

**UNIVERSITY OF VAASA
SCHOOL OF ACCOUNTING AND FINANCE**

Salla Saarteinen

**DOES THE INCORPORATION OF ESG CRITERIA LEAD TO SUPERIOR
FINANCIAL PERFORMANCE?**

Master's Thesis in
Accounting and Finance
Line of Finance

VAASA 2019

1. INTRODUCTION	7
1.1. Purpose of the study	9
1.2. Research questions	10
1.3. Structure of the study	11
2. SOCIALLY RESPONSIBLE INVESTING	12
2.1. History of Socially Responsible Investing	16
2.2. SRI strategies	17
2.2.1. Screening	17
2.2.2. Shareholder Advocacy	18
2.2.3. Community Investing	19
2.2.4. Sin stocks	19
3. THEORETICAL BACKGROUND	21
3.1. Efficient market hypothesis	21
3.1.1. Measuring market efficiency	22
3.2. Portfolio Theory	25
3.3. Socially responsible investing	27
4. PRIOR EMPIRICAL EVIDENCE	32
4.1. No significant impact	32
4.2. Positive impact	33
4.3. Negative impact	35
4.4. Conclusions from prior empirical evidence	37
5. DATA AND METHODOLOGY	38
5.1. Data description	38
5.2. Portfolio construction	40
5.3. Methodology	40
5.3.1. CAPM	41
5.3.2. Fama and French three model	41
5.3.2.1. Market factors and returns	42
5.3.3. Jensen's Alpha	42
5.3.4. Sharpe ratio	43
5.4. Research hypotheses	43

6. EMPIRICAL ANALYSIS AND RESULTS	45
6.1. Regression results on the Nordic market	45
6.2. Regression results on other European stock markets	49
6.2.1. London Stock Exchange	49
6.2.2. Euronext	51
6.2.3. Deutsche Börs	53
6.3. Summary of results	55
7. CONCLUSIONS	56
REFERENCES	58

LIST OF FIGURES

Figure 1. Socially Responsible Investing in the US 1995-2016	12
Figure 2. US Investment Funds Incorporating ESG Criteria 1995-2016	13
Figure 3. Growth of the PRI from 2006-2017	16
Figure 4. CAPM Investment Opportunities	23
Figure 5. The minimum-variance frontier of risky assets	26
Figure 6. The efficient frontier of risky assets with the optimal capital allocation line	27
Figure 7. Ethical investor's utility function	29
Figure 8. A conventional investors indifference curves and an ethical investors indifference planes	31
Figure 9. ESG metrics and score formation	38

LIST OF TABLES

Table 1. Sustainable and responsible investment strategies	14
Table 2. Nordic stock market data	39
Table 3. Comparison stock market data	40
Table 4. Nordic portfolio performance	48
Table 5. LSE portfolio performance	50
Table 6. Euronext portfolio performance	52
Table 7. Deutsche Börs portfolio performance	54

UNIVERSITY OF VAASA**Faculty of business studies**

Author: Salla Saarteinen
Title of the Thesis: Does the Incorporation of ESG Criteria Lead to Superior Financial Performance?
Supervisor: Nebosja Dimic
Degree: Master of Economic Sciences and Business Administration
Department: Department of Finance
Major subject: Finance
Year of entering the University: 2014
Year of completing the thesis: 2019 **Pages:68**

ABSTRACT

During the past decade, socially responsible investing has become a rapidly growing phenomenon in the financial industry that has caught the attention of socially and environmentally conscious investors and firms. The emergence of socially responsible investing has allowed investors to combine their personal preferences and values with their investment decisions. This has led to the exponential growth of SRI funds and firms publishing non-financial information. The aim of this thesis is to examine the possible abnormal returns socially aware investors are provided from incorporating ESG criteria to their investment decisions.

The impact of incorporating ESG criteria is measured and analyzed using the CAPM and Fama-French three factor model for over 200 listed companies in the Nordic market. Three large European stock markets are used as a comparison to examine whether the Nordic market has varying return patterns from the rest of the European markets. Thomson Reuter's ASSET 4 ESG scores are obtained to select companies with ESG activities for the period from 2000-2016. Regression models measure the abnormal returns provided by the synthetically constructed ESG and non-ESG portfolios.

Empirical findings suggest that the Nordic ESG portfolio is able to earn insignificantly higher abnormal returns than the non-ESG during the whole sample period. However, when splitting the sample period to crisis and non-crisis periods, the ESG portfolio significantly outperforms the non-ESG portfolio. Incorporating ESG criteria to investment decisions in the Nordic market during market crises seems to be associated with higher abnormal returns. These findings contribute to existing literature by examining ESG performance in the Nordic countries.

KEYWORDS: ESG, socially responsible investing, sustainability, investment performance

1. INTRODUCTION

In recent years, due to the uncertainty of the political and economic environment, investors have increasingly incorporated practices that promote climate change, diversity and employee relations into their investment decisions. Social responsibility seems to be gaining a higher importance in the near future. Recent events, such as Hurricane Irma and the California wild fires, the rise of ISIS and the Time's Up movement have increased the interest concerning environmental and social issues. The ongoing political uncertainty caused by tension between the United States, Russia and North Korea and the trade war between the US and China have increased the public interest of socially responsible investing.

Finance and economics have a common perception that investors act rational and their behaviour is motivated by self-interest maximization. However, recently a variety of different motives that drive investor behaviour have provoked the interest of research. The behaviour of investors, stakeholders and shareholders influence corporations to include values such as environmental care, social equality and corporate governance into their daily operations. (Fehr & Gächter 2000; Bovenberg 2002.) Furthermore, Beal, Goyen and Phillips (2005) present that in addition to socially responsible firms accumulating superior returns, non-wealth returns and contribution to social change are alternative reasons investors are willing to pay extra for ethical options. However, no matter what type of values an investor has, the number one motivation for incorporating socially responsible firms in investment portfolios is the value creation of superior returns (Beal et al. 2005).

Due to the increase of popularity in social responsibility and socially responsible investing, the amount of available SRI funds has expanded exponentially over the last decade increasing by almost 14-fold. From 2014 to 2016 the actively managed SRI funds in the US grew by 33 percent from \$6,57 trillion to \$8,72 trillion. In 2016, there were 1002 investment funds incorporating ESG factors amounting to \$2,60 trillion. (US SIF 2016.) The amount of academic literature has increased alongside the growth of the SRI industry. This indicates that the incorporation of environmental, social and governance criteria may have a growing importance in the near future. Most published academic literature concentrates on the performance of SRI stocks and funds, occasionally presented in an opposite perspective with the use of sin stocks. However, to this day there is no conclusive answer on how SRI funds perform compared to the market or their more conventional counterparts. Multiple studies, including those of

Hamilton, Jo and Statman (1993) and Goldreyer and Diltz (1999), find that the performance of SRI funds does not vary significantly from conventional funds.

The effect of market crises on performance has also been heavily researched after the 2007 financial crisis. Silva and Cortez (2016) find that environmentally friendly green funds tend to underperform conventional funds during non-crisis periods, yet green funds outperform their conventional counterparts during market crises. Nofsinger and Varma (2014) also find that mutual funds concentrating on ESG criteria tend to outperform conventional funds by up to 107 basis points during crisis periods. Quite the reverse, Munoz, Vargas & Marco (2014) find that green funds do not perform significantly different during crisis periods and even underperform compared to the rest of the market. Evidently, one cannot jump to any conclusions about market crisis performance based on previous research.

On the contrary to SRI performance, several studies find that screening intensity and the choice between negative and positive screens restricts investment opportunities consequently reducing diversification benefits and, therefore, negatively impacting portfolio performance (Lee, Humphrey, Benson & Ahn 2010; Nofsinger & Varma 2014). Lee et al. (2010) Find that the level of screening can decrease performance by 70 basis points and increase the total risk due to a negative relationship. Especially the excessive use of negative screens tends to undesirably harm portfolio returns particularly during bear markets. This is common amongst religious funds that predominantly exclude stock from their portfolios. (Areal, Céu Cortez & Silva 2013.) Additionally, the exclusion of certain assets when applying socially responsible criteria or the concentration of other assets exhibiting social responsibility permanently biases portfolios which affects long-term performance (Rudd 1981).

Socially responsible investing is difficult to define due to its ambiguity and varying research results. One possible reason behind this is the different methodologies that are used in SRI studies to measure performance. The performance measures vary from single index model instruments such as the Capital Asset Pricing Model and Jensen's alpha (Hamilton, Jo & Statman 1993) to multifactor model instruments such as the Fama and French (1993) three factor model and the Carhart (1997) four factor model (Nofsinger & Varma 2014; Bauer, Koedijk & Otten 2005). Moreover, a significant portion of research is conducted using individual countries instead of an international approach making international comparison challenging (Renneboog, Ter Horst & Zhang

2008). Nevertheless, SRI is a relatively new and rapidly growing phenomenon in the financial sector making it an interesting topic for further research.

Motivation for this subjects stems from Nordic countries being known to emphasize the importance of corporate social responsibility and ESG issues. Their business community and government policies are often viewed as exemplary due to their excellent performance in international rankings that rate companies on their CSR and ESG performance (Scholtens & Seivänen 2013). Vidaver-Cohen and Brønn (2015) suggest that Nordic firms and social institutions promote ethical and socially responsible behavior resulting in higher corporate social responsibility. This raises the question whether the Nordic market able to produce superior financial returns with the use of ESG criteria compared to the rest of Europe.

1.1. Purpose of the study

The purpose of this study is to examine whether incorporating ESG criteria in investment decisions lead to superior financial performance. The study aims to contribute to the existing SRI literature by examining how ESG scores effect portfolio performance in the Nordic setting during crisis and non-crisis periods. Thomson Reuters ESG database offers ESG scores for over 6000 companies globally with the use of 400 ESG metrics derived from annual reports, CSR reports, company websites and global media sources in a standardized and simplified form. The Thomson Reuters ESG score consists 10 different ESG topics that are weighted from 178 selected critical ESG measures. Therefore, the score varies from 0, no ESG coverage, to 178, full ESG coverage. (Thomson Reuters 2018.) Additionally, the sample period will include the 2007 financial crisis to measure how different market conditions effect performance.

The study will concentrate on the Nordic stock market and will use other European stock markets as a comparison. As existing literature usually concentrates on individual countries, the study contributes to previously conducted research with international comparison. Moreover, the study aims to analyze existing literature to provide a thorough review of the main contributions on the subject of SRI and ESG screening. This is done to combine the results of this study to existing literature, as the hypotheses are derived from published academic literature.

1.2. Research questions

As mentioned earlier, this study will focus on the financial performance of portfolios incorporating ESG criteria. A large number of research focuses on the performance of SRI portfolios and funds; however, very few seem to focus on Nordic countries and an international comparison.

The first research question concentrates on whether the incorporation of ESG criteria is able to lead to superior financial returns. According to Derwall, Guenster, Bauer and Koedijk (2005), investors are able to use ESG criteria as an investment tool to produce abnormal returns. However, according to Renneboog et al. (2018), investors using ESG criteria as an investment tool bear a higher cost and are willing to accept suboptimal performance. The motivation behind this question underlies in the uncertainty of whether investors are able to benefit from incorporating ESG criteria to their investment decisions. More specifically:

RQ1: Does the incorporation of ESG criteria lead to superior financial returns?

The second and final research question focuses on market turmoil. Prior empirical research finds that portfolios incorporating social responsibility and ESG criteria outperform their conventional counterparts during market crises. Lins, Servaes and Tamayo (2017) state that firms engaging in CSR activities, which are closely linked to ESG activities, are able to outperform those that are not engaged in CSR activities. This is mainly due to high importance of trust during crisis periods. The final research question attempts to examine the relationship between portfolios incorporating ESG criteria and the market cycle. The research question studies the following:

RQ2: How does the market cycle affect the performance of portfolios incorporating ESG criteria?

All the research questions have a slightly different angle, but overall, they all try to uncover the relationship between ESG criteria and financial performance.

1.3. Structure of the thesis

The study will proceed in the following manner. The second chapter covers socially responsible investing from its historical roots to its modern form. The chapter also covers the concept of SRI and presents three common socially responsible investment strategies. Sin stocks are briefly introduced as the concept lands on the opposite side of the value-based investing spectrum. The third chapter covers the most relevant and important theories regarding modern finance and socially responsible investing. Chapter four reviews existing academic literature and summarizes the most relevant findings from different perspectives. The fifth chapter describes the used data and how ESG portfolios are synthetically constructed. Chapter five also comprehensively explains the regression models used chapters six which presents and discusses the empirical findings. The final chapter recaps the major findings and concludes the paper.

2. SOCIALLY RESPONSIBLE INVESTING

In recent years, socially responsible investing has surfaced as a rapidly developing and dynamic phenomenon of the US financial and economic services (Schueth 2003). The United States Social Investment Forum's "Report on US Sustainable, Responsible and Impact Investing Trends" (2016) states that more than one out of every five dollars under professional management in the US is invested in a sustainable, responsible and impactful way. Figure 1 demonstrates the development of the total US-domiciled assets under management using SRI strategies from 1995 to 2016 denoted in billions of dollars. Additionally, the US SRI universe has exhibited a compound annual growth rate of 13,25 % since the US SIF Foundation first measured the size of the market in 1995. (US SIF 2016.)

