over the period of 2010 to 2020.

4.3.2. Business cycle

To study the performance of SRI mutual funds the chosen period will be divided into economic downturn and growth periods. The aim is to examine whether SRI funds perform better in highs or lows. The results are also compared to the market portfolio, to find out how SRI funds perform compared to traditional funds. The division is based on the S&P 500 Index rates because it is also used as the market benchmark in this study.

Figure 3 illustrates the daily rates of the S&P 500 Index over the studied period. The period is divided into four downturn and four growth periods. The beginning of the entire studied period was excluded from the business cycle analysis to keep the number of periods equal in between downturn and growth periods.

Figure 3. S&P 500 daily rate 2010-2020



The first downturn period occurred from June 2011 to October 2011. The first growth period ranges from October 2011 to June 2015. After this the economy turned to a second a downturn from July of 2015 to February 2016. The second growth period ranges from February 2016 to the end of 2018 as the economy experienced constant growth. The third downturn takes place from the September 2018 to the end of 2018. During 2019 the markets kept growing and the growth period ended in February 2020. The last downturn is set from February 2020 to the beginning of April 2020. The Covid-19 pandemic caused stocks to plummet in the beginning of February 2020. Market prices started climbing back to the pre-Covid levels in the spring of 2020.

5. RESEARCH RESULTS

This chapter goes through the results of the study. The chapter begins with average annualized returns and annualized volatilities of the funds over the entire research period. After, the performance of funds will be examined by presenting the Sharpe and Treynor ratios. Jensen's alpha and the betas of the funds were calculated by regression analysis. Lastly the results of the business cycle analysis are presented in the same order as the results of the entire period. The business analysis is divided into two parts: economic downturn periods and growth periods are examined separately.

5.1. Fund performance over the period 2010-2020

The average annualized returns and annualized volatilities are introduced in this chapter. After that, the Sharpe and Treynor ratios are presented, followed by the linear regression results.

Table 2. Average annualized returns and annualized volatilities

Fund Name	Average re- turn (p.a.)		Volatility (p.a.)	
Baywood Socially Responsible Fund	5,03 %	13.	18,93 %	9.
Calvert Capital Accumulation Fund A	7,08 %	11.	20,38 %	12.
Calvert Equity Portfolio A	9,02 %	10.	18,92 %	8.
Green Century Equity	12,9 %	3.	17,26 %	4.
Neuberger Berman Socially Responsive A	16,75 %	1.	33,67 %	13.
Parnassus Endeavor Fund	10,53 %	6.	20,14 %	11.
Parnassus Mid Cap Fund	9,97 %	8.	16,98 %	2.
Pax ESG Beta Quality Fund	9,83 %	9.	18,01 %	6.
Pax Small Cap Fund	6,95 %	12.	19,9 %	10.
Praxis Growth Index Fund A	14,47 %	2.	17,69 %	5.
TIAA-CREF Social Choice Equity Inst.	10,62 %	5.	18,25 %	7.
Walden Equity Fund	10,42 %	7.	16,98 %	1.
S&P 500 Index	12,8 %	4.	17,25 %	3.

The bolded results in average annualized returns represent the funds that reached a higher return rate than the market index. The bolded results in the volatility column represent the funds that reached a lower volatility than the market index. Only three SRI funds reached a better average annualized return than the market portfolio (12,8 %). These funds were Neuberger Berman Socially Responsive A (16,75%), Praxis Growth Index Fund A (14,47 %) and Green Century Equity (12,9 %). The table shows that the lowest average returns were from Baywood Socially Responsible Fund (5,03 %), Pax Small Cap Fund (6,96 %) and Calvert Capital Accumulation Fund A (7,08 %).

