Socially Responsible Investments – A Comparative Performance Study of the Scandinavian Mutual Fund Market

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Executive Summary

During the last decade the market for Socially Responsible Investments (SRI) has experienced continuous growth. The SRI equity mutual fund market has grown both in the number of funds and in total Assets under Management (AuM). However, SRI currently lacks a uniform definition in order to consistently label a mutual fund as being an SRI fund. In academia a SRI is classified as an investment which considers certain ethical or responsible non-financial aspects prior to the financial return of an investment.

This thesis describes and analyzes the Scandinavian market for SRI mutual funds. This is done to determine whether or not Scandinavian investors pay for their discriminatory investment decision relative to the return from conventional portfolios. Initially an overview of a selected body of academic literature presents the most important previous findings with respect to a range of SRI related topics. Here it is found that the results regarding the performance of SRI mutual funds are mostly non-statistically different from their conventional counterparts. However, some papers indicate underperformance and some indicate outperformance based on the application of certain Environmental, Social and Governance (ESG) filters.

The conducted data collection identified a total of 48 SRI equity mutual funds in the three Scandinavian countries. From these funds it was found that 10 of the funds donate fixed amounts of money to charity each year, a tendency which has not been described in the previous literature on SRI covered in this thesis.

The analysis is conducted based on 642 Scandinavian equity mutual funds where 48 are classified as SRI funds. These funds are analyzed using the Sharpe ratio to establish the risk return relationship. The Capital Asset Pricing Model (CAPM) and the Fama and French Three Factor model is used to test the hypothesis of whether or not SRI mutual funds under- or outperform their conventional counterparts.

The results of this thesis indicate underperformance of Swedish and Danish SRI funds relative to their conventional counterparts. In Norway no statistical difference in return is found when conducting the three factor regression. The importance of treating portfolios equally across borders is raised in the discussion as it is indicated that the implementation of negative filters among Scandinavia SRI funds is very high and this could be an interesting field of future study.

Contents

1 Introduction

Socially Responsible Investments (SRI) gives an investor the option of selecting ethics before considering the potential financial return of an investment. In academia this is referred to as deciding on non-financial aspects of an investment before considering the financial return albeit not disregarding financial return (Bollen, 2007).

In the recent years SRI has attracted a lot of attention in academia (Renneboog, et al., 2011). The world investment market has experienced large inflows of capital to SRI mutual funds, Benson et al. (2006), and Bello (2005). Furthermore, the number of SRI labeled funds has experienced high growth during the last three years.

An article in the Danish financial newspaper 'Børsen' stated that it will cost an investor up to 1% in return on an investment per year if the investor should choose to invest according to a SRI strategy (Carlsen, 2012). However, the investor is, according to the newspaper article, actively participating in changing the world (ibid).

In a similarly themed article published in 'Der Speigel' from 2009 it is stated and shown that ethical investments have outperformed the rest of the market due to the demand for carbon dioxide reducing technologies (Scott, 2009). This has led to ethically themed mutual funds, such as green energy funds, outperforming the market.

Determining which article provides the right answer could potentially have a large impact on individual investors. If an investor wants to act ethically will he or she then achieve a superior return? Or will the investor pay for his/her ethical considerations by having a relatively lower economic return compared to conventional investments?

Classical portfolio theory tells any student of economics, or well informed investor, that diversification is the key to reducing risks and optimizing one's investment risk return relationship. By restricting the investment universe a sub optimal investment will be achieved due to a lack of diversification of firm specific risks (Bodie, et al., 2011). Since the 1970s the academic world has sought to answer the question of whether or not an investor is worse off by investing in an SRI portfolio relative to a conventional portfolio. The results of the relative SRI performance is mixed, some papers indicate outperformance, some equal performance and some underperformance.

The article published in 'Børsen' mentioned above stated that the investor was actively changing the world. This implies that the choice to invest ethically makes a difference, and that the individual investor can, with the investment made, impact the world according to his/her own values. However, as ethics are not always uniform from investor to investor it would seem highly implausible that an investment made in a mutual fund could fit the bill for each investor and match individual ethical considerations. In addition to this, ethics are not a static concept as business move in and out of favor in the public and media, and it is hard to determine when actions are ethical or not. It would also be hard to determine when to invest in a given company and when to divest, and how the manger of a mutual fund would know when actions of corporations are insufficiently ethical.

Whether or not funds invest differently when applying a responsible profile to the fund description has been the focus of several academic studies. The findings are mixed, some indicate large differences in portfolio holdings, and others find that the mutual funds are often more similar to conventional stock indices than they are to ethical indices. Despite the mixed performance results, the combined responsible investment market for equity funds has experienced high growth throughout the financial crisis. As of 2010 the total world asset under management according to some form of SRI policy reached €7,594 trillion (Eurosif, 2010). From 2006 to 2011 the number of SRI mutual funds in Europe more than doubled (Familiari & Pezzolato, 2011). During both worldwide and European studies of SRI it has been highlighted that the Scandinavian countries are the world leaders in responsible investments. However, no comparative performance focused study of mutual fund performance in Scandinavia has been located by this thesis. It would therefore be interesting to use the same methods used by academics to examine the performance of the Scandinavian market.

1.1 Research Philosophy and Approach

This thesis utilizes a positivistic epistemological[1] approach. This implies that only observable phenomena can lead to the production of credible data and hypothesis testing (Saunders, et al., 2007). Hence, only data that can be traced back to a source that is observable to all, constitutes applicable data. The results achieved through working with the data will lead to an end product which seeks to uncover general facts that are observable in social reality and this is in accordance with the positivistic approach (ibid). Another important aspect related to the chosen research

[1] The epistemology revolves around the production of knowledge and how to do so (Saunders, et al., 2007)

philosophy is that it is assumed that the data collection is not impacted by the feelings of the author. This is done to ensure replication of the achieved results given that the exact same approach is used as stipulated in the data and method sections.

The research approach of this thesis is structured around a deductive approach where the analysis of the collected data is structured around hypothesis testing. This approach is structured round the following sequential stages (Saunders, et al., 2007):

1. Deducting a hypotheses from the presented and reviewed theory
2. Expressing the hypotheses in operational terms
3. Testing the operational hypotheses
4. Examining the outcome of the inquiry

The hypothesis deduction from the theory is conducted following the overview of the literature and the SRI market. The hypothesis is constructed with the Scandinavian market in mind as it has not been possible to identify comparable academic studies on the performance of Scandinavian SRI mutual funds.

The hypotheses are formulated with a basis on previously developed hypotheses utilized in previous academic papers. The hypotheses are tested by utilizing the selected methods and the outcome is discussed in the discussion section.

The ontological[2] stance of this thesis follows an objectivist perspective. This implies that the observed mutual funds in the financial markets exist in reality. By stating that the mutual funds exist in reality it implies that the results achieved from the linear regressions of the performance in this thesis are not subjective. Hence, the hypothesis testing is not dependent on the person viewing the results or the person conducting the regressions (Saunders, et al., 2007). Due to this view on reality and the creation of knowledge a large amount of attention is directed towards describing and explaining the data collection process and the methods utilized to analyze the data. The following structure has been selected in accordance with research philosophical stance.

[2] Ontology is the study of reality and deals the ways the world operates and how relations can be observed.

1.2 Structure of the thesis

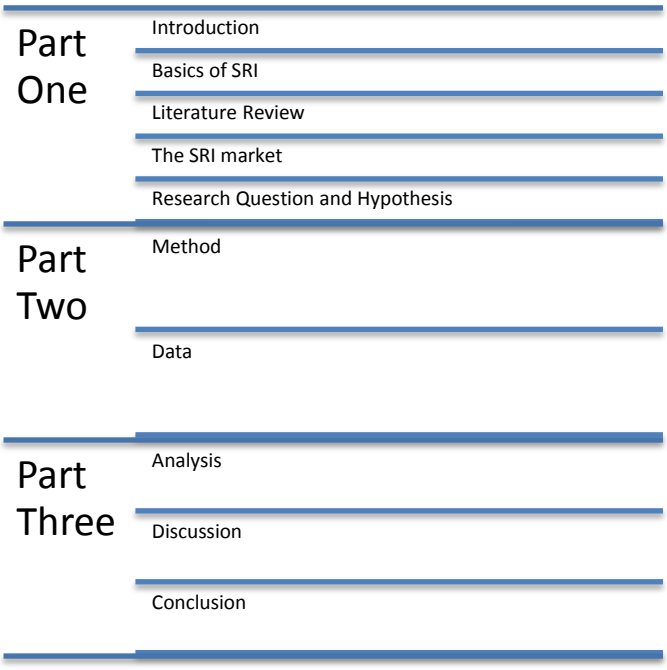

Figure 1 - Structure of the thesis

The first part of the thesis deals with the definition of the concept SRI and gives an overview of the academic papers published on the topic of SRI with a specific emphasis on the performance of SRI funds. The 'Basics of SRI' section provides an understanding of the concept, SRI, and the challenges associated with studying SRI. This is done to ensure an understanding of the concept before progressing to an overview of a selected body of literature written about the performance of SRI funds. The SRI market describes the World, European and Scandinavian market to place the Scandinavian market in a comparable context to the markets already described in the academic literature, and to establish that there is indeed a significant market size that offers a potentially interesting field of study. Following this the gap in the literature is identified which leads to the establishment of the research question, and the hypotheses tested in order to answer the research question.