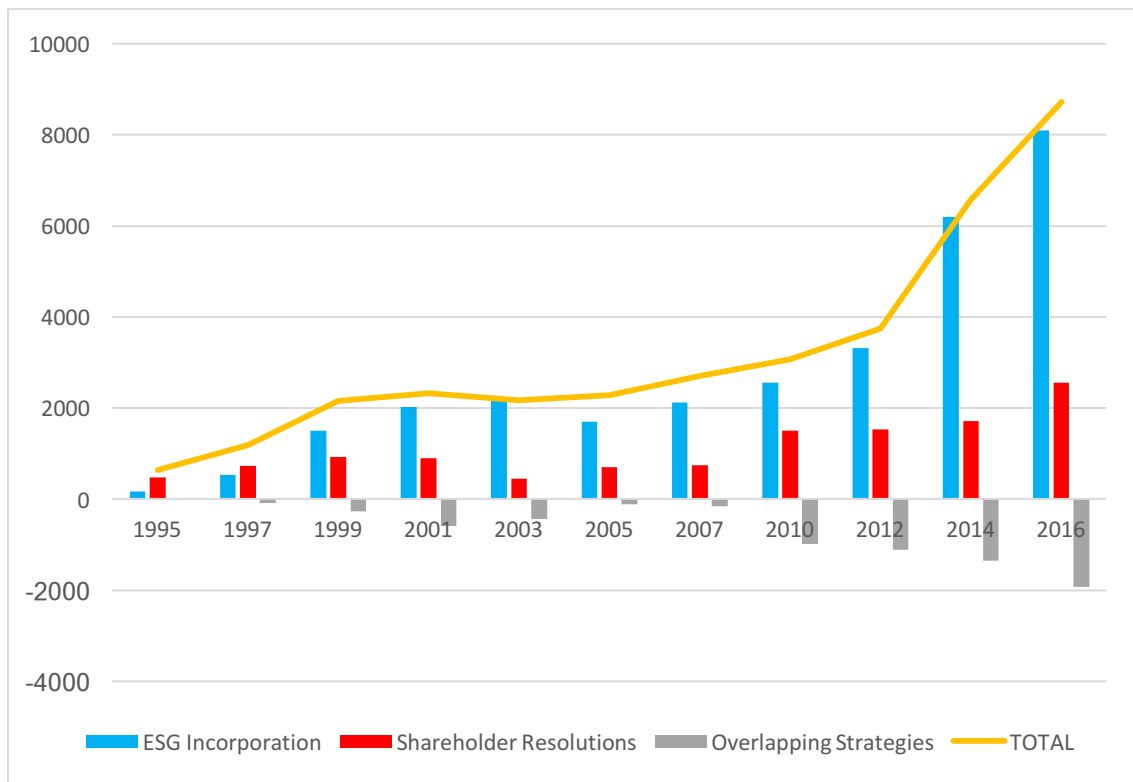


Figure 1. Socially Responsible Investing in the US 1995-2016 (US SIF 2012; US SIF 2014; US SIF 2016).

One of the key drivers behind the rapid growth of socially responsible investing is the increasing demand for investment strategies that promote environmental, social and governance values and exclude firms producing socially undesirable products (Nofsinger & Varma 2014). Figure 2 displays the number of investment funds incorporating ESG criteria from 1995-2016, which strongly correlates with the

requirements of individual investors. The number of funds incorporating ESG criteria increased from 55 in 1995 to 1 002 in 2016 with a 12 percent growth from 2014 to 2016. The total net assets have grown from \$12 billion to \$2,60 trillion over the past decade. (US SIF 2016.)

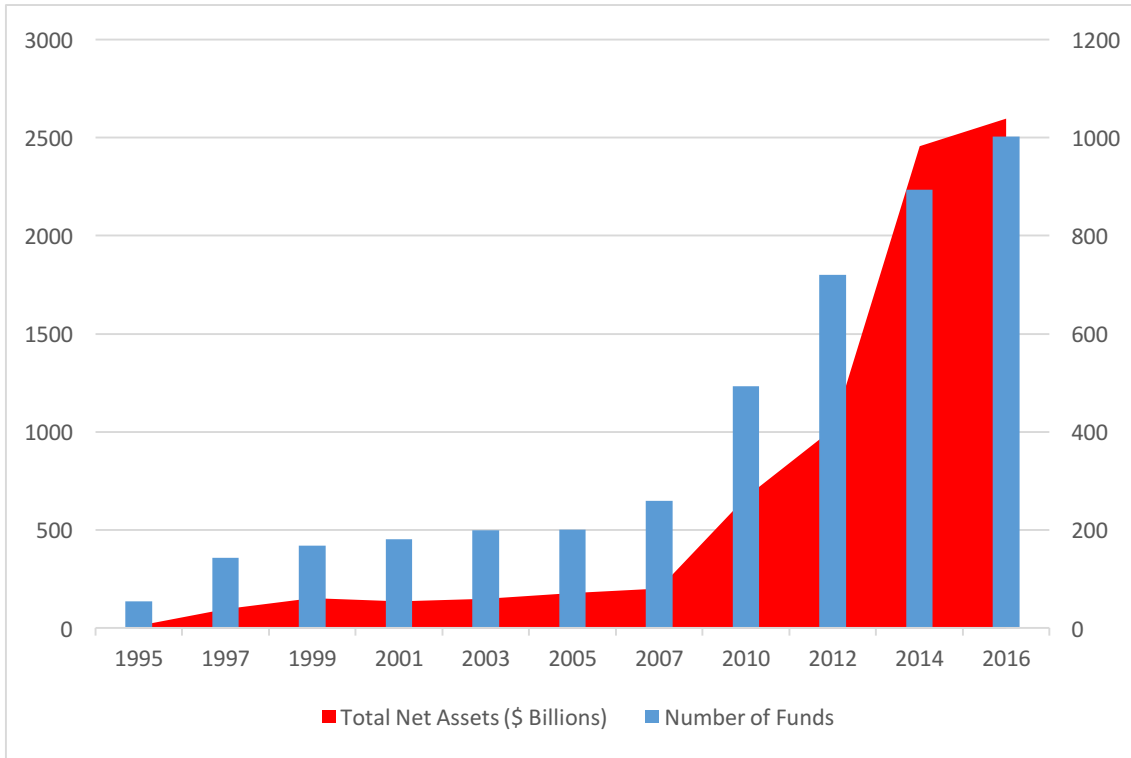


Figure 2. US Investment Funds Incorporating ESG Criteria 1995-2016 (US SIF 2016).

There are two complementary types of motivations that investors attracted to socially responsible investing tend to have. The first group of investors feel the need to invest their wealth in a manner that adheres to their personal values and priorities. This group of investors are often referred to as “feel good” investors due to their desire to feel good about themselves and their investment portfolios. The other group of investors feel the need to put their investment capital to work in a way that contributes to a positive change in society and encourages improvements in the quality of life of the less fortunate. (Schueth 2003.) Other motivations behind the increasing growth of socially responsible investing are achieving long-term competitive financial returns, risk management, fulfilling fiduciary duties, and contributing to advancements in environmental, social and governance practices. Furthermore, the application of SRI investment strategies across asset classes is common to promote stronger corporate social responsibility, build long-term value for corporations and their stakeholders, and

to harvest businesses or develop products that will be beneficial to the environment and society at large. (US SIF 2016.)

Another interesting point of view to explain the motivation behind socially responsible investing is traditional vs. philanthropy investing. Traditional investors only focus on finance and pay no focus or limited focus to ethical criteria. Their only aim is to earn competitive returns. On the other side of the spectrum, there are philanthropy investors who only focus on areas where ethical needs require financial trade-off leading to suboptimal returns. Table 1 explains the story between traditional and philanthropy investors and gives an overview of how investment strategies can be used for ESG risk management, ESG opportunities and high-impact solutions whilst considering competitive returns. (Bridges Ventures 2012.)

	Traditional	Responsible	Sustainable	Thematic	Impact-first	Philanthropy
	Competitive returns					
		ESG risk management				
			ESG opportunities			
				High-impact solutions		
Focus	Finance only Limited or no focus on ESG factors of underlying investments		The New Paradigm			Impact only Focus on one or a cluster of issues where social or environmental need requires some financial trade-off
		Focus on ESG risks ranging from a ware consideration of ESG factors to negative screening of harmful products	Focus on ESG opportunities, through investment selection, portfolio management and shareholder	Focus on one or a cluster of issue areas where social or environmental need creates a commercial growth opportunity for market-rate or market-beating returns	Focus on one or a cluster of issue areas where social or environmental need requires some financial trade-off	

Table 1. Sustainable and responsible investment strategies (Bridges Ventures 2012)

In addition to personal motives, there are multiple factors behind why socially responsible investing has experienced explosive growth over the past two decades. The most important factor is the amount of information that is available to investors. Nowadays, investors are better educated and are more informed at the current moment than any other time in the past. The quality of information provided by social research organizations is much higher than before and the organizations are more far more capable than previously. Most importantly, investors actions tend to be more responsible with the increase of available information. Another fueling factor may lie with women who have moved out of their homes to become active members of the workforce. This introduces diversity into the ranks of MBA programs, management of organizations and amongst the members on the board of directors. Women are naturally

more concerned about socially responsible investing and amount to roughly 60 % of all socially conscious investors. Moreover, investors no longer need to sacrifice long term performance when investing in a socially responsible manner as academic literature has proven socially screened portfolios to exhibit similar returns to conventional portfolios. (Schueth 2003.)

The Principles for Responsible Investment (PRI) give tangible evidence to the growing importance of socially responsible investing. The PRI was founded in early 2005 by the United Nations when a group of the world's largest institutional investors were invited to develop the Principles for Responsible investment. The PRI's mission is to encourage investors to integrate ESG criteria into their investment decisions to contribute to an economically efficient and sustainable global financial system. This benefits the environment and society and goes hand in hand with long-term value creation. The PRI has launched six principles for responsible investment to offer possible actions to help investors incorporate ESG criteria in their investment decisions. Incorporating ESG criteria into investment decisions contributes to the development of a more sustainable and resilient global financial system. (Principles for Responsible Investment 2018.)

Principle 1. Incorporate ESG issues into investment analysis and decision-making processes.

Principle 2. Be active owners and incorporate ESG issues into our ownership policies and practices.

Principle 3. Seek appropriate disclosure on ESG issues by the entities in which we invest.

Principle 4. Promote acceptance and implementation of the Principles within the investment industry.

Principle 5. Work together to enhance our effectiveness in implementing the Principles.

Principle 6. Report on our activities and progress towards implementing the Principles. Since the Principles for Responsible Investment were launched at the New York Stock Exchange in 2006, the number of signatories has grown constantly from 100 to over 1800. Figure 3 demonstrates the growth of the number of signatories who have signed to follow principles and the assets under management from 2006 to 2017. Assets under management have grown from \$6,5 trillion in 2006 to \$68,4 trillion in 2017. (Principles for Responsible Investment 2018.)

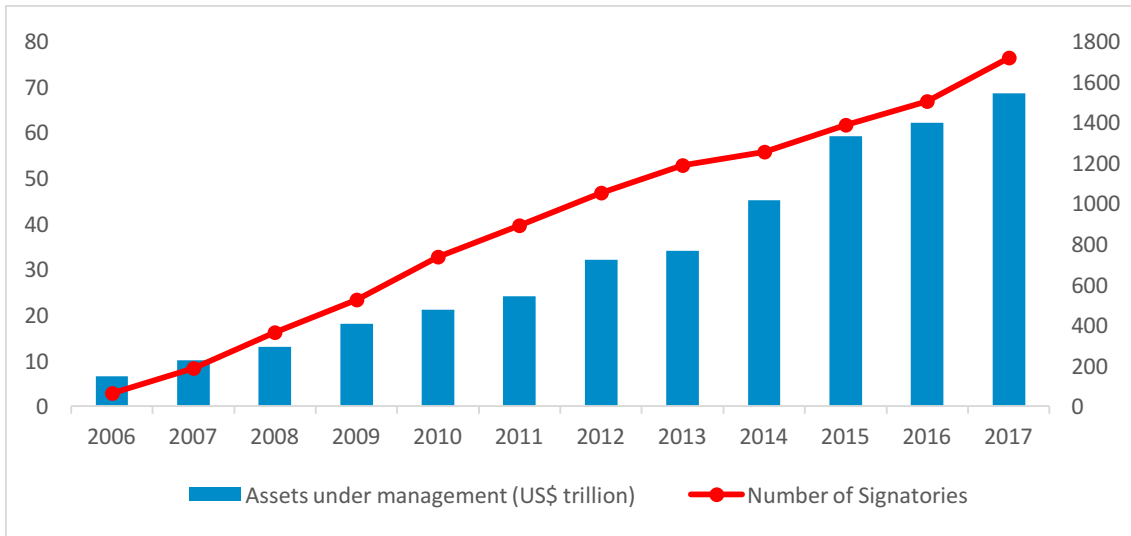


Figure 3. Growth of the PRI from 2006-2017 (Principles for Responsible Investment 2018.)

All in all, socially responsible investing is an ambiguous concept which is influenced by investor behavior and their personal values. Investors who favor socially responsible investing value companies and stock using criteria such as environmental stewardship, diversity and employee equality. Due to these elements and the ambiguity of socially responsible investing, the SRI factor of stocks and firms are difficult to measure and define. (Hamilton & Statman 1993.)

2.1. History of socially responsible investing

The roots of socially responsible investing date back to the early biblical times when Jewish law laid down guidelines on how to invest in an ethical and virtuous way. For centuries religious investors invested in peace and avoided investing in enterprises that profited from human slavery and weapons used for war. The religious origins of socially responsible investing can be seen to this day through the avoidance of sin stocks. Stocks are referred to as sin stocks if the issuing company is involved in the alcohol, tobacco and gaming industries. This is a common strategy that is still used by US socially conscious investors. (Schueth 2003.)

Over the course of modern finance, socially responsible investing has developed from a religious and ethical method used by responsible investors to its modern form of value based investing. During the 1960s, socially responsible investing advanced with the political climate to a value-based, exclusionary and inclusionary investment approach.