Two SRI funds reached a lower annualized volatility than the S&P 500 Index (17,25 %). These funds were Parnassus Mid Cap and Walden Equity Fund, which both reached the volatility 16,98%. The table shows that the highest volatilities come from Neuberger Berman Socially Responsive A (33,67 %), Calvert Capital Accumulation Fund (20,38 %) and Parnassus Endeavor Fund (20,14 %). It was noted that Neuberger Berman Socially Responsive A had the highest annualized returns but also a significantly greater volatility than any other studied fund. During the research it was found that the year 2020 strongly affected the volatility rates. When examining only the years 2010 to 2019, the volatilities seemed to fluctuate between 10-15 % whereas with 2020 included, they fluctuate between 15-20%. This indicates that the financial crisis caused by the Covid-19 pandemic has had a significant effect on the markets. The effects of the pandemic are further discussed in the business cycle analysis chapter.

Annualized returns of funds by themselves are not an accurate way to measure the performance of funds. Risk-adjusted measures should be included in the evaluation of fund performance. The following tables represent the results of chosen risk-adjusted measures and the results of the linear regression model.

Table 3. Sharpe and Treynor ratios

Fund	Sharpe		Treynor	
Baywood Socially Responsible Fund	0,1622	13.	0,0344	13.
Calvert Capital Accumulation Fund A	0,2469	12.	0,0625	11.
Calvert Equity Portfolio A	0,4003	9.	0,0859	10.
Green Century Equity	0,7146	2.	0,1223	2.
Neuberger Berman Socially Responsive A	0,3258	10.	0,1187	4.
Parnassus Endeavor Fund	0,4453	8.	0,0903	9.
Parnassus Mid Cap Fund	0,5335	5.	0,1098	6.
Pax ESG Beta Quality Fund	0,4822	7.	0,0936	8.
Pax Small Cap Fund	0,2518	11.	0,0588	12.
Praxis Growth Index Fund A	0,7925	1.	0,1252	1.
TIAA-CREF Social Choice Equity Institutional	0,5218	6.	0,0974	7.
Walden Equity Fund	0,5639	4.	0,1112	5.
S&P 500 Index	0,7059	3.	0,1218	3.

Sharpe and Treynor ratios of the studied funds are presented in table 3. The bolded ratios represent the funds that reached a higher ratio than the market index. Two SRI funds, Green Century Equity (0,7146) and Praxis Growth Index (0,7925), reached a higher Sharpe Ratio than the market index (0,7059). This means that these two funds outperformed the market portfolio when excess returns were adjusted to the funds' risk rates. However, the performance of the market index did not fall far behind. The worst Sharpe ratios were generated by Baywood Socially Responsible Fund (0,1622), Calvert Capital Accumulation Fund A (0,2469) and Pax Small Cap Fund (0,2518).

The Treynor ratio shows similar results to the Sharpe ratio. Treynor ratio can be used to compare results, but it does not indicate how much the results differ from each other proportionally. Green Century Equity (0,1223) and Praxis Growth Index (0,1252) generated a higher Treynor ratio than the market Index (0,1218). The same funds had a higher Sharpe ratio than the market index. The worst Treynor ratios come from Baywood Socially Responsible Fund (0,0344), Pax Small Cap Fund (0,0588) and Calvert Capital Accumulation Fund (0,0625). All funds have a positive Treynor ratio. The results show that the funds performed similarly with both Sharpe and Treynor ratios. The

only fund with significant differences in the rankings was Neuberger Berman Socially Responsive A. This may be explained by the fund's volatility, which was relatively high. The beta used in Treynor ratio measures the systematic risk of the fund. The results indicate that a significant portion of the fund's risk is unsystematic, which is not included in the Treynor ratio. Thus, the fund performs better in Treynor ratio rankings than in Sharpe ratio rankings.

Table 4. Annualized alphas, betas, and R-squared values

Fund name	α	β	R²
Baywood Socially Responsible Fund	-0,0756*	0,992*	0,817
Calvert Capital Accumulation Fund A	-0,0580*	1,032*	0,763
Calvert Equity Portfolio A	-0,0378	0,944*	0,741
Green Century Equity	0,0101	0,99*	0,979
Neuberger Berman Socially Responsive A	-0,0096	0,983*	0,254
Parnassus Endeavor Fund	-0,0247	1,056*	0,818
Parnassus Mid Cap Fund	-0,0252	0,922*	0,876
Pax ESG Beta Quality Fund	-0,0277	0,998*	0,912
Pax Small Cap Fund	-0,0580*	0,978*	0,718
Praxis Growth Index Fund A	0,0141	0,993*	0,937
TIAA-CREF Social Choice Equity Institutional	-0,0202	1,022*	0,932
Walden Equity Fund	-0,0212	0,951*	0,933