Part two of the thesis is initiated with the method utilized to test the hypothesis and it provides an overview of the concepts and theories of modern portfolio theory associated with the data analysis. This data section describes all the important aspects of the data collection and gives an overview of the types of mutual funds and stock indices used in the analysis. The method used to collect the data is also reported to ensure reliability of the data collection.

Part three of the thesis provides the answers to the research question. The analysis section contains the statistical regressions conducted in accordance with the selected methods and the data collected. This section provides a review of the important findings uncovered when working with the data and it contains the hypotheses testing, the central part of answering the formulated research question.

The discussion debates the implications of the results achieved in the analysis and the selections made with regards to stock indices. The conclusion rounds off the thesis and lists the new potential areas of study based on the developed insight in to the Scandinavian market.

2 Basics of SRI

This section presents and explains the basics of SRI and defines the concept. in order to ensure full understanding of the SRI concept before progressing to an overview of the literature published on the performance of SRI portfolios. This is followed by a subsection on the application of negative and positive asset filters focusing on Environmental, Social and Governance screens (ESG). This leads to a perspective on the utility obtained from an SRI investment from an investor's perspective. The final subsection describes the challenges of studying SRI and asset screens.

2.1 SRI Defined

SRI is a term that has been studied and had a place in the public arena since the political changes taking place in the US in the 1960s (Bauer, et al., 2005). The concept of responsible or ethical investments has attracted an increasing amount of attention since the early 2000s (Murry & Michael, 2008) and it has been the focus of academia since the 1970s (Bello, 2005). A common ground for the definition of SRI is that it is an investment that is made following the outcome of a non-financial screening process. This screening process focuses on issues regarding: environmental, social, governance, ethical or religious consideration (Hong & Kacpercyzk, 2009). Hence, SRI can be viewed as an investment strategy that creates a definite layer of possible investments that is built as a sub-selection of the traditional investment universe Hong & Kacpercyzk (2009), Bodie et al. (2011), and Derwall et al. (2011). This means that the subselection is created by taking social or ethical values into account before selecting which equities to invest in. An addition crucial common denominator in the definitions of SRI is that the investment process takes into account both financial and non-financial attributes, hence, the object and the purpose of an investment becomes more than a purely financial gain, while still striving at creating financial results with the focus of non-financial matters given to ethical, environmental or moral concerns (Benson, et al., 2006). Hence, the SRI process can be described as a two-fold investment strategy, where one factor (ethical or social considerations) supersedes other target (the financial return) (Bollen, 2007). However, as a term 'responsible' or 'ethical investments' cover a wide range of individual investment possibilities where specific considerations are present in addition to financial return

Blowfield & Murray (2008), Bello (2005), Renneboog et al. (2011), Renneboog et al. (2011), and Bauer et al. (2007). These investment possibilities range from ethical or religious considerations to ESG screened portfolios. All these forms of investment opportunities are studied in academia under two different albeit comparable headings: SRI or Ethical portfolios, Renneboog et al. (2011), Bauer et al. (2005), Bauer et al. (2007), Erhversstyrrelsen (2011). Figure 2 represents the possible spectrum of SRI or Ethical investment portfolios.

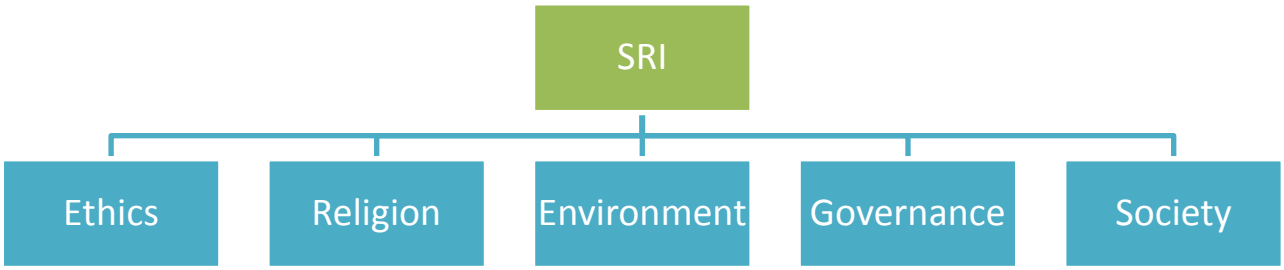

Figure 2 - The Spectrum of SRI investments

The social or ethical approach can also be applicable to any form of financial investment such as: Government bonds, corporate bonds, equity investments or any other form of investment. To apply an SRI strategy in complex financial instruments would also be possible. However, this would require that the underlying asset is transparent to the investor. In short the definition used in this thesis is: SRI is an investment strategy which introduces the notion of extracting utility from investing capital from not only the financial return but also from the socially responsible or ethical dimension of an investment.

2.2 ESG Screens

The application of filters such as Environmental, Social and Governance (ESG) screens is crucial in establishing an SRI portfolio Juravle & Lewis (2009), Bauer et al. (2005), Bello (2005), and Bollen (2007). These filters define the non-financial attributes of an SRI portfolio. The selection of the non-financial attributes is very commonly done through the ESG process (Bodie, et al., 2011). The inclusion of a specific filter in the asset selection process creates an investment universe that seeks to fulfill the ethical requirements for the potential investors (Murray & Blowfield, 2008). The application of filters can be done by using either a negative or a positive filter (Hoepner, 2010). The negative filter will exclude a range of possible investments and the exclusion is based on poor

performance within the definition of the specific filter. The positive filter focuses on identifying the best performers within the definition of a specific filter.

The filters used to create an SRI or ethical portfolio come in many varieties. An ethical investment fund may choose to implement a variety of specific exclusion filters such as: Firms testing products on animals, weapons manufacturing, alcohol, tobacco, pornography and gambling (Renneboog, et al., 2011). A religious fund would exclude industries that are contradictory to the values held by the followers of a given religion, and this may include banks paying interest (Islamic) or firms involved in the production of surgical equipment for abortion (US Christian). Environmental screens may exclude heavy polluting firms, firms with large negative environmental performance, and positively focus on green tech companies, and firms working towards lowering emissions and environmental footprints. Social and governance screens will relate to: child labor, employee rights, and governance principles (stock holder influence, transparency etc.) and human rights (Galema, et al., 2008).

The process of implementing ESG filters in portfolio management and investment has received quite a lot of attention in recent years and the United Nations Principles for Responsible Investments (UNPRI) has devoted resources to further expand the usage of ESG filters. They have published a set of non-binding principles that investment managers can choose to abide by. The UN Principles have been formulated by the investment community and can be linked to the mutual funds process of forming SRI portfolios or investments, as they present any asset owner or manager with a set of guidelines that can be used to promote the implementation and further development of environmental, social and corporate governance issues (UNEP Finance Initiative, 2011). These issues can affect the performance of investment portfolios and therefore must be given appropriate consideration by investors (UNPRI, u.d.).

The United Nations Principles for Responsible Investment

- We will be active owners and incorporate ESG issues into our ownership policies and practices
- We will seek appropriate disclosure on ESG issues by entities in which we invest
- We will promote acceptance and implementation of the principles within the investment industry
- We will work together to enhance our effectiveness in implementing the principles
- We will each report on our activities and progress towards implementing the principles (UNPRI, u.d.)

Figure 3 -The UN principles for responsible investments 2011

The process of applying ESG filters and the selection of how an institutional investor chooses to tackle this issue can prove to have a direct impact on an SRI portfolio within several parameters.

Several studies of SRI assert that ethical and moral screening of companies is likely to affect the characteristics of the assets that are included in the portfolio, portfolio diversification, and portfolio performance because the screening process imposes an additional set of constraints to the wealth-maximizing investor Rudd (1981) and Diltz (1995). The findings associated with the ESG process related to economic performance are explored in section 3.4.

2.3 Constructing an SRI portfolio

The following example portrays a theoretical creation of an SRI portfolio from a portfolio manager's perspective. The downwards pointing pyramid depicted in Figure 4 gives a graphical overview of the SRI portfolio creation process. Initially the assumption is that a given fund manager wants to set up an SRI portfolio that is 100% invested in equities. The manager will start with a survey that covers the entire stocks market. At this point in time he can buy all stocks that are sold on stock exchanges all over the world. However, in order to create an ethical or SRI portfolio a filter is applied to the available assets. In most cases the first step in the process is the application of a negative filter (Renneboog, et al., 2011). When a negative ESG filter is applied this would result in the elimination of all the worst performers within the environmental, social and governance parameters. Hence, the filtering process has created a constrained amount of possible stocks to invest in. The manager will now select the assets to invest in and create an SRI or ethically screened portfolio. Some managers will apply a second filter, the positive filter. This form of screening filtering process identifies the best performers within a specific area of focus (Hoepner, 2010). The end portfolio of assets in this example is an SRI portfolio. The process of creating an SRI portfolio is independent of the amount or types of filters applied to the financial asset (Allianz Global Investors, 2010).