This influenced the public to become more aware of the impact companies and investors have on the public good. (Finley & King 2013.) The amount of socially conscious investors grew dramatically in the 1980's when companies, universities, cities and states began pursuing investment strategies that focused on the empowerment of minorities. Catastrophic nuclear incidents, such as the Chernobyl disaster, and global warming have attracted the interest of socially concerned investors to pay more attention on environmental issues. More recently, human rights issues and the working conditions in factories around the world have become points of interest for responsible investors. (Schueth 2003.)

2.2. SRI Strategies

Socially responsible investing is the process of integrating personal values and societal concerns with profit seeking investment decisions. There are three basic strategies socially responsible investors use that are aimed at the dual objective of developing society whilst accumulating competitive financial returns. The three main strategies are screening, shareholder advocacy and community investing. (Schueth 2003.) Positive screening and shareholder advocacy are the most important factors in the development of modern socially responsible investing as they consider investors values without harming diversification or long-term returns (Finley & King 2013).

2.2.1. Screening

The most traditional and dominant SRI strategy is screening as it represents 73 percent of the total SRI investment universe (de Colle & York 2009). Screening can be split into negative and positive screening where negative screening is the oldest and most basic SRI strategy. Negative screens are used to filter and avoid specific firms that are involved in unethical industries that have a negative impact on the environment and social wellbeing of the public. Generally, firms involved in the tobacco, weapons and gaming industry are excluded from a portfolio. Other negative screens may include irresponsible foreign operations, violations of human rights, animal testing, meat production and so on. After utilizing negative screens on an asset pool, a portfolio is created using financial and quantitative selection for diversification purposes. (Renneboog, Ter Horst & Zhang 2008.) Negative screens also avoid stocks that are likely to cause high-impact negative news regarding their environmental, social or

governance issues which allows SRI portfolios to withstand bear markets (Nofsinger & Varma 2014).

A more modern version of screening is positive screening where socially conscious investors seek firms that make positive contributions to the public and meet superior corporate social responsibility standards. Most commonly positive screens concentrate on ESG criteria and, therefore, select firms that incorporate ESG in their daily operations to create a portfolio. Positive screens are often combined with a best-in-class approach where firms are ranked within an industry based on their CSR or ESG score. Subsequently, firms with the highest CSR and ESG scores are selected into a portfolio. (Renneboog et al. 2008; Schueth 2003.) Like negative screens, positive screens select stocks that are unlikely to cause negative shocks regarding their ESG issues allowing the created portfolio to better withstand bear markets (Nofsinger & Varma 2014).

Typically, a combination of the two different screening strategies is used to create portfolios exhibiting superior financial returns. The combined analysis results in portfolios that include firms with superior corporate social responsibility, high environmental stewardship, excellent employee satisfaction, and companies that produce and sell products that are useful to the public whilst promoting human rights issues. (Schueth 2003.) This is often referred to as the triple bottom line as it focused on people, plant and profit by integrating ESG criteria into both negative and positive screens (Renneboog et al. 2008).

2.2.2. Shareholder advocacy

Shareholder advocacy can be described as the actions socially conscious investors take in their role as owners of corporations through their voting rights. The strategy seeks to influence the senior management of a corporation with the acquirement of a significant ownership position in a firm to lobby for change in annual meetings. The goal is to encourage the management of a corporation to incorporate corporate social responsibility and ESG criteria in their daily operations. This is done through direct dialogue with the management or proxy votes to lobby for greater responsibility and to guide a corporation towards a more ethical strategy. Shareholder advocacy increases the wellbeing of a corporation's stakeholders whilst improving financial performance through increased customer, employee, stockholder, vendor and community satisfaction. (de Colle & York 2009; Renneboog et al. 2008; Schueth 2003.)

As currently practiced, shareholder advocacy is an extemporaneous method to address environmental, social and governance issues of a firm. Even though shareholders are able to lobby for a change, most resolutions are unsuccessful. If the economic opportunity of underlying operations is available to the rest of the market, shareholder requests may be overwritten for economic and cost purposes. Shareholder advocacy's impact would be greater if investors were able to systematically change industrial practices and participate in issues at an industry level. However, industrial levels have not been at the focus of shareholder activists who tend to concentrate on firm-specific issues. (Haigh & Hazelton 2004.)

2.2.3. Community investing

Community investing is a strategy that allows investors to engage in under privileged communities that cannot access capital through conventional channels. The idea is to direct funds to low-income, at-risk and financially disadvantaged communities. Idyllically these funds will provide credit, banking, and other basic financial services to underserved communities. Some socially conscious investors make an effort to allocate a small percentage of their investments to Community Development Financial Institutions (CDFIs) that offer resources and programs to support economically disadvantaged communities. CDFIs also focus on generating economic growth by providing low income housing and business financing to create opportunities that would otherwise be unattainable. (de Colle & York 2009; Schueth 2003.)

2.3. Sin stocks

Sin stocks are on the opposite end of the spectrum from socially responsible investing. Sin stocks are commonly used to study the effect that social norms have on the market. The stock of companies involved in the alcohol, tobacco and gaming industry are most universally perceived as sin stocks and are often referred to as the "triumvirate of sin". Consumer products of these industries are viewed as sinful due to their addictive properties and undesirable social consequences when excessively consumed or used. These industries are especially avoided by institutional investors of pension funds and endowments who negatively screen sin to rule out any association. (Hong & Kacperczyk 2009.)

Sin stocks are considered socially unacceptable, unethical and immoral because they are perceived as profiting from exploiting human weaknesses. Enterprises involved in the production of alcohol, tobacco and gambling are exposed to a significant price effect due to their avoidance by institutional investors. By shunning certain stock, investors cause the cost of capital to increase which subsequently affects stock prices and returns. Moreover, abstaining from these stocks lead to additional financial costs and losses that certain investors are willing to bear for ethical reasons. This implies that socially responsible investing is of a growing importance within the financial sector (Hong & Kacperczyk 2009.)

Social values affect economic values particularly in the case of sin stock. Fabozzi and Oliphant (2008) find that a portfolio compiled of sin stock produced significantly higher returns than commonly used benchmarks such as the market. The economic gain sin stocks exhibit accrues from their characteristic of not conforming to social standards and their tendency to be underpriced in the market. Another reason behind the outperformance comes from the social norms of investors and their negative attitudes towards enterprises operating in sinful industries. (Fabozzi & Oliphant 2008.)

Similar to SRI fund performance, the VICEX “sin” fund exhibits varying returns during different market cycles. Empirical findings suggest that the VICEX fund has the opposite reaction to market distress than socially responsible mutual funds which lie on the opposite end of the spectrum. The VICEX fund outperforms the market and delivers superior returns compared to socially responsible mutual funds during market expansion. During market turmoil, the VICEX underperforms the market which is the opposite reaction to SRI mutual funds. However, both types of funds offer long-term sustainable performance despite their varying returns during different stages of the market cycle. (Soler-Dominguez and Matallin-Saez 2015.)

3. THEORETICAL BACKGROUND

The purpose of this chapter is to provide the theoretical background behind this study. The chapter will introduce the efficient market hypothesis and the Markowitz (1952) portfolio theory. These two theories are essential when explaining the theory behind socially responsible investing as SRI may harm market efficiency and diversification benefits. The chapter aims to connect the mentioned theories with socially responsible investing with the use of existing academic literature and commonly used methodology.

3.1. Efficient market hypothesis

A market is commonly referred to as efficient if security prices fully reflect all available information. In an efficient market, stocks are traded at a fair value and arbitrage opportunities do not exist as stock are not under or overvalued. However, this assumption doesn't always hold. Three forms of market efficiency have been presented: weak, semi-strong, and strong. When market efficiency is in a weak form, prices only reflect historical information. The weak form of market efficiency is based on a random walk theory that assumes the market movements of securities move randomly making it impossible to predict future prices. In a semi-strong form, market prices reflect historical information as well as publicly available information such as initial public offerings (IPOs), announcements of mergers and acquisitions, stock splits and other corporate actions. A strong form of market efficiency is reached when security prices reflect all available information including non-public information. Non-public information can also be referred to as insider information as some investors have monopolistic access to relevant information about security price movements. (Fama 1970.)

Since 1970, Fama (1991) has altered his original efficient market theory. Fama (1991) develops his theory by reviewing theoretical and empirical research and adjusting the different efficient market forms. The first category of weak form tests, which are only concerned with the forecast power of past returns, are altered to include the more general area of tests for return predictability. Tests for return predictability include the forecasting power of past returns and variables such as dividend yields and interest rates. This category of tests also considers the cross-sectional predictability of returns since market efficiency and equilibrium-pricing are inseparable from each other.

Additionally, the tests include asset pricing models and anomalies such as the size and January effect. (Fama 1991.)

For the second and third categories, Fama (1991) suggests a change in title with the coverage remaining the same. The semi-strong form title is alerted to event studies which has been a growing industry in the financial sector. The use of event studies is increasing as they give the most direct and supportive evidence on market efficiency. Strong form of market efficiency is changed to tests for private information, to better describe the concept of insider trading. Tests for private information are able to capture the monopolistic position of corporate insiders accessing private information that has not been reflected in security prices. Non-public information provides insider traders with arbitrage opportunities that may lead to superior returns. (Fama 1991.)

In modern finance, the most common way to distinguish among the three versions of efficient markets are the weak, semi-strong and strong forms. Even if the markets are efficient, a rational investor would select stock to a well-diversified portfolio to minimize systematic risk. Theoretically the efficient market hypothesis seems logical however, the EMH has never been accepted amongst portfolio managers. In the case of socially responsible investing, investors wouldn't be able to acquire superior returns if all assets were fairly priced. If the extreme strong form of market efficiency were to hold, many trading strategies could be disregarded because they would just lead to additional costs and a sub-optimally diversified portfolio. (Bodie, Kane & Marcus 2004:373-393.)

3.1.1. Measuring market efficiency

The capital asset pricing model (CAPM) can be used to measure market efficiency as it is a set of predictions concerning risky assets and their equilibrium expected returns (Bodie et al. 2004:287). The CAPM was created in the 1960's and it builds on the portfolio selection theory developed by Markowitz (1952) where investors select a portfolio at a past time ($t-1$) that produces return in a future period of time (t). Furthermore, Markowitz (1952) theory assumes that investors are risk averse and only choose portfolios that are mean-variance-efficient. (Fama & French 2004).

Figure 4. presents capital asset pricing model portfolio opportunities using the mean-variance-efficient frontier with a riskless asset and minimum variance frontier for risky assets. The vertical axis displays the expected return and the horizontal axis portfolio

risk, which is measured by the standard deviation of portfolio return. Curve *abc* presents the minimum variance frontier for risky assets that traces different combinations of expected return and risk for risky portfolios minimizing return variance. At point *T* where the mean-variance-efficient frontier asset and minimum variance frontier for risky assets meet, the rate of expected return is attained with the lowest possible volatility. (Fama & French 2004.)

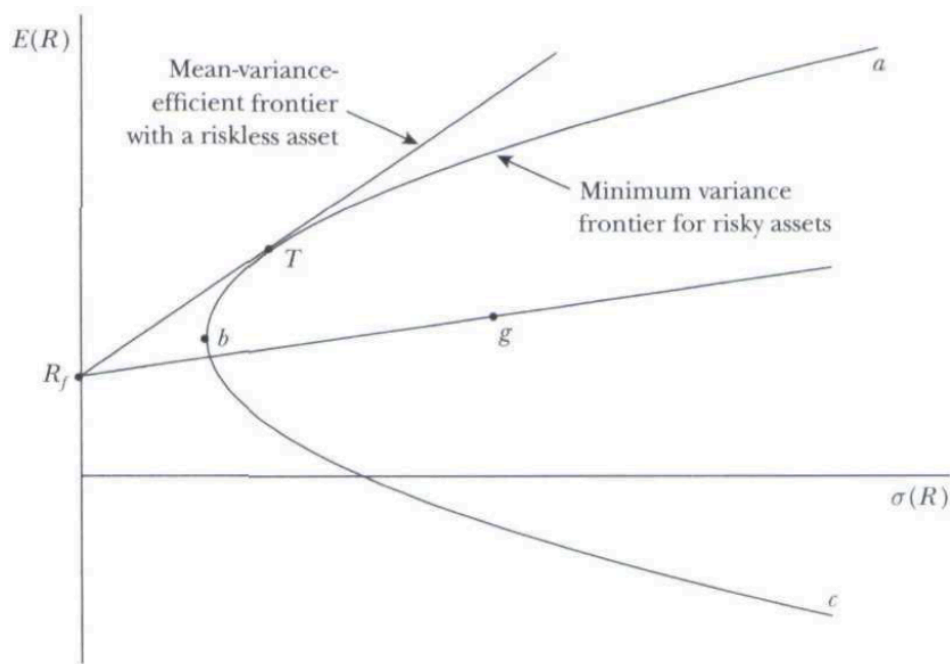


Figure 4. CAPM Investment Opportunities (Fama & French 2004.)

The capital asset pricing model is still widely used in finance as it simple and based on an assumption that the expected rate of return for a security can be derived from the risk-free rate, expected market return and security market beta. Thus we obtain the CAPM which is presented in equation (1). (Fama & French 2004.)

$$(1) \quad E(R_i) = R_f + [E(R_M) - R_f]\beta_{iM}$$

Where $E(R_i)$ = Expected return on security *i*
 R_f = Risk-free rate of return
 $E(r_M)$ = Expected market return
 β_{iM} = Market beta of security *i*

Bodie, Kane and Marcus (2004) present six simplifying assumptions that lead to the basic and common version of the capital asset pricing model. These assumptions are based on individuals acting as alike as possible with the exceptions of initial wealth and risk aversion to simplify the understanding of CAPM. The following list presents the simplified assumptions:

1. Perfect competition assumption of microeconomics.
2. All investors have the same holding period.
3. Investors only trade publicly available assets and are able to lend at the risk-free rate.
4. No taxes or transaction costs.
5. Investors act rationally.
6. All investors behave homogeneously. (Bodie et al. 2004:287.)