* Statistically significant at 5% risk rate

The results of linear regressions performed are presented in table 4. The alphas represented have been converted to annualized values. The model is statistically significant at a 5 % risk level. The R squared values of the regressions ranged between 75 % and 95% so the model represents the markets well. The only exception is Neuberger Berman Socially Responsive A fund, which has a R squared value of 25,4%. The fund had the highest annualized return and volatility of the studied funds. This indicates that the fund may be an outlier in the data and is not as suitable for the model as other chosen funds.

Only three funds reached a statistically significant alphas at a 5% risk level. These funds were Baywood Socially Responsible Fund, Calvert Capital Accumulation Fund

A and Pax Small Cap Fund. Jensen's alpha indicates whether the fund is reaching excess returns compared to the market portfolio. All statistically significant alphas were negative which means that the market index has been generating higher returns than the SRI funds. The only funds that generated a positive alpha were Green Century Equity and Praxis Growth Index, which were also able outperform the market index in Sharpe and Treynor ratio. However, it should be noticed that the alphas of these funds were not statistically significant at either 5 % or 10 % risk levels.

The betas of all funds were statistically significant at a 5% risk level. Three funds have a beta value over 1, which is the beta for the market index. This means that these funds were more vulnerable to fluctuations in the markets than the market index. These funds were Calvert Capital Accumulation Fund A, Parnassus Endeavor Fund and TIAA-Cred Social Choice Equity Institutional. However, the rest of the funds have a beta lower than 1, which indicates that the funds have a lower risk level than the market index. All betas have a positive value, which means that fluctuations generally move the funds to the same direction as the markets.

The results show that only Green Century Equity and Praxis Growth Index were able to outperform the market index in all the performance measures. The results seem to line up with research by Renneboog et al. (2007) and Jones et al. (2008), who found in their research that SRI funds tend to underperform the markets. However, it should be noted that the market index did not reach the highest values in any of the chosen performance indicators.

5.2. Business cycle analysis

This chapter presents the results of the business cycle analysis. The results of the business cycle are divided into two parts: downturn periods and growth periods will be presented separately. This allows to examine the trends of performance in contraction and growth periods of the economy. The S&P 500 Index rate show two relatively small and two relatively large downturns in the economy. There are also two relatively long and two relatively short growth periods. The chosen periods vary relatively much in length, which may have affected the results of the study.

Table 5. Total return % and volatility per period, downturn periods

	Total return %				Total	Volatility
	Jun 2011- Oct 2011	Jun 2015- Feb 2016	Sep 2018- Dec 2018	Feb 2020 -Mar 2020		
BVSIX	-16,58 %	-29,03 %	-27,20 %	-39,32 %	-112,13 %	37,06 %
CCAFX	-20,76 %	-28,65 %	-23,66 %	-37,25 %	-110,32 %	39,45 %
CSIEX	-14,29 %	-27,75 %	-19,74 %	-30,08 %	-91,86 %	38,31 %
GCEQX	-13,46 %	-12,06 %	-16,70 %	-32,37 %	-74,59 %	35,38 %
NRAAX	-17,84 %	-21,39 %	-24,95 %	-33,93 %	-98,11 %	37,36 %
PARWX	-16,87 %	-22,12 %	-29,26 %	-37,08 %	-105,33 %	40,48 %
PARMX	-18,93 %	-14,16 %	-19,33 %	-37,12 %	-89,54 %	33,89 %
PWGIX	-17,76 %	-17,51 %	-22,00 %	-33,71 %	-90,98 %	36,91 %
PXSIX	-24,98 %	-16,63 %	-30,94 %	-40,37 %	-112,92 %	41,61 %
MGNDX	-11,31 %	-10,82 %	-21,30 %	-29,96 %	-73,39 %	36,79 %
TISCX	-14,91 %	-18,03 %	-25,81 %	-34,59 %	-93,34 %	38,75 %
WSEFX	-13,95 %	-14,19 %	-18,44 %	-33,31 %	-79,89 %	34,58 %
S&P 500	-14,09 %	-11,83 %	-18,61 %	-33,69 %	-78,22 %	35,69 %