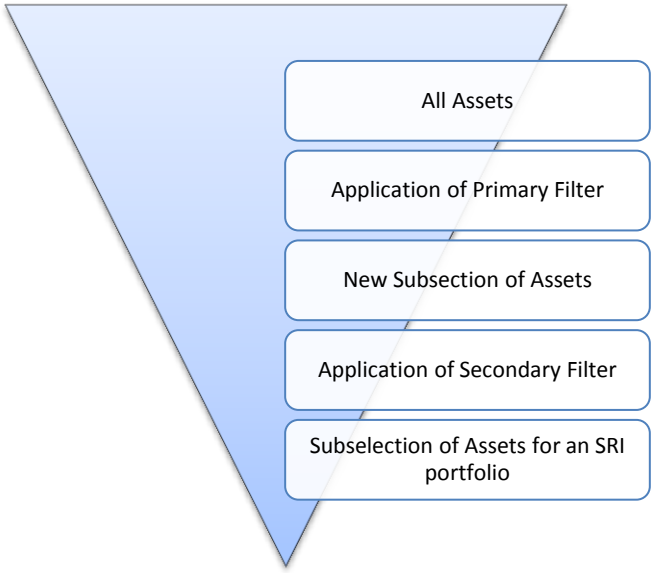

Figure 4 - The SRI creation pyramid

This example described the fundamentals of SRI portfolio construction and the idea behind creating a negatively or positively screened portfolio. The example highlighted an important point: Whether

funds are labeled as SRI funds or ethical funds, they share one common structural component in relation to the portfolio construction. The mentioned types of investment funds are all comprised of diverging subsets of the entire universe of equities that are available for investments. This implies that for different reasons a group or groups of assets have been deliberately excluded from having the potential of being a part of the end portfolio. The end portfolio can then be classified as a thematic fund (Eurosif, 2010), SRI, or an ethical portfolio - the label is in the eye of the beholder and it relies on the types of screens that are applied.

2.4 Investing in SRI

An interesting aspect of the rationale behind investing in SRI portfolios is the way in which investors derive utility from investments. In portfolio theory investors are assumed to desire the maximization of utility, where utility is given by the following function: (Bodie, et al., 2011)

$$U = E(r) - \frac{1}{2}A\sigma^2$$

Equation 1 - The investor utility function

Where U is the utility,

E(r) is the expected return,

A is the risk aversion for the individual investor

σ^2 is standard deviation of the portfolio

However, when combined with SRI the focus on ethical or social values in investments offer an extension to the expected utility function. In the utility function the utility of an investment is given by the expected return on an investment with respect to individual aversion to risk as measured by the standard deviation (Bodie, et al., 2011).

The utility function is extended by Murray & Blowfield (2008), Bollen (2007) in an attempt to describe the behavior of SRI investors. In their papers it is argued that the SRI investors may derive utility from holding the securities of companies that are consistent with a set of personal values or societal concerns. In other words, they (the SRI investors) may have a multi-attribute utility function (Bollen, 2007) explaining their actions. Without establishing a mathematical equation describing the utility function of an SRI investor it is apparent that another factor must be added to the utility function in order to account for the value derived from ethical or social factors. An SRI

investor should therefore seek to maximize the utility through both financial returns, with respect to risk, plus an ethical or social factor. The maximization of utility could include a value that derives from acting responsibly or improving public image. Hence, the multi-attribute utility function will give a higher utility from an SRI investment given equal returns and risk aversion and standard deviation relative to a conventional investor given a positive value extracted from responsible actions. It is worth noting that this group of investors that are thought to apply a multi-attribute utility function is observable in the market and the group is quite substantial Schröder (2007), Allianz Global Investors (2010), and Juravle & Lewis (2009). The SRI portfolio should for a socially conscious investor deliver a higher utility than a conventional portfolio given the same risk and return.

In economic terms this is based on the notion that the investors are driven not only by economic return but also by the nonfinancial dimensions of corporate performance, such as the possible impact on the environment, social relations, and corporate governance. (Galema, et al., 2008). This does not imply that the financial return loses its importance. The SRI strategy should always seek to maximize the financial return (the 'bottom line') given the social and/or environmental constraint (Murray & Blowfield, 2008).

2.5 Challenges associated with SRI

The challenge with the study of social responsibility or ethical investment is that it is indeed subject to personal interpretation. As a result of the challenge of making a definite universal definition it is interesting to look at some of the previously offered interpretations of what social investments imply. Moskowitz (1972) offers an interesting starting point in the theoretical debate on responsible investments as it presents one of the cornerstones of SRI portfolio creation. From a performance standpoint it is mentioned that it would make more sense to concentrate on avoiding the socially irresponsible companies as opposed to investing in the most responsible companies (Moskowitz, 1972). The article makes a claim that an investor should seek to remove controversial stocks from the personal holdings. This argument is based on how the public is assumed to act in the case of an environmental disaster or if corporations do not deliver products that live up to what is promised. While not being a statistical or empirical paper the arguments seem to be prevalent as the usage of negative filters to possible investments is a basic part of SRI portfolio creation.

It is interesting to consider the perceptions of ethical or social responsibility as a part of public consensus. As the creation and maintenance of SRI portfolios must accommodate the wishes of the

public and aim to incorporate the public's values. This is done through the filtering process to ensure that the offered products are able to correspond to and live up to the values that a large group of investors have. Hence, the term SRI is dependent on and closely connected to time and public/subjective opinions and values. Public trends can force investment companies to make specific decisions regarding specific investments. One such example of this type of push for a negative investment filter was documented in the 1980s. At that time concerns arose among investors about supporting businesses with operations in South Africa, and a possible risk of supporting apartheid and the unequal treatment of colored employees. As a consequence of these concerns equities were removed from portfolios, based mainly on ethical or non-financial reasons, and a divesture movement in South Africa by US corporations emerged (Murray & Blowfield, 2008). However, it would be hard if not impossible to make a definite definition of where SRI funds can and cannot invest without including 'hard' quantifying concepts such as responsibility and ethics. The massive challenge comes from individual investors and the values they hold with respect to religion, ethics and responsibility. One example is to look at Islamic funds, which is a concept that falls under the ethical sub-category of SRI and it follows the same selection process as described in Figure 4. An Islamic portfolio will only be sellable in markets where there is a reasonably sized Muslim population, unless of course it delivers outstanding results, in which case all investors should flock to it unless the ethical value would be negative. The point of this example is that there would not be much point in marketing a portfolio with negatively screening towards companies that are involved in products from pork production, banks charging interests etc. and selling it as ethical in markets where the consumer does not hold a set of values that correspond to the portfolio. This is crucial to acknowledge when studying the field of SRI. In Renneboog et al. (2011) both Christian values and Islamic funds are included as SRI funds in their study, something which would not necessarily matter to an environmentally oriented investor, but these portfolios are nonetheless dealt with under the same heading in academia.

Based on the scenario of stock divestments in South Africa the undervaluation of SRI would predict that an SRI portfolio can deliver superior performance because the market systematically undervalues the importance of corporate social responsibility (CSR) in influencing the firm's expected future cash flows (Derwall, et al., 2011). Hence, by not being invested in companies where the risk of negative publicity is high there is a possibility of achieving higher financial return due to a non-occurrence of sudden divestment. However, the exact challenge created by the difficulty in

defining what is responsible or ethical in the eyes of the public makes it very hard to stay clear of firms where there could be a high possibility of negative public attention.

2.5.1 Challenges associated with ESG

The implementation of any form of non-financial screens to a financial portfolio goes against most portfolio management theory. The issue is that these non-financial considerations are made prior to the financial consideration. As a consequence of this it has often been mentioned that the returns of SRI funds should be lower than conventional stock portfolio on a theoretical level (Hong & Kacpercyzk, 2009). With an offset in modern portfolio theory it would be reasonable to argue that the principle of applying any type of filter to the universe of stocks goes against the principles of portfolio optimization (Markowitz, 1952). The application of filters limits the number of stocks available to invest in. Hence, it may constrain the portfolio risk return relationship (Sharpe, 1966). To the individual investor this would basically imply that an SRI portfolio in theory will carry more risk for the return achieved, and it is not only a sub-optimal portfolio, but also worse off than comparable portfolios with no filters (Bodie, et al., 2011). These theoretical perspectives are hard to argue against, however, the SRI portfolios should not only be measured against an unrestricted market portfolio in the form of an index, but rather against conventional portfolios. The empirical study of the hypothesized lower returns from SRI portfolios has been widely studied and it has been found that the adoption of an SRI policy does not necessarily result in a set of mutual funds that are different from conventional funds in terms of performance or diversification Bello (2005), Statman (2004), and Galema et al. (2008). This relationship is further examined in the upcoming section on the performance of SRI.

The arguments for a lower expected return from SRI are not restricted to portfolio optimization. In Galema et al. (2008) it is argued that:" *excess demand for socially responsible stocks and a shortage of demand for irresponsible stocks will lead to overpricing of the first and underpricing of the latter*" (Galema, et al., 2008). Hence, it will create an imperfect market condition where investors flock to purchase the ethically correct stocks and shun the stocks that excluded by the negative filtering process known as 'sin stocks' (Hong & Kacpercyzk, 2009).

The puzzle of constrained portfolios can be expanded outside the realm of SRI portfolios in order to give a more nuanced view of what investors potentially can invest in. In a study by Hong and Kacperczyk it was shown that investors pay for their discriminatory tastes (Hong & Kacpercyzk, 2009). The article finds that for an individual investor it implies foregoing financial return by

actively making a decision to invest in an ESG screened or ethical portfolio. This result was shown by constructing and 'Anti-SRI-Portfolio or sin portfolio' that focused on investing in tobacco, alcohol, pornography, and gambling. Through CAPM testing it is concluded that:

[…] sin stocks are less held or followed by certain institutions and analysts who discriminate against sin stocks for social norm rationales; and in their absence, arbitrageurs comprised of mutual funds and hedge funds (and individuals) are willing to buy these stocks (Hong & Kacpercyzk, 2009).