Another common way to measure market efficiency is the Fama-French three-factor model. Fama and French (1993) suggest that there are three stock-market factors that affect returns and variation. The model assumes that the price of a security is dependent on the sensitivity of its returns, an overall market factor and two risk factors. To capture the affects that the risk factors impose, six portfolios are formed to mimic the underlying risk factors related to size and book-to-market equity ensuring correspondence between academic literature and practice. The three-factor model is presented in equation (2):

$$(2) \quad E(r_i) - R_f = \alpha_i + \beta_{im}R_{mt} + \beta_{iSMB}SMB_t + \beta_{iHML}HML_t + \varepsilon_t$$

Where $E(r_i) - R_f =$ Portfolios expected excess return

$\alpha =$ Securities risk premium

$R_{mt} =$ Market return

$\beta_i =$ Sensitivity of security i (beta)

$SMB =$ Small minus big

$HML =$ High minus low

$\varepsilon_i =$ Abnormal return

SMB is the difference between the returns of small- and big-stock portfolios with the same weighted-average book-to-market equity, mimicking the risk factor in returns related to size. HML is the difference between high book-to-market and low-book-to-market portfolios. The HML components are constructed using portfolios of the same

weighted average size to free it of the size factor in returns. Therefore, the two risk factor focus on their return behavior and should not overlap each other. (Fama & French 1993.)

3.2. Portfolio Theory

The modern portfolio theory is based on Harry Markowitz (1952) portfolio selection theory that assumes the process of selecting a portfolio is conducted through two stages. The first stage includes the performance analysis of available securities. Relevant beliefs about future performances and portfolio selection is done in the second stage. (Markowitz 1952.) A modern version of the Markowitz portfolio selection model generalizes portfolio construction as the choice between a risk-free asset and risky assets. The first step is similar to Markowitz (1952) and includes the determination and analysis of available risk-return opportunities in a global asset pool. The minimum-variance frontier, presented in figure 5., summarizes all available risk-return opportunities. Minimum-variance frontier of risky assets is a graph that demonstrates the lowest possible variance for a given portfolio expected return based on individual assets. When short selling is allowed, all the individual assets lie on the right hand side of the efficient frontier. Furthermore, the diagram displays that risky portfolios comprising of only one asset are inefficient and diversification decreases standard deviations while producing higher expected returns. (Bodie et al. 2004:240-241.)

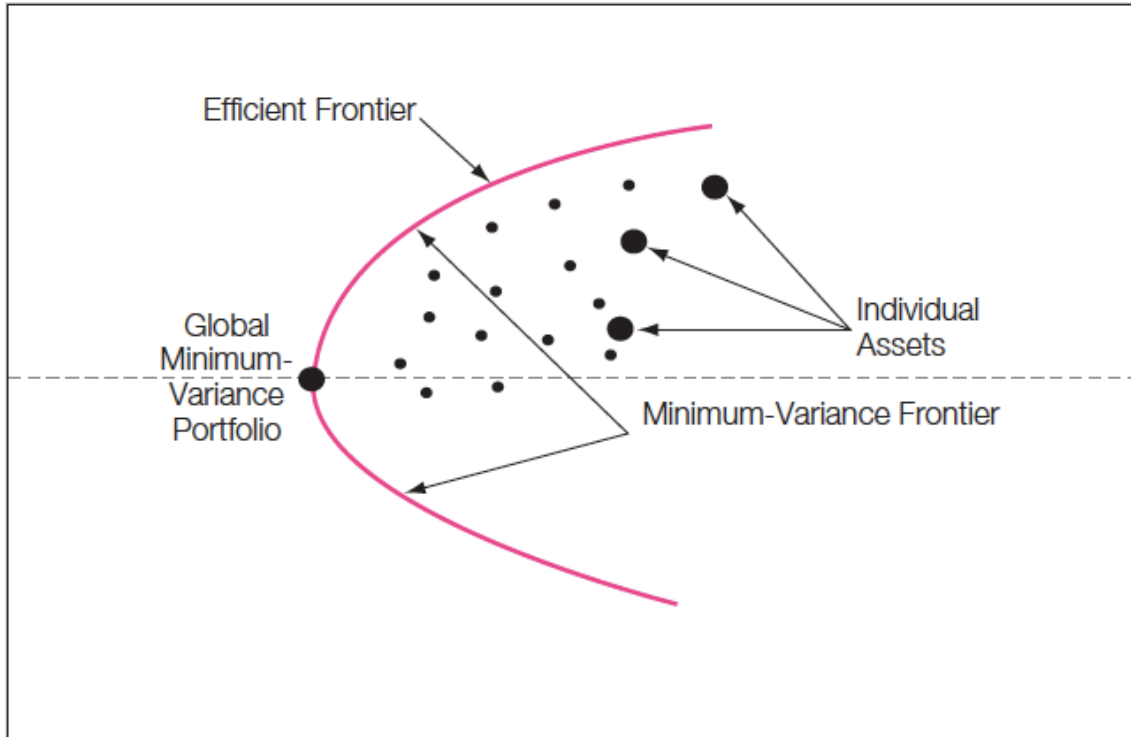


Figure 5. The minimum-variance frontier of risky assets (Bodie et al. 2004:241).

All the portfolios lying above the broken line and on the minimum-variance frontier are potential candidates as the optimal portfolio. This is because they lay upward from the global minimum-variance portfolio consequently, providing the best risk-return combinations. The part of the frontier that lies above the global-minimum variance is called the efficient frontier of risky assets that displays standard deviation and expected return combinations. Portfolios on the bottom part of the minimum variance frontier can be considered as inefficient because there is a portfolio that produces higher expected returns with the same standard deviation. (Bodie et al. 2004:241.)

The second step of the optimisation process includes the determination of including a risk-free asset using the steepest possible capital allocation line (CAL). The steeper the CAL, the higher the reward-to-variability ratio is. Figure 6. presents three CAL, where the one tangent to the efficient frontier is supported by the optimal portfolio, P. This CAL dominates all the alternative feasible lines as it is the steepest slope, therefore, providing the highest reward-to-variability. Finally, the last optimisation step considers the appropriate mix between the optimal risky portfolio P and risk-free assets. (Bodie et al. 2004:241-244.)

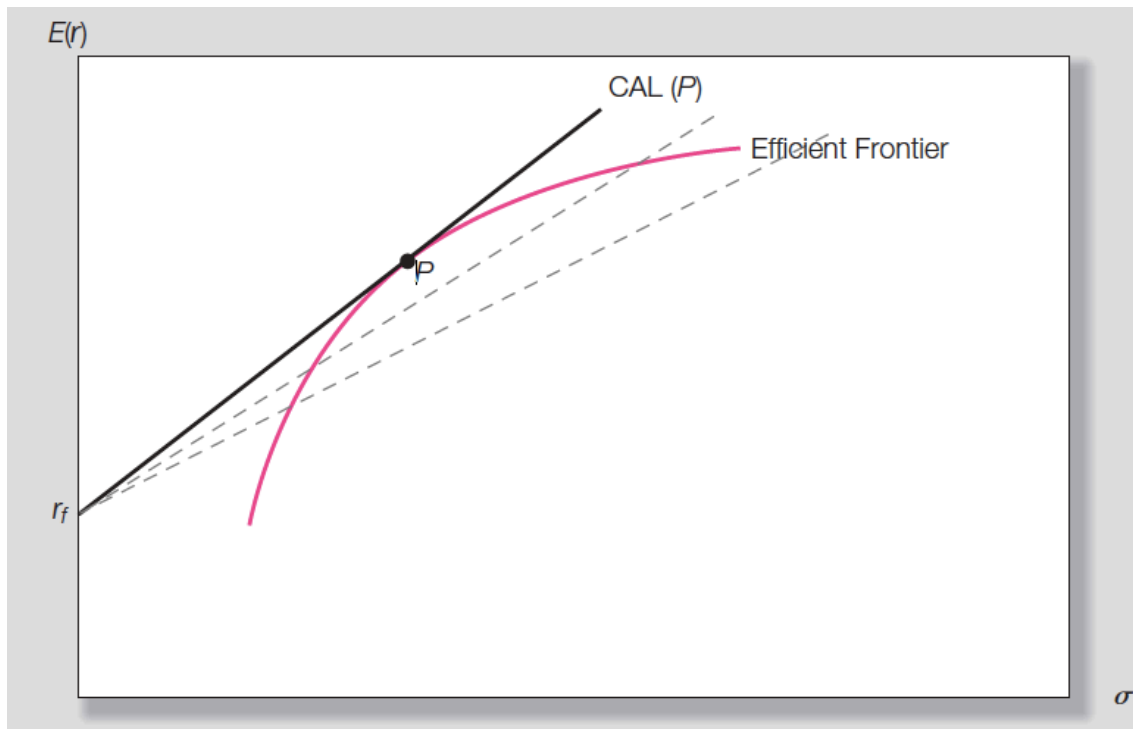


Figure 6. The efficient frontier of risky assets with the optimal capital allocation line (Bodie et al. 2004:244).

3.3. Socially responsible investing

The modern portfolio theory recognizes diversification as a method for decreasing an investor's risk exposure without harming future returns. Considering social criteria into investment decisions should theoretically harm a portfolio's diversification, increase risk exposure and decrease returns. Therefore, portfolios incorporating social criteria should be suboptimal and exhibit inferior returns. Nevertheless, it has been found that social responsibility aspects may be valuable contributors to portfolio risk reduction. This is because socially responsible funds offer different correlations to the market compared to conventional funds, offering economic benefits for investors, especially during market turmoil. (Hickman, Teets & Kohls 1999.)

As mentioned earlier, there is a common perception in finance that investors behave rationally and homogeneously when deciding on mean-variance optimization. This traditional finance theory does not consider an individual investor's preferences or values when analyzing investor behavior. If investors were to act rationally in practice, socially responsible investing would only exist due to superior returns at an equivalent amount of risk or lower risk for the same return. Over the last four decades, academic

literature on finance has shifted from this mindset. Nowadays investors are deemed as irrational to a greater extent. Investment decisions are often based on risk-return tradeoffs and investors demand higher compensation when taking on additional risk. It has been found that investor behavior can be driven by events, such as the increase of global social awareness, that create market inefficiencies, often referred to as anomalies. (Beal et al. 2005.)

Behavioral finance is a relatively new field of research in the financial industry that draws concepts and evidence of investor irrationality to explain anomalies. A few common examples of irrational behavior are overconfidence, anchoring and framing. Overconfidence refers to the behavior when an investor over-estimates their own abilities and begins to trade excessively consequently harming returns (Odean 1998). Anchoring occurs when a person conducting a quantitative analysis is simultaneously given irrelevant figures and statistics that they base their decisions on (Tversky & Kahneman 1974). Framing is an example of cognitive bias, where a proposition or question is presented in a way that influences and changes decisions (Slovic 1995). Additionally, Sherfin and Staman (1985) contribute to behavioral finance with evidence of cognitive biases and emotion affecting investment decisions, which is a fundament for value and ethics based investing.

Beal et al. (2005) derive three potential reasons why people invest ethically from traditional finance theory and academic literature on socially responsible investing: superior financial returns, contribution to social and environmental change and non-wealth reasons. These common motives are not mutually exclusive and collectively exhaustive, but offer a starting point to analyzing and understanding ethical investor behavior. The connection between corporate social performance and corporate financial performance is a widely researched topic in academic finance. However, it is inconclusive whether socially responsible investment funds over- or underperform conventional funds, making SRI funds fair investment opportunities. In addition to superior financial returns, social investors are motivated by non-wealth reasons which is apparent through investors being willing to bear extra transaction costs for options that adhere to their values. As SRI provides a vehicle for social change, many social and ethical investors base their investment decisions on the real outcomes of the activities of the firm which they have chosen to invest in. Their goal is to achieve greater social change through firms operating in sustainable industries. (Beal et al. 2005.)

A theoretical background for socially responsible investing can be derived from an investor's utility function which considers required financial returns, social status and values. Figure 7. presents an ethical investor's utility function with utility on the vertical axis and wealth on the horizontal axis. The utility function captures an ethical investors willingness to take risk, expected financial return and the utility of investing in an ethical manner. The diagram in figure 7. displays two outcomes that are equally possible. A risk-averse individual with initial wealth W_0 has a fair chance to acquire wealth up to W_2 if the investment is profitable, and lose wealth up to W_1 if the investment is unprofitable. Furthermore, the utility that the investor derives from participating in this particular investment depends on whether the investment is perceived as ethical, sustainable and morally responsible or unethical, unsustainable and irresponsible. If the investment is perceived as unethical, a socially responsible investor would be better off avoiding it, as they will derive less utility from the investment. On the other hand, if the investment was ethical, the derived utility would be higher than from avoiding it altogether. Another important implication of the model is that investors gain more utility when their initial investment is smaller rather than higher. (Beal et al. 2005.)