Table 5 presents the total returns of the SRI funds and market index in the downturn periods of the business cycle. During downturns, the funds have generated losses as their total returns are negative. The bolded values indicate instances where the SRI fund has been able to outperform the market index. The returns have been negative during the downturn period, so a smaller negative value indicates a better performance for the funds. Two funds were able to outperform the market index in the overall returns in the downturn periods: Green Century Equity and Praxis Growth Index. The results match with the overall performance results, as Green Century Equity and Praxis Growth Index were able to outperform the market index in the entire research period. The last column of Table 5 presents the average of annualized volatilities over the downturn periods. Only three funds had a lower average volatility than the market index.

Feb 2020 – Mar 2020 column represents the largest economic contraction during the research period that was caused by the Covid-19 pandemic. The results show that this

period generated the largest losses of all of the downturn periods. It is interesting to note that during the strongest downturn in the economy the largest number of funds were able to outperform the market index. This may be an indication that during strong downturns SRI funds may generate smaller losses. However, the time range for the period 4 downturn was short, which may have affected the reliability of the returns.

Table 6. Total return % and volatility per period, growth periods

	Total return %				Total	Volatility
	Oct 2011- Jun 2015	Feb 2016- Sep 2018	Dec 2018- Feb 2020	Apr 2020- Dec 2020		
BVSIX	38,54 %	55,20 %	29,74 %	53,48 %	176,96 %	17,42 %
CCAFX	41,52 %	31,91 %	36,37 %	55,35 %	165,15 %	16,87 %
CSIEX	54,60 %	35,05 %	50,00 %	47,05 %	186,70 %	15,74 %
GCEQX	84,74 %	55,32 %	44,17 %	53,62 %	237,85 %	15,41 %
NRAAX	152,23 %	39,03 %	24,94 %	52,08 %	268,28 %	20,21 %
PARWX	77,50 %	58,05 %	46,32 %	70,77 %	252,64 %	18,97 %
PARMX	66,12 %	45,64 %	34,40 %	60,68 %	206,84 %	14,52 %
PWGIX	77,11 %	37,13 %	36,02 %	48,25 %	198,51 %	15,30 %
PXSIX	58,31 %	37,64 %	31,15 %	63,00 %	190,10 %	17,03 %
MGNDX	96,69 %	68,82 %	41,01 %	51,61 %	258,13 %	16,03 %
TISCX	77,91 %	52,54 %	40,59 %	57,55 %	228,59 %	15,78 %
WSEFX	63,16 %	49,59 %	40,42 %	45,56 %	198,73 %	15,05 %
Index	86,51 %	58,82 %	43,74 %	53,48 %	245,55 %	15,05 %

Total return percentages and volatilities for growth periods are presented in table 6. During growth periods the returns have been positive for all funds. Green Century Equity, Parnassus Endeavor Fund and Praxis Growth Index Fund A outperformed the market Index on two out of four downturn periods. Neuberger Berman, Parnassus Endeavor Fund and Praxis Growth Index Fund A were able to outperform the markets in the total sum of returns over the downturn periods. The Neuberger Berman fund reached relatively high total returns during the first period, which affected its total results significantly.

The fourth growth period from April 2020 to December 2020 represents the time after the market crash caused by Covid-19. This period also generated the highest returns out of the growth periods. It is interesting to note that seven out of twelve funds generated higher returns than the market index in this period. The same phenomenon can be seen in the downturn period as the period with the largest losses had the most funds that outperformed the markets. This may indicate that SRI funds may perform better than overall markets in extreme situations.