This opens up for an interesting discussion of why there is a demand for SRI portfolios if they underperform the market, when a sin stock portfolio can outperform it? The most likely explanation for this apparent economic irrationality according to (Hong & Kacpercyzk, 2009) can be found when examining Galema et al. (2008). Their explanation for the presence of a market for SRI investment is that social investors are concerned about nonfinancial dimensions of corporate performance, such as the impact on the environment, social relations, and corporate governance (Galema, et al., 2008). Section 3.4 offers an insight into the performance of sin stock portfolios.

3 Literature review

This section presents the findings of a selection of articles dealing with the performance of mutual funds versus conventional funds, the effects on cash flows in and out of SRI funds, and the performance effects from the filtering process. This meta study has been conducted by using an approach similar to Derwall et al. (2011). This has led to the creation two main categories. These have been created in order to distinguish between general SRI portfolio performance and portfolio characteristics, and the positive or negative performance implications that are associated with the application of different forms of ESG filters. The publishing year of the articles range from 2005-2012, hence there is a focus on the more recent publications related to SRI.

3.1 SRI Performance

This subsection covers the findings of articles with an emphasis on the relative performance of SRI funds to conventional funds; this topic is primarily based on Bauer et al. (2005), Bauer et al. (2007), Renneboog et al. (2008), and Schröder (2007). This topic is of great importance as it has shed light on the possible relationship between environmental or social performance and economic performance of stock corporations (Ziegler, et al., 2007). An overview of the covered papers and their most important findings, research methods and the type of research conducted can be found in Table 1- SRI performance and cash flows.

Author	Year	Category	Research method	Type of research	Positive/negative
Bollen, Nicolas	2007	SRI - Cash flows	testing cash flows in and out of mutual funds dependent on past financial performance	statistic hypothesis testing of 205 SRI funds	Positive impact on cash flows as investment are less sensitive to performance compared to conventional funds
Bauer, Koedijk, Otten	2005	SRI – performance	CAPM and Four factor model with one month US T-bill as risk free asset	SRI vs. Conventional funds in Canada 8 SRI funds with 267 peers	No difference in performance between SRI and conventional
Bauer, Derwall, Otten	2007	SRI – performance	four factor model and Jensen's Alpha	SRI vs. Conventions based on 103 SRI funds in the US, UK and Germany	Mixed - there is a positive catching up tendency.
Renneboog, Horst, Zhang	2008	SRI – performance	four factor model applied to funds in 17 different countries	statistical research based on 463 SRI funds with 16038 conventional peers	SRI funds underperform their benchmarks. But there is no substantial difference compared to traditional funds
Renneboog, Horst, Zhang	2011	SRI - Cash flows	testing flows in and out of mutual funds	321 equity SRI funds 3532 peers (3113 US + 419 UK)	Mainly positive relationship between fund flows and the application of ESG filters. In house SRI teams increase the money flow
Schröder	2007	SRI – performance	a study of the performance of SRI indices compared to conventional	29 SRI Equity indices	SRI leads to the same risk return performance
Bello	2005	SRI - portfolio diversification	market covariance as a measurement of risk as a component of diversification	126 active mutual funds	SRI portfolios are similar to their conventional counterpart in terms of performance and diversification
Benson, Brailsform, Humphrey	2006	SRI - portfolio diversification	Sharpe ratio and CAPM	102 SRI funds	SRI portfolios perform similarly to conventional counterparts - But the portfolios are not the same as the conventional
Höpner	2010	ESG - portfolio diversification	theoretical examples based on observations	Theoretical	The application of positive filters lead to higher diversification. Negative filters imply worse diversification

Table 1- SRI performance and cash flows

Bauer et al (2005) conducted their research based on a sample of SRI and conventional funds covering three markets, the US, UK and Germany, and a selection of international markets. Their results suggest that ethical mutual funds underwent a catching up phase, before delivering financial returns similar to those of conventional mutual funds (Bauer, et al., 2005). Basically the funds largely underperformed their counterpart in the 1990s and later caught up in terms of monthly return. This meant that a significant underperformance was found for the international selection of funds in the 1990s. This underperformance of the combined SRI portfolio was, as time progressed, eliminated from 1998-2001 where it was found that the return of the ethical portfolios caught up with the conventional. The catching up phase ended when the difference between the two portfolios was no longer statistically significant. A part of the research conducted also brushes on the topic of SRI indices. Here it is somewhat surprisingly found that the R^2_{adj}[3] found through the CAPM is lower for ethical indices than it is when using a conventional index. Hence, a traditional non-ethics-screened index is better at explaining the return of an SRI investment than an actual SRI-index is. Closely related to Renneboog et al. (2008) it is also found that all portfolios on average underperform their respective stock indices. The conclusion is reached by examining the alpha values[4].

The results published by Renneboog et al. (2008) covers 17 individual countries. The paper presents an in-depth analysis of the monthly performances of 463 SRI funds located in the 17 countries. The published findings are largely supportive of Bauer et al. (2005) as it is also found that the risk adjusted returns of the SRI funds as a whole are not statistically different from the returns that are delivered by investing in a conventional portfolio. In the entire study it is found that the risk-adjusted returns of SRI funds are not statistically different from the performance of conventional funds (Renneboog, et al., 2008). However, there are very important implications for conducting nation based performance studies of the individual countries as it is found that in France, Japan and Sweden there is an actual statistical difference in the risk adjusted monthly performance of the SRI funds. It is also reported that SRI funds in the US, the UK, and in many continental European and Asia-Pacific countries underperform their domestic benchmarks by −2.2% to −6.5%. The results of a later study by Renneboog et al. (2011) indicate that while SRI funds with negative sin/ethical screens or environmental screens significantly underperform their matched conventional funds.

[3] The R^2 adjusted indicates how well a statistical regression 'fits' the data it seeks to explain while adjusting for the number of explanatory factors in a model (Gujarati & Porter, 2009).
[4] The term is explained in section 6.2.3

However, in the same paper it is indicated that some SRI attributes actually have a positive impact on returns. In particular US funds with a policy of shareholder activism can expect 4% higher returns per annum on a risk-adjusted basis. Although only significant for European SRI funds, the paper finds some evidence that using an in-house SRI research team increases the risk-adjusted return by 3% per annum. (Renneboog, et al., 2011).

During the study of a small amount (8) of SRI funds in the Canadian market Bauer et al. (2007) show that there is no statistical difference in expected returns between SRI and conventional investment funds. This conclusion is reached using both one factor and multi factor models. Furthermore it is concluded that there is no significant difference in the exposures of the SRI portfolios to the conventional portfolios (Bauer, et al., 2007). However, the study does present a very interesting result as it indicates that there is a catching up or learning phase that SRI funds or portfolio managers go through. In the earliest years studied, Bauer et al. (2007) find that SRI funds underperform their conventional counterparts. As the years progress this difference is eliminated and at the end there is non-statistically significant evidence indicating that the SRI delivers a higher expected return when adjusted for risk.

The study undertaken by Schröder (2007) differs from that of the other authors, as his study investigates the performance of SRI stock indices. It is found that SRI indices have a higher relative risk compared to conventional indices, but this is valued by the market through similar risk return ratios (Schröder, 2007). Hence, the risk return for the index is actually rightly priced, thereby supporting a notion that investors are not penalized on their investment returns by choosing to invest ethically. This is actually a conclusion shared by Bauer et al. (2007), Bauer et al. (2005), Bello (2005), and Renneboog et al. (2008) as many researchers find that there is no statistical difference in returns. This indicates that these stocks are correctly priced, and that the application of an ESG filter does in fact not limit the performance of the portfolios as it would be reasonable to claim following the modern portfolio theory. Furthermore, all aforementioned researchers also find that no group of portfolios is able to beat their respective indices in the long run. However, it is concluded that at an individual fund level, there are a few managers in both the SRI and the conventional fund groups who demonstrate positive alphas, but these represent only a small percentage (Benson, et al., 2006).

3.2 Cash flows

The topic of cash flows may not be the initial concern of an investor who is deciding if he or she should invest in an SRI fund, but it is crucial to the fund manager. A steady level of capital under management invariably means less pressure which can be introduced by investor sell off of assets following bad fund performance. In a study conducted by Bollen (2007) it was found that cash flows into socially responsible funds are more sensitive to lagged positive returns than cash flows into conventional funds, and there was a weaker evidence that cash outflows from socially responsible funds are less sensitive to lagged negative returns (Bollen, 2007). Put very plainly, SRI investors are not as susceptible to take out their money from an SRI mutual investment fund as they would be if it were a conventional fund. This is a highly interesting finding, as it could provide an incentive for the creation of SRI mutual funds, as it would imply more steady flows of capital in and out of mutual fund providers. These results are further supported by Renneboog et al. (2011). The conducted survey covering 17 different countries, plus 4 offshore legal jurisdictions found that SRI money flows are less sensitive to past fund returns. Money flows are less related especially when SRI funds primarily use negative or sin/ethical screens (Renneboog, et al., 2011). The result was identical for all regions studied and perhaps the most crucial result was that even following two negative performance years; 2001 -16% and 2002 -21% the SRI funds still experienced a strong inflow of new money (Renneboog, et al., 2011). This result is also supported by Bollen (2007) as mentioned above. The results from the cash flows indicate that there is a difference in behavior of the SRI investors compared to conventional investors (Bollen, 2007). The following section will examine if they are purchasing a product which is adequately diversified compared to conventional funds.