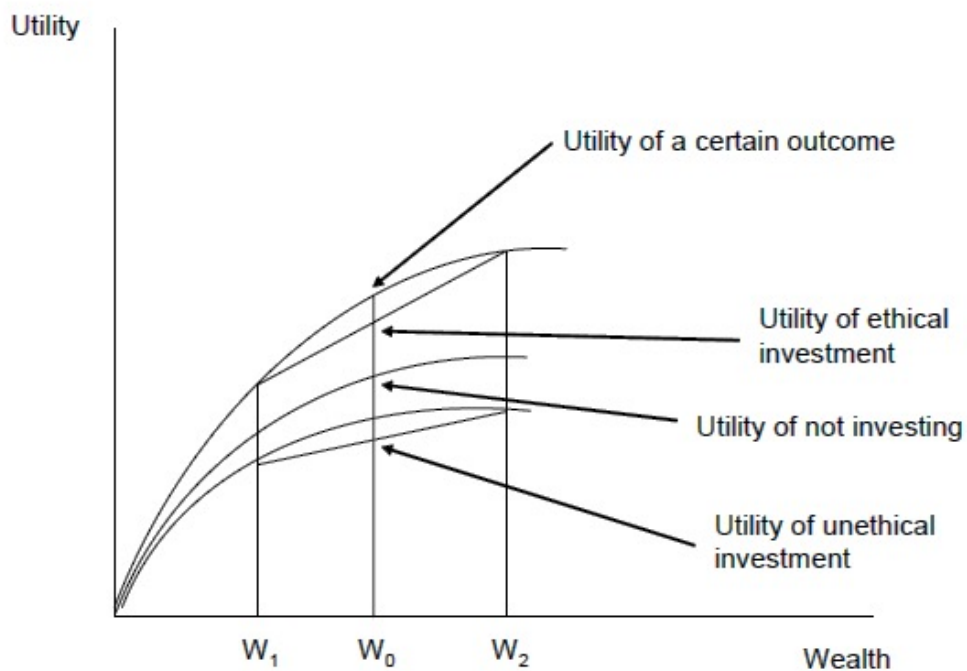


Figure 7. Ethical investor's utility function (Beal et al. 2005).

To place socially responsible investing within the theoretical economic framework, the utility function from modern finance theory can be adjusted. The utility function in modern finance theory includes two functions: risk and expected return. It measures the standard deviation of possible divergence of actual outcome from expected investment outcomes as presented in equation 3 (Beal et al. 2005):

$$(3) \quad U = f(E_R, \sigma_R)$$

Where U = Utility
 E_R = Expected return
 σ_R = Standard deviation

In modern finance theory, investors are assumed to make decisions based off risk-return tradeoffs, causing expected return to have a positively influence utility and risk to negatively influence utility. An additional variable is added to the utility function to measure the degree of ethicalness (e) and investment exhibits (Beal et al. 2005):

$$(4) \quad U = f(E_R, \sigma_R, e)$$

When the degree of ethicalness is added to the utility function, the indifference curve of an investor changes. Figure 8. demonstrates how the traditional investor's indifference curves into indifference planes. The traditional indifference curves are upward sloping because investors expect higher returns when bearing additional risk to compensate for the willingness to take on higher amounts of risk. On the other hand, indifference planes of an ethical investor consider a risk-return-ethicalness tradeoff. As in the conventional indifference curves, investors demand higher compensation when bearing additional risk. However, ethical investors are willing to accept diminishing expected returns, since they take into account the degree of ethicalness of a particular investment, even though the risk-return tradeoff were similar to a conventional investment. (Beal et al. 2005.)

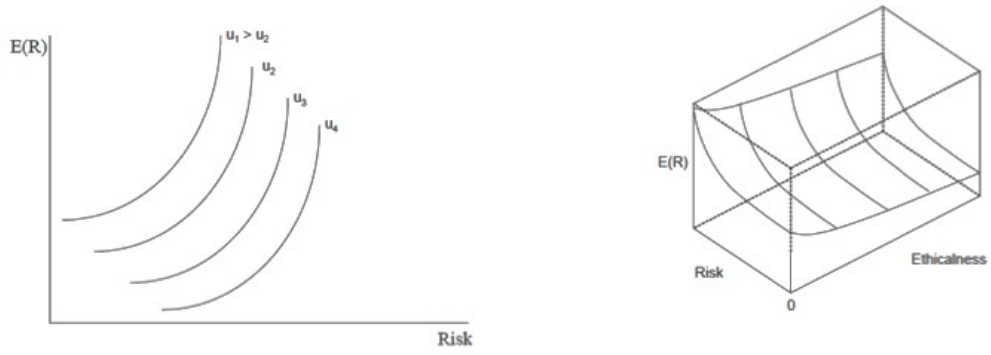


Figure 8. A conventional investors indifference curves and an ethical investors indifference planes (Beal et al. 2005).

4. PRIOR EMPIRICAL EVIDENCE

Even though socially responsible investing is a relatively new phenomenon in the financial industry, numerous studies have been conducted on the performance of SRI funds. The results vary from no significant impact between socially responsible mutual funds and their conventional counterparts (Hamilton et al. 1993; Goldreyer & Diltz 1999; Humphrey & Tan 2014), to superior financial returns (Derwall, Guesnster, Bauer & Kedijk 2005; Kempf & Osthoff 2007; Derwall, Kedijk & Ter Horst 2011) and negative returns (Renneboog et al. 2008; Adler & Kritzman 2008; Nofsinger & Varma 2014). This chapter will provide insight to the ambiguity of socially responsible investing by presenting results from previous studies focusing on SRI performance and the incorporation of ESG criteria and screens.

4.1. No significant impact

Hamilton et al. (1993) study the expected and actual relative returns of socially responsible mutual funds and conventional mutual funds. They compare the monthly excess returns of socially responsible and conventional mutual funds for two periods: funds established in 1985, or earlier, and funds established in 1986, or later. A sample of 170 conventional funds serve as a benchmark for the first group of 17 socially responsible mutual funds, and a sample of 150 conventional funds serve as a benchmark for the second group of 15 socially responsible mutual funds. Their results indicate that the market does not price the social responsibility characteristic and investors can expect the same outcome of socially responsible mutual funds and conventional mutual funds. Furthermore, social responsibility factors have no effect on a firm's cost of capital.

Goldreyer and Diltz (1999) examine the performance of 49 mutual funds that incorporate social goals and policies into their investment decisions. The sample is further split into funds that use screens based on social criteria, and funds that do not employ such screening strategies into their decisions. A random sample of conventional mutual funds is used as a benchmark for comparison. Consistent with the results of Hamilton et al. (1993), Goldreyer and Diltz (1999) find that neither one of the socially responsible sample groups display any advantage over the benchmark sample of conventional funds. Goldreyer and Diltz (1999) conclude that funds do not benefit from incorporating social criteria in their investment decisions.

Humphrey and Tan (2014) investigate whether or not the exclusion of sin stocks and incorporation of stocks with superior ESG ratings harm portfolio returns and performance. They use negative and positive screens to simulate portfolios that are designed to imitate conventional equity mutual funds with SRI characteristics. The idea is to mimic funds that are likely to be held by retail investors. Their results indicate that neither positive, or negative screening impact a portfolios' risk or returns, contributing to the results of Hamilton et al (1993) and Goldreyer and Diltz (1999). Moreover, their results are consistent with the well-established finding that incorporating ESG criteria through screening strategies does not result in significant benefits, or costs for socially aware investors.

4.2. Positive impact

On the contrary to Hamilton et al. (1993), Glodreyer and Diltz (1999), and Humphrey and Tan (2014), Derwall et al. (2005), Kempf and Osthoff (2007) and Derwall et al. (2011) find that portfolios social responsibility characteristics produce superior financial returns compared to the market and conventional assets. As mentioned earlier, the varying outcomes could result from the different methodologies used and the area-specific samples.

Derwall, Guenster, Bauer and Koedijk (2005) study whether socially responsible investing leads to inferior or superior portfolio performance from an eco-efficiency perspective. Instead of using absolute pollution levels as a proxy for environmental performance, the authors use the relative measure of eco-efficiency. Eco-efficiency is defined as the ratio of economic value a company adds from producing goods and services relative to the waste a company generates by creating that specific value. An absolute measure of environmental performance only considers companies that operate in environmentally friendly industries as good environmental performers. On the opposite side of the spectrum, companies operating in environmentally sensitive industries are considered as poor environmental performers. A relative measure of eco-efficiency observes how companies perform relative to their competitors who face the same environmental challenges, making it a more comprehensive measure.

Derwall et al. (2005) construct two mutually exclusive stock portfolios that exhibit long-term correlation between environmental criteria and investment returns. The high

ranked portfolio consists of companies providing the highest 30 percent of average returns and the low-ranked portfolio of companies providing the lowest 30 percent of average returns. Portfolios are re-ranked and rebalanced annually. Although conventional investment theories predict that incorporating ecological criteria to investment decisions decreases diversification benefits, Derwall et al. (2005) results indicate that considering environmental criteria into investment processes can provide investors with substantial benefits and superior financial performance. The results hold even when considering transaction costs.

Since socially responsible investing is a steadily growing market segment, Kempf and Osthoff (2007) study whether investors incorporating socially responsible screens into their investment processes are able to increase portfolio performance. Negative, positive and best-in-class screens are employed to investigate the impact social norms have on portfolio performance. They implement a simple long-short trading strategy based on the socially responsible ratings from the KLD Research & Analytics database. The long-short strategy is executed by purchasing stocks with high socially responsible rating and selling stocks with low socially responsible ratings. Two socially screened portfolios are constructed to analyze how SRI screens effect performance. Similar to Derwall et al. (2005), Kempf and Osthoff (2007) form a low-rated portfolio and high-rated portfolio. The high-rated portfolio consists of all stocks without any connections to controversial business area whilst the low-rated portfolio consists of stocks involved with at least one controversial business area.

Their results propose that past SRI ratings are valuable tools investors can implement into their investment decisions. Investors are able to earn significantly high abnormal returns when using positive screens or a best-in-class approach. Negative screening does not lead to superior returns, as it excludes stock from a portfolio which results in decreasing diversification benefits. The best-in-class approach exhibits the highest abnormal returns and is especially beneficial when using a combination of several SRI screens. The results stay significant even when considering transaction costs which indicates that the simple long-short strategy based SRI rating lead to superior financial returns. (Kempf & Osthoff 2007.)

Derwall, Koedijk and Ter Horst (2011) divide socially responsible investors into value-driven and profit-seeking segments. Value-driven investors tend to use negative screens to avoid investing into controversial industries and firms, while profit-seeking investors use positive screens to uncover firms with superior corporate social responsibility. The

authors attempt to explain how SRI relates to stock prices with the use of the following hypotheses: the shunned-stock hypothesis and the errors-in-expectations hypothesis. The shunned stock hypothesis assumes that socially responsible investors make investment decisions based on their values. By avoiding investments in “sin stocks”, responsible investors create a shortage of demand for irresponsible assets and an excess demand for responsible assets, creating distortions in stock prices. The errors-in-expectations hypothesis assumes that the markets systematically underestimates the value of corporate social responsibility leading socially responsible investors to accumulate superior financial returns.

Derwall et al. (2011) find that investors exploiting the profit-driven strategy create positive abnormal returns. However, the effect is diminishing in the long run. Additionally, when using a hybrid of exclusionary negative screens and inclusionary positive screens, the effect of positive returns can be canceled out. This is often referred to as the “no net-effect” which leads to SRI funds and conventional funds producing similar returns. Moreover, the paper acknowledges that the values and preferences of socially responsible investors vary, resulting in different complementary outcomes.

4.3. Negative impact

Numerous studies have found evidence of investors bearing a cost for investing in a socially responsible way. Amongst those are the studies of Renneboog, Ter Horst and Zhang (2008), Adler and Kritzman (2008), and Nofsinger and Varma (2014). Responsible investors are able to downside their risks by incorporating ESG criteria, evidently increasing the cost of capital (Nofsinger & Varma 2014). Investors have to pay a cost for the stock of companies willing to operate in an ethical way due to increased firm cost of capital (Renneboog et al. 2008).

Renneboog et al. (2008) provide one of the most extensive SRI studies done in the 21st century by presenting a critical overview of the current state of academic literature. Their paper reviews recent industry trends related to SRI from the historical roots to its modern day applications and strategies. The conflict between shareholder value maximization and stakeholder value maximization is addressed by attempting to answer which value maximization is more important from a firm’s perspective. Additionally, the paper investigates whether SRI investors are as preoccupied by financial performance as conventional investors. A behavioral aspect is considered by reviewing

literature on SRI fund cash flows and factors SRI investors consider in their investment process. Finally, Renneboog et al. (2008) review theories and evidence on how SRI may impact the real economy through cost of capital and reduced cash allocations to long-term investments.

Renneboog et al. (2008) find that even though SRI is a relatively studied field of finance, the emergence of SRI combined with behavioral biases make SRI performance difficult to conclusively measure. Even though the market does not seem to price CSR factors, which leads to increased stakeholder value, shareholders are exposed to increased costs. Furthermore, existing literature seems to hint that SRI investment funds perform worse than conventional funds, especially in Continental Europe and Asia-Pacific. SRI fund managers show signs of pursuing both financial goals and social objectives leading to potentially higher trading costs. All in all, SRI investors appear willing to accept suboptimal financial performance to pursue investment strategies that are coherent with their personal values and ethical objectives.

Adler and Kritzman (2008) claim that a market inefficiency providing responsible investors with superior returns does not exist and social responsibility always generates costs. They argue that the only motive behind owning “good” companies is expected higher returns. This is simply the active management strategy centered on the belief that companies with superior CSR generate higher returns than companies with low CSR. Their results suggest that investors should estimate the costs of social responsibility characteristics. Restricting investment choices reduces diversification and leads to a suboptimal portfolio. Moreover, their results indicate that the cost of social responsibility increases with the investor’s skills, due to added excess restrictions on an asset universe.