Table 7. Sharpe and Treynor ratios, downturn periods

	Treynor					Sharpe			
	Jun 2011- Oct 2011	Jun 2015- Feb 2016	Sep 2018- Dec 2018	Feb 2020 Mar 2020		Jun 2011- Oct 2011	Jun 2015- Feb 2016	Sep 2018- Dec 2018	Feb 2020 Mar 2020
BWSIX	-0,4349	-0,4083	-0,7019	-1,0244	-0,1161	-0,1623	-0,2887	-0,3916	
CCAFX	-0,412	-0,4066	-0,6403	-1,0208	-0,1158	-0,142	-0,2628	-0,3648	
CSIEX	-0,3582	-0,4227	-0,563	-0,9973	-0,091	-0,0956	-0,2112	-0,3173	
GCEQX	-0,3715	-0,1752	-0,496	-1,0072	-0,0947	-0,0661	-0,2056	-0,3072	
NRAAX	-0,4419	-0,3484	-0,6637	-1,0125	-0,1201	-0,0223	-0,2467	-0,3333	
PARWX	-0,4017	-0,3454	-0,7345	-1,0205	-0,1057	-0,1204	-0,27	-0,3349	
PARMX	-0,4457	-0,2392	-0,5544	-1,0205	-0,1223	-0,0822	-0,2836	-0,3938	
PWGIX	-0,411	-0,2563	-0,6087	-1,0118	-0,1113	-0,0953	-0,2386	-0,3331	
PXSIX	-0,4879	-0,3157	-0,7591	-1,0259	-0,1423	-0,1122	-0,2561	-0,374	
MGNDX	-0,3087	-0,154	-0,595	-0,9967	-0,0755	-0,0575	-0,216	-0,2833	
TISCX	-0,3709	-0,2442	-0,6787	-1,0144	-0,0969	-0,0922	-0,2402	-0,3287	
WSEFX	-0,3865	-0,2212	-0,5352	-1,0105	-0,099	-0,077	-0,2443	-0,3272	
INDEX	-0,3674	-0,1691	-0,5214	-1,0117	-0,0949	-0,0646	-0,2374	-0,321	

Table 7. presents the Sharpe and Treynor ratios during downturn periods. The bolded values indicate the values that outperform the market index. The results are similar to the values of the entire studied period as only a few funds were able to outperform the market index. Examining the results of Treynor ratios we can see that Praxis Growth Index Fund A has generated the best Treynor ratios on three out of four downturn

periods. Calvert Equity Portfolio A and Green Century Equity outperformed the market in two out of four periods. The last downturn period also contains the largest number of SRI funds that have won the market index.

The Sharpe ratios are presented in italics because they must be modified. The ratios are not reliable because the excess returns during the downturn periods have been negative. Because of this, the Sharpe ratios of downturn periods will be corrected by using a modification developed by Israelsen (2005). The modified results are presented in table 8.

Table 8. Modified Sharpe ratios, downturn periods

	Jun 2011 – Oct 2011	Jun 2015 – Feb 2016	Sep 2018 – Dec 2018	Feb 2020 – Mar 2020
BWSIX	-0,0000402	-0,0000249	-0,0000721	-0,0008161
CCAFX	-0,0000663	-0,0000276	-0,0000577	-0,0007623
CSIEX	-0,0000371	-0,0000380	-0,0000481	-0,0005175
GCEQX	-0,0000313	-0,0000086	-0,0000346	-0,0006382
NRAAX	-0,0000456	-0,0000893	-0,0000693	-0,0006601
PARWX	-0,0000458	-0,0000179	-0,0000914	-0,0008209
PARMX	-0,0000511	-0,0000098	-0,0000343	-0,0007000
PWGIX	-0,0000487	-0,0000134	-0,0000540	-0,0006502
PXSIX	-0,0000823	-0,0000102	-0,0001099	-0,0009151
MGNDX	-0,0000271	-0,0000079	-0,0000556	-0,0005736
TISCX	-0,0000382	-0,0000148	-0,0000768	-0,0007020
WSEFX	-0,0000323	-0,0000105	-0,0000359	-0,0006427
INDEX	-0,0000345	-0,0000085	-0,0000377	-0,0006734

Comparing the regular and modified Sharpe ratios reveals that the modifications were relevant, as there are multiple differences. During June 2011 - October 2011, Calvert Equity Portfolio A is no longer ranked better than the market index whereas Walden Equity Fund has risen over the index. In June 2015 – February 2016 only Praxis Growth Index outperforms the market, whereas the regular Sharpe Ratio indicated that Neuberger Berman Socially Responsive A would also be outperforming the markets.