3.3 Portfolio diversification

Researchers in academia have also looked into the topic of portfolio diversification. This is a crucial part of any form of portfolio construction as it is directly linked to the pursuit of minimizing systematic risk through diversification. As mentioned earlier a basic issue with the creation of the performance of SRI exists, and it is that it is assumed to be harder to diversify away risk, as the investment universe is constrained. In this section the articles covered are all dealing with equity SRI portfolios. The topic has attracted quite a bit of attention as it would be reasonable to assume that achieving the same diversification as a non-SRI portfolio would be difficult as the investment universe is constrained. Hence, the studies of the level of diversification is critical in examining whether or not SRI portfolios are actually different from their conventional counterparts on a

technical level, and if they are able to achieve the same levels of risk diversification. If the fund managers are not able to achieve sufficient risk diversification it implies that the individual investors are taking more risks by investing in SRI funds. The above subsection on SRI found that the performance of the portfolios was mostly none statistically different from conventional portfolios. Hence, a higher risk at a lower return would imply a worse investment to the individual investor (for more on this relationship see section 6.2.1 on the Sharpe ratio).

The first study covered was conducted by Benson et al. (2006). Through a study period of 8 years it was found that socially responsible funds do not differ from conventional funds in asset characteristics, degree of portfolio diversification, or long-run investment performance (Bello, 2005). This again supports the general findings of the performance of SRI funds, while also highlighting a very important notion, that these funds may in fact not be different from their conventional counterparts, this finding has also been published by Bauer et al. (2004). With respect to performance it is found that both a conventional and positively/negatively screened portfolio underperforms the index (Bello, 2005). The study also finds that SRI funds exhibit different industry betas indicating different portfolio compositions compared to their conventional counterparts (Benson, et al., 2006).

In a recent study Höpner (2010) seeks to further examine the degree of diversification in SRI portfolios. The goal of the study is clearly to challenge the notion proposed by Renneboog et al. (2008) that the application of filters to an investment process *must* have a negative effect on portfolio diversification. The research conducted focuses a lot more on the specific components of the portfolio, the stocks, than other previous studies such as Bello (2005) and Renneboog et al. (2007), where it was found that there was no diversification difference. The results of the study suggests that there is actually a possibility of positive diversification effects from applying positive ESG filters as opposed to negative that may impose a negative effect (Hoepner, 2010). The origin of this effect originates from a lower firm specific risk especially observed in the best in class firms when selected through positive ESG filters. This positive filtering process would then lead to a lower average asset standard deviation and thereby ultimately lead to a lower risk through improved diversification. The reduction in firm specific risk is proposed to stem from a public buildup of goodwill by showing good ESG performance largely supported by the findings of Godfrey et al. (2009). This positive effect of a ‘best in class’ ESG approach opens up for a possibility that funds could in fact turn out to be better diversified, thereby, lowering the investor risk. This implies that

the current debate about diversification of SRI portfolios is not yet complete, and that the specific risk levels could present interesting perspectives through the application of ESG filters. This is the topic of the next subsection where the relationship between specific ESG filters and stock performance is further explored. Hence, Höpner emphasizes that the application of negative filters to portfolio construction will hurt the diversification of the portfolio. By linking this to risk return relationship, it raises an interesting perspective, which is also in line with the findings of (Hong & Kacpercyzk, 2009), namely that negative filters hurt the risk adjusted return of a portfolio (ibid). This is an interesting finding because it is reached despite the fact that the objectives of the studies where completely different.

3.4 ESG filters

Author	Year	Category	Research method	Type of research	Positive/negative
Ziegler, Schröder, Rennings	2007	ESG	testing of average monthly stock return of European corporations from 1996-2001	statistical hypothesis testing combined with research conducted by Sarasin ranking the environmental and social performance of corporations	Mixed Environment has a positive impact, Social performance a negative impact. Relative to the industry has no significant difference
Derwall, Koedijk, Horst	2011	ESG	four factor model with US T-bill as risk free asset	statistical testing of strong employee relation vs. shunned (sin) stocks	Mixed results on the governance filter
Derwall, Guenster, Bauer, Koedijk	2005	ESG	testing the economic value created by companies grounded on eco efficiency scores	Portfolio comparison based on eco ranking. Testing conducted using the CAPM	Positive impact from eco-scores on portfolio performance
Galema, Plantinga, Scholtens	2008	ESG	researching the relationship between SRI and financial performance	ESG scores relative to performance	Governance = positive, Social = Positive. Others not statistically significant
Edmans	2011	ESG	four factor model applied to 100 US companies, with a focus on employee relations	Research based on data from the 100 best companies to work for in the SU	Governance has a positive impact
Ioannou, Serafeim	2010	CSR	a study of the link between positive recommendations from equity analysts and CSR performance	Large US firms over a 16 year period 1993-2008, 2698 unique companies	CSR strategies positively influence analyst recommendations
Busch and Hoffmann	2011	ESG	annual questionnaires sent to the 2500 largest companies within Dow Jones global	Qualitative and quantitative research based on responses	Environment has a positive influence on financial performance

Table 2 - ESG filters and performance

The studies covered in this section are centered on different forms of implied performance due to factors that are relatable to one or more of the ESG factors. The results span a wide variety of research methods and approaches. From questionnaires sent to companies to investigate the link between corporate social performance and corporate financial performance done by Busch and Hoffmann (2011) to the traditional statistical calculations conducted by Ziegler et al. (2007). It is worth noting that, since the results have not been achieved on an equal basis, some issues may arise when stating that the results from one study are equal to other studies. However, it is still important to review and establish an overview of the findings of academic researchers, despite the possible inability to reach a definite conclusion on the topic of ESG filters linked to financial performance.

The first result covered comes from the study by Ziegler et al. (2007). Here it is found that the average environmental performance of the industry has a significantly positive influence on the stock performance (Ziegler, et al., 2007). This conclusion is reached through a study of European stock performance, as measured by the monthly stock returns in the period 1996-2001. The study is conducted on both a relative industry level and a relative company level within an industry. This approach gives good indications of whether or not a corporation is rewarded on the stock exchange for being a part of a relatively environmentally friendly industry, which appears to matter in terms of financial performance. However, in contrast to this finding, and in contrast to ESG filters acting as identifiers of good financial performance, it is found that the average social performance of the industry has a significantly negative influence on stock returns (Ziegler, et al., 2007).

Edmans (2011) provides insight into the topic of governance related to the performance of stock companies. The study conducted is focused on corporations located in the US. Through the creation of a stock portfolio comprised of the 100 best companies to work for, he studies the possibility of creating a positive financial alpha[5]. The study finds that there is an outperformance of stocks where employees are the most satisfied with working compared to benchmarks. The created portfolio earned an annual four-factor alpha of 3.5% from 1984 to 2009, and 2.1% above industry benchmarks (Edmans, 2011). Hence, the findings indicated that an employee focused, positive governance filter could help identify companies which would aid in generating a positive financial alpha.

[5] This alpha is the one extracted from the four factor model. This model is not utilized in this thesis, the rationale behind this selection is given in section 9.2

Progressing on the environmental implications for stock performance Derwall et al. (2005) conducted a comparative study of differentiated eco-efficiency rated portfolio performance. The study is somewhat comparable to Zeigler et al. (2007), albeit the study does not extend to full industry level research. Portfolios are constructed based on eco-efficiency which is a proxy for environmental performance. Here the environmental performance is gathered from 20 sources covering the environmental performance of companies. The paper found that the high ranking portfolio (in terms of eco-efficiency scores) had substantially higher monthly returns than the low ranked portfolio over the period from 1995-2003 (Derwall, et al., 2005). This indicates that the best performance in terms of environmental performance using the applied proxies can potentially lead to better stock performance given that the applied filter can incorporate the same values that Derwall et al. (2005) identified.

Busch and Hoffmann (2011) further build on the research on the topic of environmental filters and financial performance, albeit applying a more theoretical approach than the previous studies. The study conducted focuses on the possible link between carbon emissions (as an environmental proxy) and the financial performance of a firm. The results of the survey are split in two: The results of their analysis indicate that when using carbon emissions as an outcome-based measurement, corporate environmental performance pays off. However, when a process-based measurement is used, there is a negative relationship between carbon emissions and financial performance (Busch & Hoffmann, 2011). The outcome based approach investigated in the paper is centered on stakeholder theory and pollution reduction. Based on fulfilling the environmental expectations of stakeholders and thereby gaining access to new markets, firms are able to achieve financial and environmental win-win situations (Busch & Hoffmann, 2011). The processed based analysis targets the managerial efforts to increase environmental performance through internal efforts, while not accounting for resource consumption or emission optimization. In this perspective the attempts to control or reduce emissions can be seen as restrictive on financial performance, as management diverges from their prime objective which is business, not social issues. A conclusion which is well in line with Friedman (1970) who stated that:

"*there is one and only one social responsibility of business – to use it resources and engage in activities designed to increase its profits so long as it stays within the rules of the game*" (Friedman, 1970).

In short, business should stick to doing business. The article promotes arguments for and against higher financial performance based on the utilization of environmental filters. Staying within the realm of non-statistical works Ioannou and Serafeim (2010) investigate the investment recommendations given to socially responsible firms. The study falls a bit outside the other papers reviewed in this section, but it can help to provide an interesting insight into the attention that corporate social performance is receiving in the investment community. Based on data from the last 16 years, the average recommendation (Sell – Buy) regarding a company is studied with respect to the corporate social responsibility of an individual corporation. Their study shows that in recent years firms with clear CSR strategies have received more favorable ratings from analysts (Ioannou & Serafeim, 2010). The question remains whether or not these rating agencies are correct with respect to which companies will outperform their peers, however, it does give an indication of investment professionals valuing a clear cut CSR strategy.