Nofsinger and Varma (2014) study the performance of SRI funds incorporating ESG criteria during different market conditions. They suggest that even though SRI funds exhibit negative returns in the long run, they outperform the market and conventional funds during market turmoil. Nofsinger and Varma (2014) use a sample of SRI mutual funds which are matched with conventional funds to examine fund performance during non-crisis and crisis periods. Their results consistent with Renneboog et al. (2008) and Alder and Kritzman (2008). SRI mutual funds provide inferior performance compared to conventional mutual funds during non-crisis periods. However, during market turmoil, SRI funds outperform their conventional counterparts with the exception of negatively screened funds. Negative screening seems to harm portfolio performance

more than positive screening. It can be concluded that SRI mutual funds underperform conventional funds during non-crisis periods and during crisis periods when using negative screens.

4.4. Conclusions from prior empirical evidence

When considering prior empirical evidence, it is evident that SRI is an ambiguous concept exhibiting varying results. As mentioned earlier, the results vary from no significant impact to positive and negative impact. Humphrey and Tan (2014) found that imposing negative and positive screens on an asset class neither benefits or harms performance. Kempf and Osthoff (2007) find that investors favoring a best-in-class approach or positive screening are able to achieve superior financial returns compared to the market and conventional assets. However, negative screening harms portfolio performance leading to inferior returns (Nofsinger & Varma 2014). Additionally, studies have found that socially responsible investors are willing to bear additional costs and accept suboptimal performance for the greater good of society (Renneboog et al. 2008).

5. DATA AND METHODOLOGY

This chapter aims to comprehensively present the data and methodology used in this study. The first part of the chapter explains the ASSET4 ESG score and how the score is composed. The next subsection presents the method used to construct portfolios using the ASSET4 ESG score as a differentiator. Finally, the methodology and regression models will be presented and explained.

5.1. Data description

The primary interest of this study is to examine how environmental, social and governance criteria impact financial performance. Thus, environmental, social and governance ratings are the most essential part of this study. The Thomson Reuters ASSET4 ESG score covers over 6000 companies globally using over 400 ESG metrics to compile standardized and simplified data. ESG measures are collected from publicly available annual reports, corporate social responsibility reports and other global media sources. The ESG score is a company specific measure which is based on ten ESG topics comprising of carefully selected 178 relevant and comparable data points assess overall ESG performance. Figure 9. presents how the overall ESG score is split in between the ten different ESG topics and the amount of data points one topic compiles of.

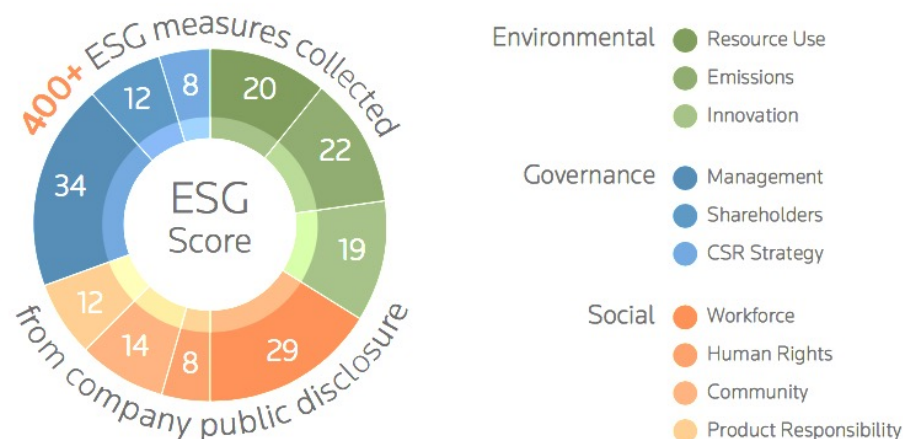


Figure 9. ESG metrics and score formation (Thomson Reuters 2018).

The initial data set comprises of annual ESG and other relevant measures for publicly listed firms over the period 2000-2016. Majority of the publicly listed firms are not assessed for their ESG performance leading to a relatively small sample size. As mentioned earlier, the main focus of this thesis is the Nordic markets. This includes listed firms from Nasdaq Helsinki, Nasdaq Stockholm, Nasdaq Iceland, Nasdaq Copenhagen and Oslo Stock Exchange. A high ESG score portfolio will contain all the firms with an ESG score. The no ESG score portfolio will contain listed firms with any ESG score available. Table 2 presents the initial and final sample of firms providing ESG scores.

	Number of listed firms	Number of firms with ESG scores
<i>Nasdaq Helsinki</i>	618	34
<i>Nasdaq Stockholm AB</i>	2980	125
<i>Nasdaq Iceland</i>	122	0
<i>Nasdaq Copenhagen</i>	818	36
<i>Oslo Exchange</i>	897	36
<i>Total</i>	5435	231

Table 2. Nordic stock market data

Table 2 provides insight to the relatively small portion of firms that are gives a score based on ESG criteria. The last column presents the amount of available ESG observations for Nasdaq Helsinki, Nasdaq Stockholm, Nasdaq Copenhagen and Oslo Stock Exchange. Since Nasdaq Iceland does not contain any ESG observations, it is excluded from further analysis. The final sample contains 231 firms that have at least one ESG observation from 2000-2016.

5.2. Portfolio construction

Portfolios are constructed based on individual firm ASSET 4 ESG scores. Table 2 presents the available firms containing ESG observations. The Nordic ESG portfolio will contain all 231 firms with ESG scores. The non ESG score portfolio will serve as a benchmark portfolio and will contain the 5313 firms that do not have ESG observations. This is to prevent distortions in returns. Selecting certain firms and excluding others may harm diversification leading to incorrect results.

Since other European stock markets are being used as a comparison, six additional portfolios will be constructed for the London Stock Exchange, Euronext and Deutsche Börs. Two portfolios will be constructed from each stock market to form a high ESG portfolio and non ESG portfolio. The portfolios will be constructed from using the firms from Table 3.

	Number of listed firms	Number of firms with ESG scores
<i>London Stock Exchange</i>	2483	516
<i>Euronext</i>	1240	227
<i>Deutsche Börs</i>	765	143

Table 3. Comparison stock market data

5.3. Methodology

The methodology of this thesis will closely follow published academic empirical work. The capital asset pricing model will be used to measure expected returns. Fama and French three factor model will be used as the main regression. Prior evidence has shown that the Fama and French three factor model is a suitable regression model when measuring socially responsible portfolio performance. Additionally, Jensen's alpha and Sharpe ratio will be used to obtain risk adjusted measures.

5.3.1. CAPM

The capital asset pricing model is built upon the assumption that an appropriate risk premium is determined by the total risk an investor bears. Investors demand higher expected returns when total portfolio risk increases. CAPM considers market expected rate of return, the risk-free rate and the beta coefficient of a stock or portfolio. There is a relationship between expected return and beta often referred to as the expected return-beta relationship. The commonly known relationship assumes that the expected return of a portfolio is determined by the risk-free rate and a risk premium which is based on the beta of a portfolio as presented in equation (5). (Bodie et al. 2010: 291-297.)

$$(5) \quad E(R_p) = R_f + \beta_p [E(R_M) - R_f]$$

Where $E(R_p)$ = Expected portfolio return
 R_f = Risk-free rate
 β_p = Portfolio beta
 $E(R_M)$ = Expected market return

5.3.2. Fama and French three-factor model

There are three stock market risk factors that affect the returns of stocks. An overall market factor capturing market risk and factors related to firm size and book-to-market equity. Portfolio expected excess returns can be explained by excess market return, firm size and book-to-market equity as presented in equation (6). (Fama & French 1993.)

$$(6) \quad E(r_i) - R_f = \alpha + \beta_{im}R_{mt} + \beta_{iSMB}SMB_t + \beta_{iHML}HML_t + \varepsilon_t$$

Where $E(r_i) - R_f$ = Portfolios expected excess return
 α = Securities risk premium
 R_{mt} = Market return
 β_i = Sensitivity of security i (beta)
 SMB = Small minus big
 HML = High minus low
 ε_i = Abnormal return

The SMB factor captures the risk factor relative to size. SMB can be defined as the difference between the returns on small and big stock portfolios exhibiting similar weighted average book-to-market equity. The HML factor mimics the risk factor related to book-to-market equity. HML can be defined as the difference between the returns on high book-to-market and low book-to-market portfolios of with similar weighted average size. (Fama & French 1993.)

5.3.2.1. Market factors and returns

The three factors and returns for the Fama and French three factor regression and CAPM are derived from the Kenneth R. French data library. Kenneth R. French provides the Fama and French factors are returns for developed markets including Europe. Annual data is gathered the Fama/French European 3 Factors file to allow regression analysis. (Kenneth R. French Data Library)

5.3.3. Jensen's Alpha

A commonly used risk adjusted measure is Jensen's alpha which was first presented by Michael Jensen (1968). Jensen's alpha is also widely known as the Jensen performance index. Jensen's alpha is an extension of the CAPM capturing abnormal return that the CAPM cannot predict. When a portfolio exhibits a positive alpha, it has outperformed the market index or benchmark. Conversely, a negative alpha indicates that a portfolio has underperformed the market index or benchmark. Jensen's alpha is presented in equation (7). (Elton, Brown, Gruber & Goetzmann 2014: 668.)

$$(7) \quad \alpha_p = \bar{R}_p - [\bar{R}_f + \beta_p(\bar{R}_M - \bar{R}_f)]$$

Where \bar{R}_p = Mean return of the portfolio
 \bar{R}_f = Risk-free rate of return
 β_p = Beta of the portfolio
 \bar{R}_M = Average market return.

5.3.4. Sharpe Ratio

William F. Sharpe (1966) developed a commonly used formula to measure portfolio performance known as the Sharpe ratio. The Sharpe ratio is a risk adjusted performance measure that compares portfolio excess return to the standard deviation of portfolio returns. In other words, the Sharpe is the average excess return per unit of standard deviation which is also known as portfolio volatility or total risk as presented in equation (8). (Sharpe, Alexander & Bailey 1999.)

$$(8) \quad SR_p = \frac{R_p - R_f}{\sigma_p}$$

Where SR_p = Sharpe's ratios for portfolio p
 R_p = Portfolio p return
 R_f = Risk-free rate of return
 σ_p = Portfolio p volatility

When comparing portfolios during a review period, the portfolio exhibiting the highest Sharpe ratio has outperformed all other portfolios.

5.4. Research hypotheses

The hypotheses of this study are derived from existing academic literature on the performance of socially responsible investment funds and portfolios. Three hypotheses will be derived as existing literature has found that integrating environmental, social and governance criteria either negatively or positively effect on portfolio performance. Furthermore, different market conditions seem to effect the performance of funds incorporating ESG criteria.

The first hypothesis seeks to analyze differences between portfolios that are synthetically conducted using the company specific Thomson Reuters ESG score as a differentiator. The hypothesis is derived from the study of Nofsinger and Varma (2014) where they investigate the performance of SRI funds exhibiting environmental criteria.

They find portfolios with highest environmental scores underperform portfolios with no environmental scores.

H₁: Companies with high ESG scores underperform companies with no ESG score.

The second hypothesis is also based on the study by Nofsinger and Varma (2014) which analyzes the effect of different extreme market conditions. They find that socially responsible mutual funds exhibit different performance depending on the market cycle. During market turmoil, socially responsible mutual funds outperform their conventional counterparts. However, during non-crisis periods, socially responsible mutual funds underperform conventional mutual funds. The hypothesis is tested by splitting the sample to non-crisis periods and crisis periods. The financial crisis will be the main crisis period in question.

H₂: The high-ESG score portfolio outperforms the non-ESG score portfolio during market turmoil.

The three hypotheses are tested using common socially responsible investing methodology. This includes Jensen's Alpha, Sharpe Ratio, Capital Asset Pricing Model and the Fama and French three factor model. These measures are used in the aforementioned research.

6. EMPIRICAL ANALYSIS AND RESULTS

This chapter empirically analyses the impact of ESG criteria on financial returns in the Nordic market by using commonly known regression models. First, the overall effect of incorporating ESG criteria will be analyzed which will be followed by an analysis of different market conditions. Furthermore, three large European stock markets will be used as comparison for deeper insight. Regression results will be presented in table 4 for the Nordic market and tables 5, 6 and 7 for the comparison stock markets.

6.1. Regression results on the Nordic market

Initially, I run a capital asset pricing model regression on the ESG and non-ESG portfolio to provide an understanding of the expected portfolio returns. This model provides directional results that set a framework for further regression models. Additional factors are added according to the Fama and French (1993) three-factor model. As mentioned earlier, the Fama and French three-factor model is an extension of the CAPM with additional factors capturing company size and company book-to-market equity. Jensen's Alpha and the Sharpe ratio are used to provide risk-adjusted returns.

According to prior empirical evidence, market conditions have an effect on the performance of portfolios incorporating ESG criteria. For this reason, the initial sample period is split into crisis and non-crisis periods. The crisis period includes the early 2000s crisis caused by the dot-com bubble and the global financial crisis from 2007 to 2008. The crisis periods are more specifically from March 2000 to October 2002 and October 2007 to March 2009. The aforementioned regression models are run separately on the crisis and non-crisis periods.

Table 4 Panel A displays the relationship between financial returns and the incorporation of ESG criteria for the whole sample period 2000-2016. The capital asset pricing model shows that the portfolio incorporating ESG criteria in the Nordic market is able to attain 1,64 % higher returns than the non-ESG portfolio. The additional return however, is not statistically significant. The ESG portfolio provides a return of 6,77 %, which is significant at a 10 % level. However, when introducing additional factors, the effect is no longer statistically significant even though the ESG portfolio provides higher returns. The results in Panel A are surprising as prior empirical evidence in other

stock markets have the opposite result. Usually, non-ESG portfolios outperform ESG portfolios during long sample periods.