Column three (Sep 2018 – Dec 2018) contains several differences. Calvert Equity Portfolio A and Praxis Growth Index have fallen in the rankings beneath the market index. Parnassus Mid Cap Fund and Walden Equity Fund rank higher with modified Sharpe ratios than with regular ratios. In February 2020 – March 2020 Neuberger Berman, Pax ESG Beta Quality Fund and Walden Equity Fund have risen in the rankings above the market index. Especially Walden Equity performs better in the modified Sharpe rankings. This may be a result of the fund's relatively low volatility.

Examining the Sharpe and Treynor ratio performance of the funds in the downturn periods reveals similar results to the overall study period. Green Century Equity and Praxis Growth Index Fund A performed the best out of the SRI funds and were able to outperform the markets in three out of four periods. The fourth period contains the highest amount of funds that perform better than the market index. The results support previous studies as it has been found that SRI funds performed better than conventional funds during the Covid19 crisis.

Table 9. Sharpe and Treynor ratios, growth periods

	Treynor				Sharpe			
	Jun 2011- Oct 2011	Jun 2015- Feb 2016						
BWSIX	0,092	0,1749	0,2442	0,6524	0,0343	0,0827	0,2467	0,1171
CCAFX	0,0835	0,122	0,365	0,7673	0,0303	0,0498	0,3467	0,1459
CSIEX	0,1186	0,1323	0,4404	0,6713	0,0483	0,0508	0,347	0,1341
GCEQX	0,1776	0,1697	0,3509	0,7001	0,079	0,0855	0,2476	0,1401
NRAAX	0,2558	0,1325	0,2269	0,6998	0,0519	0,0572	0,2707	0,1336
PARWX	0,1666	0,1748	0,3146	0,8199	0,0657	0,0769	0,2579	0,137
PARMX	0,1498	0,1791	0,3527	0,8636	0,0626	0,0809	0,3557	0,1622
PWGIX	0,1521	0,1293	0,3208	0,666	0,0664	0,0557	0,278	0,1364
PXSIX	0,1352	0,1412	0,2951	0,8162	0,0487	0,0594	0,2575	0,1359
MGNDX	0,1952	0,2071	0,3371	0,6738	0,0857	0,1014	0,2805	0,1275
TISCX	0,157	0,1696	0,3364	0,7457	0,0697	0,0789	0,2874	0,147
WSEFX	0,1423	0,1666	0,3387	0,6257	0,0621	0,0794	0,2899	0,1273
INDEX	0,1752	0,1865	0,3582	0,6983	0,0789	0,0959	0,2782	0,1414

Table 9. presents the Sharpe and Treynor ratios of the funds during growth periods. The bolded values represent values that outperform the market index. The results of Treynor ratios follow previous results as the fourth period has the most funds outperforming the market index. Four funds, Calvert Equity Accumulation, Green Century Equity, Neuberger Berman, and Praxis Growth Index have outperformed the markets during two out of four growth periods.

The Sharpe values presented in the table do not require modifications, as in these cases the excess returns have been positive. The Sharpe ratios show a surprising result, as in this case the third period (instead of fourth) contains the largest number of funds that outperform the market index. Otherwise, the results seem to support previous results as the first and second growth periods have only a few funds outperforming the market index. The Praxis Growth Index Fund A reached the best performance compared to the market index as it outperformed it in three out of four periods.