Galema et al. (2008) takes the focus back to the link between ESG performance and monthly stock returns. The study is centered on the performance of US SRI portfolio returns and on the effects of ESG scores. The paper finds that the performance of SRI portfolios is statistical non-different compared to conventional non-ESG-screened portfolios (Galema, et al., 2008). However, the study is further extended to include a direct test of the effects of individual social aspects of investments. The study focuses on environmental, governance and social factors, and these are measured and ranked by a specialized advisory firm. Individual firms are evaluated based on the strengths and weaknesses in six categories that are all relatable to ESG. It is found that portfolios that score positively on diversity, environment and product perform better than their counterparts (Galema, et al., 2008). Hence, their results indicate that portfolios that are based on the better performing companies within the specific ESG factors apparently perform better than the counterparts where concerns exist in this same area. Note that this rating on whether or not a company performances positively or is in a concern category has been done by an external advisor and the screens applied to reach this classification have not been published. Hence, it is hard to know exactly how this process is conducted. However, it indicates that best performers/positively screened companies may lead to higher returns on portfolios.

Ultimately, the results of Derwall et al. (2011) give a very interesting insight into both positive screens and the performance of sin/shunned stocks. The average monthly difference between investors using negative ESG filters to avoid controversial stocks (value-driven) and investors using

only positive filters (profit-driven) is explored through a study from1992-2008. The study covers a shunned stock portfolio comprised of all the stocks that are filtered out by applying negative screens, and a portfolio with the best performers in the employee relations group as identified by an external consultancy firm: Their results indicate that the shunned stocks deliver a positive alpha from all years surveyed and results are statistically significant. The strong employee relations only provide statistically significant alphas from 1992-2004 (Derwall, et al., 2011). This is a very interesting conclusion as it speaks highly against only applying negative ESG filters when identifying stocks for investments. If profit is desired over value the shunned portfolio may achieve higher expected returns. However, this can also be found by applying a best in class governance filter, with an employee proxy.

The results of Derwall et al. (2011) opens up for an important aspect of ESG filters that should be further examined, namely that the portfolio of shunned stocks outperformed the ethically acceptable stocks that the value driven investors would invest in. It is indicated that the group of investors that are not interested in the shunned stocks is large enough to put a downward pressure on stock prices. Thereby, allowing for a group of stocks to potentially outperform the market due to a lack of demand. This relationship between shunned stocks and outperformance is explored by Hong and Kacperczyk (2009). The performance of sin stocks is investigated by conducting a study of both monthly stock returns based on "sin category" and the types of professional investors holding different types of stocks. In their paper they find the institutional investors, such as pension funds are often constrained from investing in sin stocks and as such they incur a penalty for this constraint (Hong & Kacpercyzk, 2009). They find that sin stocks receive relatively less coverage from investment professionals and that this group of stocks does in fact deliver a significant outperformance on a yearly level.

To sum up, the differences in results are significant when the topic is performance and ESG screens. Renneboog et al. (2011) Galema et al (2008) completely disagrees as the latter find that portfolios that have a positive score on diversity, environment and product – have a significant impact on stock returns. (Galema, et al., 2008). This is further supported by Derwall, et al. (2005), where it is indicated that companies rated highly for environmental performance outperform those rated poorly. This does leave a murky impression on the effects of ESG screens on performance, and it does appear that no clear tendency has been found with regards to how each negative filter affects

an SRI portfolio. But this does not mean that mutual funds and investors should not care about ESG filters as the indicatory results indicate interesting effects from positive filters.

This section presented an overview of the empirical results published with respect to SRI portfolio performance, portfolio diversification, cash flows in and out of funds, and the performance implication of applying negative or positive forms of ESG filters. The results covered on the topic of SRI portfolio performance showed that there is a widespread agreement in academia that the performance of SRI portfolios does not create any statistically significant difference in investment performance compared to non-screened investments. However, as mentioned previously this is not necessarily bad news to institutions managing SRI portfolios since they can offer investors comparable investment performance while also catering to the personal values held by the group of investors that are interested in SRI investments. This is further indicated by the fact that the diversification of stocks is comparable between SRI portfolios and conventional portfolio.

Hence, given that the risk return relationship holds, then all portfolios should offer equal performance given the level of risk taken. Furthermore, positive filters could lead to a better diversification and lower the portfolio standard deviation. The study on cash flows indicate that institutional investors should offer SRI portfolios to investors, as the group of investors investing with the SRI values in mind are less susceptible to withdraw their invested funds in the case of bad performance. The study of ESG filters indicated that investors will suffer a penalty when only applying negative filters however; positive filters can in certain cases lead to higher portfolio performance, given that the right proxies are used to locate the best performers with respect to environment, governance, or social areas.

The studies covered showed that there has been a large amount of attention in the literature directed towards the US and a few worldwide studies. It has not been possible to find any empirical studies that covered the Scandinavian investment market with respects to SRI investments.

4 The SRI market

This section of the thesis gives an overview of the emergence, growth and current size of the market for SRI. The first part of this section gives an overview of the historical development the market has undergone and the growth the market has experienced in the past decade. Following this overview the focus is shifted to the European and Scandinavian SRI markets. Note that throughout this section of the thesis the SRI market includes all potential forms of investments (equity, bonds etc.) unless specifically specified.

4.1 The Emergence of SRI Markets

The origins of ethical investments can be traced back hundreds of years (Bauer, et al., 2005). Historical accounts of ethical conducts span from value driven religious considerations documented in the 18th century to early quotes by Aristotle (ibid). While these show initial considerations of the potential impact of actions associated with corporate conduct it is not going to be the starting point of this overview. Instead the focus is on the modern roots of the responsible movement which can be traced back to the political climate in the US during the 1960s (ibid). This modern approach to SRI altered the concept from being predominantly religious to include a wider range on investment criteria which encompass the societal development and reaches a larger group of potential investors (Derwall, et al., 2011).

The societal debate taking place during the 1960s in the US brought forth issues regarding the environment, civil rights, nuclear energy and the negative effect of tobacco. As these topics became more debated and received growing attention mutual funds were set up in the US to accommodate the preferences of the environmentally and socially conscious investors.

In the 1970s social activism spread to governance principles and employee issues at corporations, while protection of the environment also became increasingly important for investors. The broadcasting of tobacco ads was banned in the US in 1971, thereby conclusively making tobacco a commodity to avoid when investing responsibly (Hong & Kacpercyzk, 2009). The 1970s also put the analysis of ethical mutual funds on the agenda in the scientific community with the paper written by Moskowitz in 1972 (Schröder, 2007).

During the 1980s the issue of apartheid in South Africa was the center of much public attention and this lead to a massive focus on corporations operating in the country. The attention directed towards the country lead to a series of divestments in the country and the establishment of negative

screening of corporations engaged in South Africa. This topic was dealt with more in-depth in section 2.5 of this thesis. In the same decade the number of funds utilizing positive and negative screens in the equity selecting process entered into a growth period that would continue for the next 30 years (Copp, et al., 2010). The Social Investment Forum, now known as the US SIF – The Forum for Sustainable and Responsible Investment, was founded in 1984 as one of the first organizations serving social investors. Currently it functions as a platform where yearly reports are published, and a range of topics are in focus to increase public awareness of certain issues. The growth of the SRI market in the 1980s also created a new interesting byproduct, the sin stock portfolios. These are comprised of all the stocks that are banned from SRI. They were created as more investment firms started to shun certain stocks such as, tobacco, alcohol, pornography and gambling. This lead to a new investment focusing on sin stock investments which potentially could deliver higher returns due to the divestments in sin stocks (Renneboog, et al., 2008).

The following decade continued the trend of increased attention towards SRI. The 1990s also ushered in the birth of social indices. In 1990 the first social index was launched, the Domini 400 social index, launched by Domini social investments. The index was primarily made up of 400 large-cap U.S. corporations, selected on a wide range of social and environmental standards. In 1995 the US ethical mutual fund market had grown to $12 billion (Bauer, et al., 2005).

During the 2000s, the FTSE4Good index was launched with the support of the United Nations Children's Fund (UNICEF). The index uses data provided ethical investment research services to select the members of the index. The launch of additional SRI equity indices followed the general market trend. By 2001 the total assets under management in US ethical mutual funds had grown to $153 billion (Bauer, et al., 2005). In the same year the European social investment forum was launched. This marked the start of a pan-European interest group promoting ESG principles and monitoring the development of SRI in Europe. In 2005 the United Nations Principles for Responsible Investments were founded. This was launched by the UN secretary general in cooperation with the UN environment program finance initiative and the UN global compact. This was formed through dialog with the world's largest financial institutions. Thereby, SRI was shown a combined support from the financial industry itself and a supra-national organization. By 2010 the US social investment forum identified $3.07 trillion in total assets under management using one or more sustainable and/or responsible investment strategies. In the light of the financial crisis social investing enjoyed a growth of more than 13 percent from 2007-2010 (Foundation, 2010).

A vast amount of interest has been given to the US SRI investment market. However, the largest market is the European market that holds the largest share on the world SRI market in terms of AuM (Eurosif, 2010). The world SRI market is as of September 2010 estimated at a total size of €7,6 trillion. The specific markets and the sizes can be seen below.