Panel B provides the results for the crisis and non-crisis period. According to the CAPM, both the ESG and non-ESG portfolio earn significant and positive returns during non-crisis periods. The non-ESG portfolio earns 15,28 % and the ESG portfolio 14,12 % during the sample period in question. Both are significant at a 5 % level. Even though the non-ESG portfolio earns an additional 1,16 %, the additional return is insignificant. When adding the SMB and HML factors, the non-ESG portfolio earns higher returns than the ESG portfolio, however, the result is no longer statistically significant. When analyzing the risk-adjusted returns, the ESG and non-ESG portfolio are both able to earn significantly high returns with the non-ESG portfolio earning insignificant superior returns by 1,05 %.

During crisis periods, the ESG portfolio outperforms the non-ESG portfolio according to each regression model. The results of the CAPM are statistically insignificant but provide directional results for further analysis displaying that both portfolios earn negative returns as expected. The CAPM alpha for the additionally earned 3,30 % from the ESG portfolio is statistically significant at a 10 % level. According to the Fama and French three-factor model, the ESG portfolio outperforms the non-ESG portfolio by 2,30 %, which is insignificant. The ESG portfolio exhibits returns of -11,57 % and the non-ESG portfolio -13,87 % which are significant at a 10 % and 1 % level, respectively. This is adjacent to the second hypothesis that expects the ESG portfolio to outperform the non-ESG portfolio during market turmoil. Jensen's alpha provides the risk-adjusted returns which are insignificant for both portfolios.

The results of Table 4 Panel A oppose the first hypothesis that portfolios incorporating ESG criteria underperform compared to a non-ESG portfolio. This is an interesting result as the results of the non-crisis periods in Panel B support the first hypothesis. Portfolios screened on ethical criteria harm diversification which should lead to the suboptimal returns of the ESG portfolio in Panel A. The result may be driven by behavioral characteristics or by the data in question. Further analysis is needed to provide insight and evidence to this phenomenon. However, the additional return is insignificant. On the contrary, the results of the crisis period in Panel B support the second hypothesis and the ESG portfolio is able to significantly outperform the non-ESG portfolio. These multidimensional results may be driven by the superior emphasis on corporate social responsibility issues in the Nordic market and large financially

successful listed companies stressing the importance of social, ethical and governance issues.

Table 4.
Nordic portfolio performance.

Estimate	ESG Portfolio		Non ESG Portfolio		ESG - Non-ESG	
<i>Panel A: Annualized returns for ESG portfolio and Non-ESG portfolio</i>						
CAPM Alpha	0,0677*		0,0513		0,0164	
	[2,094]		[1,497]		[0,965]	
FF3 Alpha	0,0346		0,0142		0,0204	
	[1,005]		[0,387]		[0,955]	
Jensen's Alpha	0,0705		0,0458		0,0248	
	[1,063]		[0,690]		[0,357]	
Shape Ratio	0,4268		0,3580			
	ESG Portfolio		Non ESG portfolio		ESG - Non-ESG	
	Non-crisis	Crisis	Non Crisis	Crisis	Non Crisis	Crisis
<i>Panel B: Annualized returns for ESG portfolio and Non ESG portfolio in crisis and non-crisis periods</i>						
CAPM Alpha	0,1412**	-0,0485	0,1528**	-0,0815	-0,0116	0,0330*
	[2,395]	[-0,881]	[2,560]	[-1,735]	[-0,3099]	[2,440]
FF3 Alpha	0,0688	-0,1157*	0,0787	-0,1387***	-0,0099	0,0230
	[0,984]	[-2,559]	[1,405]	[4,901]	[-0,232]	[0,920]
Jensen's Alpha	0,1533**	-0,0689	0,1637***	-0,1030	-0,0105	0,0341
	[2,867]	[-1,111]	[3,185]	[-1,667]	[-0,435]	[0,552]
Sharpe ratio	1,5426	-1,1256	1,6024	-1,3894		

This table presents the statistics on ESG and non ESG portfolio performance during crisis and non-crisis periods. T-statistics are presented in the parentheses below the corresponding statistic. Significance levels are presented as follows:

* 10 % significance level

** 5 % significance level

***1 % significance level

6.2. Regression results on other European stock markets

The second part of this empirical analysis provides results from three large European stock markets as a comparison. The stock markets in question are London Stock Exchange, Euronext and Deutsche Börs. These stock markets are included based on their market capitalization value of shares. The same regression models used for the Nordic stock market are run on the two European stock markets.

6.2.1. London Stock Exchange

Table 5 Panel A displays the relationship between financial returns and ESG characteristics for the whole sample period. In coherence with the Nordic portfolios, the ESG portfolio, constructed of London Stock Exchange companies with an available ESG score for at least one year during the sample period, provides superior financial returns compared to the non-ESG portfolio according to each regression model. However, none of the results are statistically significant leading to the conclusion that there is no statistically significant difference between the performance of the ESG and non-ESG portfolio. This phenomenon may be driven by country specific events such as Brexit.

Panel B displays the results for two separate sample periods according to the market cycle. During non-crisis periods, the ESG portfolio underperforms the non-ESG portfolio according to each model. These results hold even when the additional factors SMB and HML are taken into consideration. The results closely follow the same pattern as the Nordic portfolios, though, none of the overall returns are statistically significant. The excess 8,45 % earned, as reported by the CAPM alpha, is almost statistically significant at a 10 % level. According to Jensen's risk-adjusted measure, the non-ESG portfolio earns an additional 5,58 % which is statistically significant at a 10 % level. Conversely, during crisis periods, the ESG portfolio outperforms the non-ESG portfolio earning an additional risk-adjusted return of 8,5 % with a 5 % significant level.

The results of Table 5 are in line with the two main hypotheses of this thesis and closely follow the ones of the Nordic portfolio. The non-ESG portfolio performs better in normal market conditions even earning statistically significant additional risk-adjusted returns. During market turmoil, the ESG portfolio is able to outperform the non-ESG portfolio.

Table 5.

LSE portfolio performance.

Estimate	ESG Portfolio		Non ESG Portfolio		ESG - Non-ESG	
<i>Panel A: Annualized returns for ESG portfolio and Non-ESG portfolio</i>						
CAPM Alpha	0,0492		0,0402		0,009	
	[1,598]		[0,915]		[0,382]	
FF3 Alpha	0,0206		0,0170		0,0036	
	[0,605]		[0,364]		[0,141]	
Jensen's Alpha	0,0516		0,0432		0,0084	
	[0,913]		[0,582]		[0,323]	
Sharpe Ratio	0,3845		0,2988			
	ESG Portfolio		Non ESG portfolio		ESG - Non-ESG	
	Non-crisis	Crisis	Non Crisis	Crisis	Non Crisis	Crisis
<i>Panel B: Annualized returns for ESG portfolio and Non ESG portfolio in crisis and non-crisis periods</i>						
CAPM Alpha	0,0654	0,0048	0,1191	-0,0797	-0,0537	0,0845
	[1,026]	[0,077]	[1,300]	[-1,731]	[-1,304]	[1,871]
FF3 Alpha	-0,0128	-0,0434	0,0056	-0,0990	-0,0185	0,0556
	[-0,172]	[-0,603]	[0,052]	[-1,175]	[-0,339]	[0,804]
Jensen's Alpha	0,0778	-0,0154	0,1315	-0,1013	-0,0537*	0,0859**
	[1,378)	[-0,242]	[1,870]	[-1,636]	[-2,046]	[3,066]
Sharpe Ratio	1,0784	-0,7458	1,0959	-1,3813		

This table presents the statistics on ESG and non ESG portfolio performance during crisis and non-crisis periods. T-statistics are presented in the pranteses below the corresponding statistic. Significance levels are presented as follows:

* 10 % significance level

** 5 % significance level

***1 % significance level

6.2.2. Euronext

Table 6 Panel A displays the relationship between financial returns and the incorporation of ESG criteria for the whole sample period. Opposite of the Nordic portfolios, the ESG portfolio, constructed of Euronext companies with an available ESG for at least one year during the sample period, underperforms the non-ESG portfolio. However, none of the results are statistically significant. This means that there is no disadvantage of investing in a social manner in the long run and the market does not price ESG characteristics.

Identical to the previous data sets, the sample period is split into non-crisis and crisis periods in Panel B. During non-crisis periods, the non-ESG portfolio provides significant financial returns at a 1 % level. When introducing the SMB and HML factors, the alpha remains highly significant at a 5 % level delivering a return of 11,06 %. Throughout the same period, the ESG portfolio underperforms the non-ESG portfolio according to each regression model. The risk-adjusted return of the ESG portfolio is 9,03 %, which is significant at a 10 % level. All in all, the non-ESG portfolio demonstrates significantly high financial returns during non-crisis periods. This is in line with the first hypothesis of this thesis. However, the excess return earned is not statistically significant for any regression model.

During crisis periods, the ESG portfolio outperforms the non-ESG portfolio. According to the Fama and French three-factor model, the ESG portfolio provides a negative return of -11,56% which is significant at a 5% level. The risk-adjusted return of the ESG portfolio is 9,03 % which is significant at a 10 % level. Both the CAPM alpha and Jensen's alpha display that the ESG portfolio is able to outperform the non-ESG portfolio by significantly at a 10 % and 5 level, respectively. The CAPM alpha displays outperformance by 3,47 % and the risk-adjusted alpha by 3,60 %. The results are incoherence with the second hypothesis of this thesis.

All results considered, the findings of Table 6 are in coherence with the hypotheses. The non-ESG earns significantly high returns during stable market conditions whereas the ESG portfolio earns positive returns according to each model but only the risk adjusted returns are significant at a 10 % level. During market turmoil, the ESG portfolio significantly outperforms the non-ESG portfolio at a 10 % and 5 % level depending on the regression model.

Table 6.

Euronext portfolio performance.

Estimate	ESG Portfolio		Non ESG Portfolio		ESG - Non-ESG	
<i>Panel A: Annualized returns for ESG portfolio and Non-ESG portfolio</i>						
CAPM Alpha	0,0046		0,0138		-0,0092	
	[0,134]		[0,495]		[-0,264]	
FF3 Alpha	0,0055		-0,0007		0,0062	
	[0,130]		[-0,020]		[0,141]	
Jensen's Alpha	0,0065		0,0162		0,0065	
	[0,126]		[0,0293]		[0,1264]	
Sharpe Ratio	0,1796		0,2383			
	ESG Portfolio		Non ESG portfolio		ESG - Non-ESG	
	Non-crisis	Crisis	Non Crisis	Crisis	Non Crisis	Crisis
<i>Panel B: Annualized returns for ESG portfolio and Non ESG portfolio in crisis and non-crisis periods</i>						
CAPM Alpha	0,0847	-0,0261	0,1350***	-0,0610	-0,0502	0,0347*
	[1,25]	[-0,502]	[3,740]	[-1,32]	[-0,633]	[2,103]
FF3 Alpha	0,0636	-0,1156**	0,1106**	-0,1208*	-0,0470	0,0052
	[0,698]	[-2,64]	[2,795]	[-2,32]	[-0,488]	[0,401]
Jensen's Alpha	0,0903*	-0,0484	0,1403***	-0,0844	-0,0500	0,0360**
	[1,933]	[0,744]	[4,928]	[-1,280]	[-0,988]	[3,389]
Sharpe Ratio	0,9434	-1,0014	2,0482	-1,2461		

This table presents the statistics on ESG and non ESG portfolio performance during crisis and non-crisis periods. T-statistics are presented in the parentheses below the corresponding statistic. Significance levels are presented as follows:

* 10 % significance level

** 5 % significance level

***1 % significance level

6.2.3. Deutsche Börs

Table 7 presents the regression results for portfolios formed from Deutsche Börs based on their ESG score. The ESG portfolio is constructed based on Deutsche Börs companies with an available ESG for at least one year during the sample period. Panel A provides the results for the whole 16-year sample period. The ESG portfolio earns a significantly higher return than the non-ESG portfolio at a 10 % level according to the CAPM alpha and Jensen's alpha. The ESG portfolio provides a 5,58 % higher return than the non-ESG portfolio during this period.

Panel B displays the results for crisis and non-crisis periods. The CAPM alpha of the ESG portfolio and Jensen's alpha of the non-ESG portfolio are statistically significant at a 10 % level during non-crisis periods. The non-ESG portfolio earns higher returns than the ESG portfolio; however, the excess return is insignificant according to each used model. During market crises, the ESG portfolio insignificantly outperforms the non-ESG portfolio. The Fama French three factor alpha is statically significant at a 1 % and 5 % level, respectively.

The results of the Deutsche Börs portfolios is in line with the hypotheses of this thesis and follows the return patterns of the Nordic portfolio. The results of Panel B are slightly different from the aforementioned portfolios. The outperformance of each portfolio is insignificant for all models. During the crisis periods, the CAPM alpha of the difference between the two portfolios is almost significant at a 10 % level providing insight to the difference.

Table 7.

Deutsche Börs portfolio.