Table 10. Alphas and betas, downturn periods

	Jun 2011 – Oct 2011		Jun 2015 – Feb 2016		Sep 2018 – Dec 2018		Feb 2020 – Mar 2020	
	α	β	α	β	α	β	α	β
BWSIX	-0,0004	0,9684	-0,0013	0,9707	-0,0017	0,9675	-0,0038	0,9671
CCAFX	-0,0006	1,2243	-0,0013	0,9631	-0,0011	0,9414	-0,0024	0,9783
CSIEX	0,0042	1,0376	-0,0012	0,8995	-0,0004	0,9243	0,0001	0,8781
GCEQX	0,0000	0,9510	0,0000	0,9828	0,0004	1,0183	0,0006	0,9947
NRAAX	-0,0005	1,0119	-0,0008	0,8561	-0,0012	0,9935	-0,0006	0,9664
PARWX	-0,0003	1,0632	-0,0008	0,8912	-0,0015	1,1863	-0,0009	1,0669
PARMX	-0,0006	1,0522	-0,0003	0,8411	-0,0007	0,7971	-0,0035	0,9021
PWGIX	-0,0004	1,0837	-0,0004	0,9624	-0,0006	0,9893	-0,0006	0,9627
PXSIX	-0,0013	1,1885	-0,0005	0,7439	-0,0026	0,9217	-0,0038	1,0073
MGNDX	0,0004	0,9834	0,0001	1,0066	0,0001	1,2115	0,0017	0,9805
TISCX	0,0000	1,0392	-0,0004	1,0384	-0,0009	1,1454	-0,0004	1,0079
WSEFX	-0,0001	0,9422	-0,0002	0,9112	-0,0002	0,9328	-0,0003	0,9635

Table 10 presents the alphas and betas of the funds during economic downturn periods. The values bolded in the table indicate values that were statistically significant at a 5% risk rate. All betas were statistically significant. Most of the betas have a value under 1, which is the beta of the market index. Funds with a beta under 1 are less vulnerable to fluctuations in the markets than the S&P 500 Index. It is surprising to note that during June 2011 – October 2011 most of the funds generated a beta over 1.

Only two of the alphas were significant. Values written in italics represent alphas that were significant at 10% risk rate. Most of the funds generated a negative alpha, which means that the market index has been generating higher returns than the funds. However, Praxis Growth Index Fund A generated a positive statistically significant alpha during the last downturn period. The other alphas generated by Praxis and all of the alphas of Green Century Equity were also positive, which means that these funds in question may have generated higher excess returns than the market.

Table 11. Alphas and betas, growth periods

	Oct 2011 – Jun 2015		Feb 2016 – Sep 2018		Dec 2018 – Feb 2020		Apr 2020 – Dec 2020	
	α	β	α	β	α	β	α	β
BWSIX	-0,0003	0,9579	0,0000	1,0084	-0,0004	1,0065	-0,0001	1,0704
CCAFX	-0,0004	1,1268	-0,0002	0,9597	0,0000	0,8199	0,0002	0,9434
CSIEX	-0,0002	1,0076	-0,0002	0,8881	0,0002	0,9264	0,0000	0,9100
GCEQX	0,0000	0,9701	-0,0001	1,0413	0,0000	1,0308	0,0000	1,0001
NRAAX	0,0003	1,0582	-0,0002	0,9778	-0,0004	0,9109	0,0000	0,9706
PARWX	0,0000	0,9615	0,0000	1,0548	-0,0002	1,2041	0,0002	1,1435
PARMX	-0,0001	0,9381	0,0000	0,8323	0,0000	0,8036	0,0004	0,9231
PWGIX	-0,0001	1,0489	-0,0002	0,9575	-0,0001	0,9241	0,0000	0,9415
PXSIX	-0,0001	0,9344	-0,0001	0,8879	-0,0002	0,8714	0,0003	1,0160
MGNDX	0,0001	0,9810	0,0001	1,0310	-0,0001	0,9982	-0,0001	0,9985
TISCX	-0,0001	1,0251	-0,0001	0,9959	-0,0001	0,9903	0,0001	1,0113
WSEFX	-0,0001	0,9499	-0,0001	0,9634	-0,0001	0,9796	-0,0001	0,9441

Table 11 presents the alphas and betas of the funds during economic growth periods. All funds generated a statistically significant beta value. Baywood Socially Responsible Fund generated the only significant alpha of the dataset during the third growth period. The first growth period generated the highest number of betas over 1. However, overall, most of betas fall under 1, so the SRI funds are proportionally less affected by fluctuations of the market than the market index. Comparing the results of downturn and growth periods shows that betas may tend to get smaller values during growth periods. A larger amount of funds generated a positive alpha during growth periods than downturn periods. This suggests that SRI funds may be less vulnerable to changes in the market during growth periods than conventional funds.