	Type of SRI	*SRI AuM*	*Total SRI AuM in billion EUR*
United States	*Total SRI*	*$3,069*	*€2,141*
Canada	*Core SRI*	*$54,2*	*€405*
	Broad SRI	*$555*	
Australia & New Zealand	*Core SRI*	*$18,2*	*€58*
	Broad SRI	*$74,8*	
Japan		*¥579*	*€4*
Europe	*Core SRI*	*€1,150*	*€4,986*
	Broad SRI	*€3,836*	
World Total			*€7,594*

Table 3 - Global SRI data (Eurosif, 2010) in the Japanese study there was not distinction between core and broad SRI

In Eurosif 2010 there is a distinction between Core SRI and Broad SRI. Core SRI covers, norm and value based exclusions (negative ESG, positive screens, screening according to UNPRI etc. and thematic funds i.e. green tech etc.) and broad SRI covers sectors wide screens based on one or more exclusions of; arms manufacturing, pornography, animal testing etc. and shareholder engagement (Eurosif, 2010).

SRI has undergone a massive development in terms of AuM where some form of SRI screening is utilized. The growth of SRI was motivated by societal movements, which lead to an increased creation of investment opportunities available to the public. The push for more sustainability and ethical considerations has in part been recognized by the financial world, and now the UN has formulated views on ESG screening and SRI.

4.2 The European SRI Market

The previous section established that the European SRI market is the single largest market for ethical and responsible investments in the world in terms of AuM. The European market has experienced substantial growth over the last decade. As of 2011 there were 886 SRI retail funds in

Europe, and these include ethical and ESG screen funds. Following two years of high growth in the number of SRI retail funds from 2008-10, the market has been, consolidating in 2011 (Familiari & Pezzolato, 2011). The development of the market can be seen in the graph below:

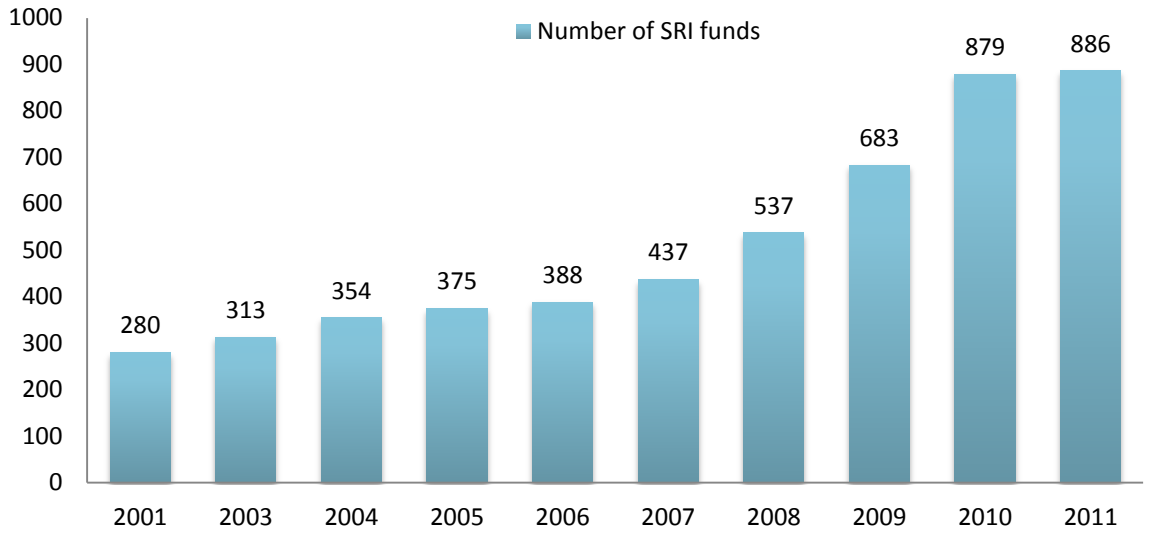

Figure 5 - The European SRI market (Familiari & Pezzolato, 2011)

The major national markets in the EU include; France, Belgium, the United Kingdom and Switzerland, with these markets accounting for a total of 72% of all SRI funds in the EU. Along with the high amount of funds in these markets they also account for a higher proportion of SRI assets as these markets account for 76% of the European SRI AuM (Familiari & Pezzolato, 2011).

The SRI thematic funds found in Europe are predominantly engaged in the clean energy sector where there is an emphasis on wind power, solar or geothermal energy. The range of investment opportunities is growing throughout the region and covering funds focusing on health and nutrition themes and sustainable business practice funds (Eurosif, 2010). In a recent survey by Allianz Global Investors AG, the outlook for thematic sustainability funds is bright with the highest market potential found for pension funds. The European SRI market is largely driven by institutional investors (Banks, pension funds, mutual funds, hedge funds etc.) who currently represent 92% of the total SRI market. In a survey conducted by Eurosif (2010) it was also found by the respondents that the top demand driver for SRI was the demand created by institutional investors, ranked above; international initiatives such as the UNPRI, the Media and ultimately the retail/individual investors.

4.2.1 Challenges to the European SRI market

One of the key challenges faced by the SRI market according to Eurosif (2010) is the definition and categorization of the term SRI. As more factors become incorporated in fund management it becomes increasingly important to define the boundaries of what includes SRI investments. Furthermore, SRI is not a protected label, and all can state that they have responsible investment practices. One example of this challenge regarding the classification of SRI is seen by examining a Danish investment manager, Nykredit Invest. Like many other investment managers in Scandinavia, Nykredit invest screens all portfolios twice a year to ensure that no bonds of equities go against their own internal responsibility guidelines. Hence, they have a companywide negative screening process, or a broad SRI policy. On top of this broad strategy they have a core SRI product which is labeled as an SRI portfolio. This goes to show the difficulty of classifying what an SRI portfolio is. In much of the academic literature thematic negatively screened SRI portfolios are classified as SRI portfolios, however, if many institutional investors utilize their own negative screens it becomes hard to say which portfolio distinguishes themselves as SRI portfolios and which are simply conventional. This is a specific target area for Eurosif in the coming years to facilitate an industry wide SRI classification to make a clear distinction between forms of investments to help the investors and policy makers alike. This specific area also warrants the need for a specific SRI classification when conducting a survey of the Scandinavian SRI market.

4.3 The Scandinavian SRI Markets

This section of the thesis will give an insight into a market that has not previously been specifically described in terms of relative SRI performance to the knowledge of this thesis. As a whole there is not a lot of literature that covers the relative performance of Scandinavian mutual funds, as two countries are present in EU reports: Denmark and Sweden, but not Norway. The Scandinavian countries are regarded as the European leaders in the support of SRI (Eurosif, 2010). Therefore, the region presents some unique characteristics that should be noted when making a study of SRI performance in Scandinavia.

	2009	2010	2011
Denmark	10	12	12
Sweden	61	58	55
Norway[6]	-	-	7

Table 4 - Total Scandinavian SRI funds Equity and Bonds (Familiari & Pezzolato, 2011)

The largest SRI market, based on the number of SRI funds, in Scandinavia is Sweden, followed by Denmark with largely the same amount of SRI equity funds as Norway. Each of the three markets will be individually described in the following sections to give an overview of the individual market specifics, in these sections data from local social investment forums are largely utilized.

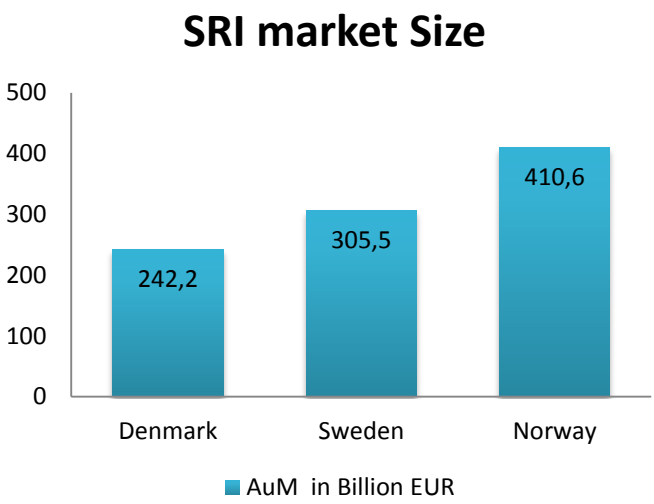

Figure 6 - SRI market sizes Eurosif (2010)

In terms of total SRI AuM the largest market is surprisingly the Norwegan market when recalling the number of funds. The Norwegian market size exceeds the Swedish with more than €100 billion. The market size is heavily influence by the Norwegian Government pension fund, for more on this see section 4.3.3.

The fundation of the present day SRI policies in Scandinavia can accoring to Bengtson (2008) be traced back to the 1960s. In his paper Bengtson argues that the Scandinavian countries were and are at the very forfront in the development of SRI (Bengtson, 2008).