Estimate	ESG Portfolio		Non ESG Portfolio		ESG - Non-ESG	
<i>Panel A: Annualized returns for ESG portfolio and Non-ESG portfolio</i>						
CAPM Alpha	0,0539**		0,0010		0,0548*	
	[2,167]		[0,024]		[1,970]	
FF3 Alpha	0,0463		0,0030		0,0434	
	[1,493]		[0,066]		[1,346]	
Jensen's Alpha	0,0562		0,0016		0,0546*	
	[1,061]		[0,026]		[2,043]	
Sharpe Ratio	0,4278		0,1628			
	ESG Portfolio		Non ESG portfolio		ESG - Non-ESG	
	Non-crisis	Crisis	Non Crisis	Crisis	Non Crisis	Crisis
<i>Panel B: Annualized returns for ESG portfolio and Non ESG portfolio in crisis and non-crisis periods</i>						
CAPM Alpha	0,0895*	0,2010	0,1016	-0,1056	-0,0120	0,1266
	[2,091]	[0,291]	[1,448]	[1,769]	[-0,265]	[1,775]
FF3 Alpha	0,0332	0,1259***	0,0209	-0,1619**	0,0124	0,0360
	[0,675]	[5,279]	[0,254]	[2,766]	[0,239]	[0,771]
Jensen's Alpha	0,1002	-0,0847	0,1095*	-0,1462*	-0,0093	-0,0615
	[2,313]	[-1,170]	[2,136]	[-2,319]	[-0,309]	[1,389]
Sharpe Ratio	1,4390	-0,6343	1,1108	-1,4660		

This table presents the statistics on ESG and non ESG portfolio performance during crisis and non-crisis periods. T-statistics are presented in the parentheses below the corresponding statistic. Significance levels are presented as follows:

- * 10 % significance level
- ** 5 % significance level
- ***1 % significance level

6.3. Summary of results

The primary market of interest in this thesis is the Nordic market. The portfolios for the Nordic market are derived from Nasdaq Helsinki, Nasdaq Copenhagen, Nasdaq Stockholm and Oslo Stock Exchange according to their ESG score provided by Thomson Reuters. In addition to the Nordic market, three major stock markets are used as a comparison.

The results of the Nordic market are mostly incoherence with the hypotheses of this thesis. Panel A of Table 4 display a slight insignificant outperformance of the non-ESG portfolio which is against the first hypothesis. When the sample is split into crisis and non-crisis results, the ESG portfolio earns significantly higher returns than the non-ESG portfolio. However, when additional factors are introduced, the effect is diminishing. During non-crisis periods the non-ESG portfolio slightly outperforms the ESG portfolio. This result is insignificant.

When comparing the rest of the stock markets to the Nordic market, there is a clear pattern. The ESG portfolio slightly outperforms the non-ESG portfolio during the whole sample period. The ESG portfolio constructed from Deutsche Börs companies is able to significantly outperform the non-ESG portfolio at a 10 % level. Conversely, the non-ESG portfolio outperforms the ESG portfolio during non-crisis periods in all stock markets just as the Nordic market.

All in all, the results of this thesis display all three common results of prior empirical evidence. The results are in line with those of Hamilton et al. (1993) and Nofsinger and Varma (2014) finding no significant impact of incorporating ESG criteria in investment decisions and positive impact during crisis periods. All ESG portfolios slightly underperform the non-ESG portfolio during non-crisis periods but insignificantly.

7. CONCLUSIONS

The purpose of this paper is to contribute to the existing literature on socially responsible investing and test whether portfolios incorporating ESG criteria are able to earn superior returns in the Nordic market. As socially responsible investing is a relatively new phenomenon and ambiguous concept, existing empirical findings vary from no significant impact to positive and negative impact. To contribute to the existing literature, this paper concentrated on a specific area, the Nordic market. Companies are selected according to their ESG scores which are obtained from the Thomson Reuters ASSET4 data. Thus, the main objective is to measure whether incorporation of ESG criteria leads to superior financial returns. Furthermore, the sample period is split into crisis and non-crisis periods for deeper insight.

The first part of the study is dedicated to explaining the concept of socially responsible and presenting the latest trends of the subject. Drivers behind this rapidly growing phenomenon are presented with widely accepted theoretical guidelines. The behavior of socially aware investors may alter the finance theory around the utility function and indifference curves. Profit maximization is no longer the main objective of socially responsible investors who base decisions on their personal values and preferences. Some social investors do not consider competitive returns at all and invest in a philanthropic manner accepting suboptimal returns. Nonetheless, the subject is controversial and direct implications on financial returns are ambiguous.

Prior empirical evidence suggests that there are three common outcomes of investing in a social manner: no significant impact, positive impact and negative impact. The returns of socially responsible investments seem to either follow those of conventional investments or present negative returns implicating that socially responsible investors bear a cost for investing in a socially responsible manner (Renneboog et al. 2008; Nofsinger & Varma 2014). During market crises, when the importance of trust is of a high priority, firms incorporating CSR activities or ESG criteria are able to outperform those that are not engaged in such activities (Lins et al. 2017). This implicates that investors incorporating ESG criteria are able to protect themselves during crisis periods even though they bear a cost for this investment strategy.

The empirical evidence provided by this thesis mostly support previous evidence and theories. This however, depends on the stock market in question. London Stock Exchange is most likely affected by country specific events which leads to varying

return patterns. The United Kingdom has been hit by its own crises caused by elections and Brexit during the sample period. In the long term when an investor is incorporating ESG criteria in their investment decisions, they bear a cost for behaving in an ethical manner. These results are in line with those of Renneboog et al. (2008) and Nofsinger and Varma (2014). Nevertheless, these investors are able to protect themselves during market turmoil when market trust is of a high importance. Lins et al. (2017) find that during the 2008-2009 financial crisis stocks from firms invested in CSR activities are able to outperform low social capital firms by up to 7 percent.

This study is concentrated on the Nordic stock market as a whole and does not examine the impact of ESG criteria on the individual stock markets included in the Nordic portfolio. Additionally, the variety of the ASSET 4 ESG scores used in this study are not analyzed. Creating portfolios with the highest quartile of ESG scores and comparatively analyzing their returns with low or no ESG score portfolios would be an interesting approach for future analysis.

Overall, the results of this paper suggest that investors are able to protect themselves during turmoil with the simple strategy of incorporating ESG criteria into their investment decisions. On the other hand, these investors must be willing to bear a cost during neutral markets due to limited diversification opportunities.

REFERENCES

- Adler, T. & M. Kritzman, (2008). The cost of socially responsible investing. *Journal of Portfolio Management* 35 (1), 52–56.
- Areal, N., Céu Cortez, M. & Florinda Silva (2013). The conditional performance of US mutual funds over different market regimes: do different types of ethical screens matter? *Financial Markets and Portfolio* 27:4, 397-430.
- Bauer, R., K. Koedijk & R. Otten (2005). International Evidence on Ethical Mutual Fund Performance and Investment Style. *Journal of Banking and Finance* 29, 1751 – 1767.
- Beal, D., Goyen M. & Peter Phillips (2005). Why Do We Invest Ethically? *The Journal of Investing* 14:3, 66–78.
- Bodie, Z., Kane, A. & Alan J. Marcus (2004). *Investments*, 6th Global Ed. 1003 p. McGraw-Hill Companies. ISBN-0-390488860.
- Bodie, Z., Kane, A. & Alan J. Marcus (2004). *Investments*, 6th Global Ed. 1003 p. McGraw-Hill Primis. ISBN-0-390488860
- Bodie, Z., Kane, A. & Alan J. Marcus (2014). *Investments*, 10th Global Ed. 1014 p. McGraw-Hill Education. ISBN-13 9780077161149.
- Bovenberg, A. L. (2002). Norms, values and technological change. *De Economist* 50,521-553.
- Darren D. Lee, Jacquelyn E. Humphrey, Karen L. Benson, Jason Y. K. Ahn (2010). Socially responsible investment fund performance: the impact of screening intensity. *Accounting and Finance* 50, 351-370.
- de Colle, S. & Jeffrey G. York (2009). Why is wine not glue? The unresolved problem of negative screening in socially responsible investing. *Journal of Business Ethics* 85, 83-95.

- Derwall J., N. Guenster, R. Bauer & K. Koedijk, (2005). The eco efficiency premium puzzle. *Financial Analysts Journal* 61 (2), 51–63.
- Derwall, J., K. Koedijk, J. ter Horst, (2011). A tale of value-seeking versus profit-driven investors. *Journal of Banking and Finance* 35 (8), 2137–2147.
- Fabozzi, F., K. Ma & B. Oliphant (2008). Sin stock returns. *Journal of Portfolio Management* 35: 82-94.
- Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *Journal of Finance* 25:2, 383-417.
- Fama, E. F. (1991). Efficient Capital Markets: II. *Journal of Finance* 46:5, 1575-1617.
- Fama, E.F. & Kenneth R. French (1993). Common risk factors in the returns of stocks and bonds*. *Journal of Financial Economics* 33, 3-56.
- Fama, Eugene & K. R. French (2004). The Capital Asset Pricing Model: Theory and Evidence. *The Journal of Economic Perspectives*, 18, 25-46.
- Fehr, Ernst & S. Gächter (2000). Fairness and Retaliation: The Economic of Reciprocity. *Journal of Economic Perspectives* 14, 159-181.
- Finley E.J. & Andrew N. King (2013). Socially responsible investing. *Trusts & Estates* 152:9
- Goldreyer, Elizabeth & David Diltz (1999). The performance of socially responsible mutual funds: Incorporating sociopolitical information in portfolio selection. *Managerial Finance* 26, 23-26.
- Haigh, M., James Hazelton (2004). Financial Markets: A tool for Social Responsibility? *Journal of Business Ethics* 52: 59-71.
- Hamilton, S. Jo, H & Meir Statman (1993). Doing well while doing good? The investment performance of socially responsible mutual funds. *Financial Analyst Journal* 49:6, 62-66.

- Hickman, K. A., Teets, W.R., & John J. Kohls (1999). Social investing and modern portfolio theory. *American Business Review* 17:1, 72-78.
- Hong, H. & M. Kacperczyk (2009). The price of sin: The effects of social norms on markets. *Journal of Financial Economics* 93: 15-36
- Humphrey, J.E. & David T. Tan (2014). Does it hurt to be responsible? *Journal of Business Ethics* 122:3, 375-386.
- Kempf, A. & Peer Osthoff (2007). The Effect of Socially Responsible Investing on Portfolio Performance. *European Financial Management* 13:5, 908-922
- Lee, D., Humphrey J.E., Beson, K., & Jason Y.K. Ahn (2010). Socially responsible investment fund performance: the impact of screening intensity. *Accounting & Finance* 50:2, 351-370.
- Lins, K.V., Servaes H., Ane Tamayo (2017). Social Capital, Trust, and Firm Performance: The Value of Corporate Social Responsibility during the Financial Crisis. *The Journal of Finance*, 4: 1785-1824
- Markowitz, H. (1952). Portfolio selection*. *Journal of Finance* 7:1, 77-91.
- Munoz, F., Vargas, M. & Isabel Marco (2014). Environmental mutual funds: Financial performance and managerial abilities. *Journal of Business Ethics* 124:4, 551-569.
- Nofsinger, J. & Abhishek Varma (2014). Socially responsible funds and market crises. *Journal of Banking & Finance* 48, 180-193.
- Odean, T (1998). Are investors reluctant to realize their losses? *Journal of Finance* 53, 1775-1798
- Principles for Responsible Investment (2018). Available from World Wide Web <
<https://www.unpri.org/about>>

Renneboog, L., Ter Horst, J. & Chendi Zhang (2008). Socially responsible investments: Institutional aspects, performance, and investor behavior. *Journal of Banking & Finance* 32:9, 1723-1742.

Rudd, Andrew (1981). Social Responsibility and Portfolio Performance. *California Management Review* 23, 55-61.

Scholtens, B. & Riikka Sievänen (2013). Drivers of Socially Responsible Investing: A Case Study of Four Nordic Countries. *Journal of Business Ethics* 115, 605-616.

Schueth, S. (2003). Socially Responsible Investing in the United States. *Journal of Business Ethics* 43:3, 189-194.

Sharpe, W.F., Alexander, G.J. & Jeffrey V. Bailey (1999). *Investments International* 6th Ed. 962 p. Prentice Hall International Editions. ISBN 0-13-011507-X

Shefrin, H. and Statman, M. (1985), 'The Disposition to Sell Winners too Early and Ride Losers too Long: Theory and Evidence', *Journal of Finance*, XL: 777-792.

Silvia, F. & Maria Ceu Cortez (2016). The performance of US and European green funds in different market conditions. *Journal of Cleaner Production* 135, 558-566.

Slovic, P (1995). The construction of preference. *American psychologists* 50, 364-371

Socially (ir)responsible investing? The performance of the VICEX Fund from a business cycle erspective. *Finance Research Letters* 2016.

The Forum for Sustainable and Responsible Investment (2012). Report on US Sustainable, Responsible and Impact Investing Trends 2014. [online]Available from World Wide Web: <
https://www.ussif.org/files/publications/12_Trends_Exec_Summary.pdf>

The Forum for Sustainable and Responsible Investment (2014). Report on US Sustainable, Responsible and Impact Investing Trends 2014. [online] Available from World Wide Web: <https://www.ussif.org/Files/Publications/SIF_Trends_14.F.ES.pdf>

The Forum for Sustainable and Responsible Investment (2016). Report on US Sustainable, Responsible and Impact Investing Trends 2016. [online] Available from World Wide Web: <[http://www.ussif.org/files/SIF_Trends_16_Executive_Summary\(1\).pdf](http://www.ussif.org/files/SIF_Trends_16_Executive_Summary(1).pdf)>

Thomson Reuters (2018). ESG fact sheet. [Online] Available from World Wide Web <<https://financial.thomsonreuters.com/content/dam/openweb/documents/pdf/financial/esg-scores-factsheet.pdf>>

Tversky A. & D. Kahneman (1973). Availability: A heuristic for judging frequency and probability. *Cognitive psychology* 5, 207-232

Vidaver-Cohen, D. & Peggy Simcic Brønn (2015). Reputation, Responsibility, and Stakeholder Support in Scandinavian Firms: A Comparative Analysis. *Journal of Business Ethics* 127, 49-64