When compared to the results during the whole studied period some differences can be seen. Funds with a beta over 1 were more frequent in the business cycle analysis than in the overall analysis. Dividing the study period into smaller divisions revealed that SRI funds may be outperforming the market index during specific time periods but still fall behind the market index in the overall analysis. Analyzing the different periods of the business cycle reveals that all chosen funds tend to perform similarly to one another in different economic situations. During downturn periods, the fourth period contains the largest amount of SRI funds that perform better than the S&P 500 Index. Period two on the other hand, is the least successful for SRI funds as only one fund outperformed the market index with each performance indicator.

The business cycle analysis shows that overall, most funds tend to underperform the markets in economic downturn and growth periods. Some evidence can be found to support the idea that SRI funds may be performing slightly better during economic expansions. This does not comply with previous research as they suggest that SRI funds perform better in economic contractions. However, the results also indicate that SRI funds have been performing better than the markets during the year 2020, which supports previous research.

6. SUMMARY AND CONCLUSIONS

The main goal of this thesis was to study the performance of socially responsible mutual funds in the United States over the period of 2010 to 2020. The thesis also aimed to examine whether SRI funds perform better or worse than the market's in different stages of the business cycle. The data was limited to funds marketed in the United States. The study was conducted by quantitative research by comparing the performance indicators of 12 SRI funds to the S&P 500 Index. The study also examined the performance of SRI funds in different stages of the business cycle and compared them to the markets. The performance indicators used were Jensen's alpha, Sharpe ratio and Treynor ratio. The average annualized returns and annualized volatilities were also examined.

Previous research has resulted in mixed findings. There is evidence that SRI funds tend to underperform the markets due to screening reducing financial profits. Some studies on the other hand have found that socially responsible investments tend to outperform the markets. One reason for this may be that the quality of investments that pass the screening process is higher than those of conventional funds. There are also research results that indicate that there is no significant cost or profit in choosing socially responsible investments. Even though there is a lot of differing results on the performance of SRI funds, the largest studies seem to indicate that there is no significant cost between SRI and conventional investments.

The results of this study indicate that generally socially responsible mutual funds tend to underperform the markets. The study found a couple of exceptions to this as Green Century Equity and Praxis Growth Index Fund seem to be outperforming the S&P 500 Index. Most of the funds were not able to surpass the market index in any of the indicators of performance. However, the linear regression revealed that most of the alphas were not statistically significant. This may indicate that there are no significant differences in the performance of SRI fund and the general markets. The results also indicate that even though a fund may achieve a higher annualized return rate than the market index, their real profit may be lower when the risk of the investment is considered.

The business cycle analysis revealed that the funds that were able to outperform the market index in the overall research period also outperformed in most of the downturn periods and some of the growth periods. Overall funds tend to underperform the markets in all periods. There is evidence that SRI funds may be performing better in economic expansions than contractions. The results seem to indicate that SRI funds may be able to recover faster from economic contractions than the overall markets. SRI markets seem to have performed better during the Covid-19 crisis and during the recovery than conventional funds, which supports previous research made on subject. Some of the periods used in the study were quite short, which may have affected the results.

Socially responsible investing is currently one of the most popular investing phenomena. This research aimed to contribute to the vast amount of research on the performance of SRI mutual funds. The study also aimed to examine a less researched aspect of performance by examining the effect of the business cycle on returns generated by SRI funds. The reliability of the study could be improved by including funds that have disappeared over the studied period. This would lessen or remove the effect of survivorship bias on the results. Further studies should be conducted on the performance of SRI funds over the business cycle. A larger set of data and a longer study period could be used to get a more accurate presentation of the effects.

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