4.3.1 Denmark

The Danish market for SRI is dominated by two forms of investments, one is Fixed income totaling 65,3% of SRI assets, and 20,5% of assets invested in equity, the rest is distributed between real estate, commodities, and private equity

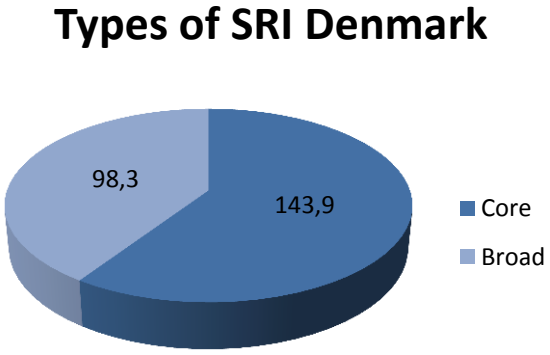

Figure 7 AuM in billion € based of SRI type Eurosif (2010)

[6] Norwegian data originates from the classification developed in this thesis as Norway is not individually covered in any of the European reports. Note that this does not include pension funds.

(Eurosif, 2010). As of 2009 the total SRI market in Denmark amounted to €242,2 billion and there was an overweight of assets invested in core SRI with €143,9 billion invested and 98,3 in broad SRI (ibid).

The largest driver of demand on the Danish market is institutional investors. The market has been characterized by an increase in the attention towards SRI from the media and NGOs. The overall view is that the Danish SRI market will continue to grow over the coming years with an increase in specialized non-traditional SRI funds (Eurosif, 2010).

4.3.1.1 Institutional investors

The single largest form of SRI investments in Denmark is the negative norm or value based exclusions, with a simple screening process (exclusion based on industry) being the second most used form of SRI. The Best in Class approach or positive screening process is the smallest player on the Danish market (Eurosif, 2010).

A specific Scandinavian model of exclusion and/or active participation with stakeholders is widely used in Denmark and it is currently being used, to some extent, by 88% of the Danish institutional investors who represent 97% of the combined SRI AuM in Denmark (Dansif, 2011). This explains the large utilization of a negative/norm based screening process (core) in Denmark in the Eurosif survey which is used by 79% of all investors. The primary focus of this Scandinavian model used in Denmark is norm based screening focused on environmental and social issues and stakeholder participation. Around half of all institutional investors in Denmark exclude investments in companies with activities such as weapons, alcohol, tobacco and pornography. Roughly 91% of the SRI AuM held by Danish institutional investors is invested according to the six UN principles (Dansif, 2011).

The vast majority of institutional investors purchase SRI screening services from outside providers who then perform portfolio analysis to localize potential issues with assets held. ESG considerations are used by around 36% of institutional investors to some extent as a part of financial analysis.

Thematic funds such as climate funds, green tech etc. are not common in the Danish market and the same goes for positively screened funds. The market is largely characterized by the adaptation of the common Scandinavian model with a limited amount of specifically labeled SRI funds. These funds are characterized by well specified ESG screening processes and the utilization of positive

screening filters. Largest asset class held under the SRI heading is fixed income, with hedged funds and structured products currently growing in demand.

4.3.2 Sweden

Sweden is among one of the forerunners of SRI in both Europe and Scandinavia. The current AuM in Sweden exceeds €300 billion and it has been growing continuously for the past years. The market grew by approximately €114 billion from 2007 (Eurosif, 2010). The SRI market in Sweden is characterized by ethical exclusion and active engagement with stakeholders. The market is dominated by the Swedish pension fund and the Church of Sweden that wish to invest with an ethical profile (ibid). Like the Danish market, the majority of Swedish institutional investors to some extent including SRI as a core part of their investment strategy.

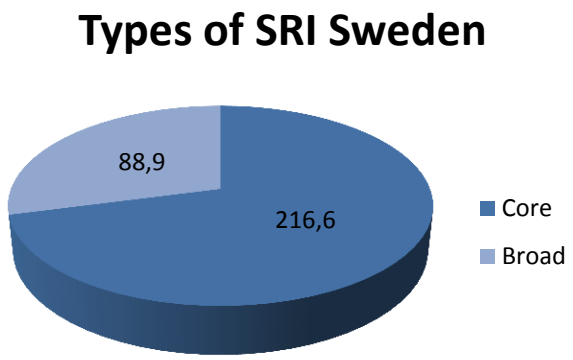

Figure 8 AuM in billion € based of SRI type Eurosif (2010)

The asset invested in Sweden is distributed similarly to the Danish market with the core SRI being the larger of the two forms of investments. This is primarily due to the common practice of norm based screening in Sweden which accounts for approximately 70% of the total SRI volume

The Scandinavian model is also prevalent in the Swedish SRI market with 67,5% of investors using a negative norm based approach to the screening process. Following the trend of the Scandinavian model more than 38,9% of the SRI invested assets are managed under active engagement practices (Eurosif, 2010). The use of positive screening and thematic funds is on the retreat in Sweden compared to the utilization of the Scandinavian model.

The Swedish market is largely driven by Institutional investors, and the single largest group of SRI assets is Fixed Income closely followed by Equity with respective shares of 48,6% and 44,6%. The large proportion of fixed income investments in Sweden is largely driven by a few organizations with highly significant amounts of capital (Eurosif, 2010).

4.3.3 Norway

The Norwegian SRI market is the largest of the three Scandinavian countries. The market has been continuously growing since the 1980s when SRI was first introduced to the market. The single largest actor in the market is the Norwegian Government Pension Fund and it is also the reason for the large market size in Norway (Eurosif, 2010). The fund serves as a benchmark for responsible investments due to its size, and the practices utilized by the fund largely dominate the application of SRI in the market. However, one should not let the importance of the fund overshadow the rest of the market for SRI, it is still there and does hold merit (ibid).

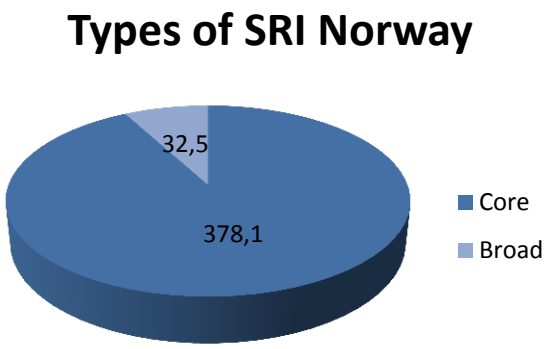

Figure 9 AuM in billion € based of SRI type Eurosif (2010)

The Norwegian SRI market totaled €410,6 billion as of 2009. The majority of investments are core SRI, the market share of core SRI largely surpasses that of its Scandinavian counterparts. With €378,1 billion invested the core SRI that one component of the market is larger than the combined core and broad SRI market segments in Denmark and Sweden respectively.

The Norwegian market is characterized by the usage of the Scandinavian model. The SRI market is largely based on ethical exclusion, with engagement being the second largest form of SRI applied. Simple screening is the third largest used tool, however, this only accounts for a quarter of the capital relative to engagement.

The Norwegian market is largely driven by institutional investors just as in the other two Scandinavian countries. The assets forms invested in as a part of the SRI market differ from the two other countries, as equities are the most prevalent SRI asset in Norway. However, the distribution between fixed income and equity is almost equal with 48,9% in equity and 48,0% in fixed income (Eurosif, 2010). The Norwegian market has the fewest number of PRI signatories relative to the two other countries (UNEP Finance Initiative, 2011).

This concludes the overview of the SRI market. This section gave insights in to the SRI markets and highlighted the usage of SRI practices on a large scale. The public push for responsibility was answered by existing and new players in the investment market and the market has been growing

ever since. The Scandinavian markets are the front runners in the global and European SRI markets. As such the requirements for the classification of SRI funds will be a crucial factor when conducting a survey of the market, or else the study could end up being practically a mutual funds study in Scandinavia. Instead the development of more stringent SRI classifications could aid in the identification of funds, and the creation of distinct retail fund categories.

Throughout the overview of the SRI market in Scandinavia and Europe there has been a large reliance on three sources. These are Eurosif (2010), Dansif (2011) and Familiari & Pezzolato (2011). Common for all three is that they can be linked to organizations or firms that have an interest in describing the market as being as large as possible. There are, to the knowledge of this thesis, no unbiased sources tracing the development of SRI. It is important to note that these figures are only used to indicate the relative market sizes and give an indication of the Scandinavian SRI market.

5 Research question

The section 2 and 3 of this thesis presented a wide range of academic papers all dealing with varying topics of SRI. However, there was a gap in the literature, as no paper to the knowledge of the author has attempted to explain the Scandinavian market for SRI investments. There is a lack of understanding of this market. This gap in the academic literature serves as the offset for the creation of the research question in this thesis and the research objectives. Furthermore, in the overview of the SRI markets it was established that the Scandinavian market had different characteristics compared to other SRI markets, and that the market size was quite substantial.

Research Question*:* How does the performance of Scandinavian SRI equity mutual funds compare to their conventional mutual fund counterparts? Furthermore, what specific characteristics are present in the Scandinavian SRI market?

The research question implies the following **research objectives** of this thesis. The objective of the analysis undertaken to answer the research question is to establish whether or not choosing to invest money "ethically" correct will affect the financial return an investor can expect from investing in a mutual fund**.** In order to answer the research question this thesis has shown that there is indeed a market for SRI investment in Scandinavia that merits the need for an analysis of the performance of SRI mutual funds. In order to describe the potential specific characteristics of the market, attention must be directed towards uncovering potential special traits exhibited by mutual funds in the Scandinavian market.

The following hypotheses will be tested in order to investigate whether or not there is a relative difference in the performance of SRI portfolios in Scandinavia.

The first hypothesis tested is related to the notion of SRI funds in Scandinavia delivering inferior results compared to their conventional counterparts due to the non-financial screening conducted as a part of the portfolio creations. This leads to the following underperformance hypothesis:

H_0: SRI equity funds as a whole underperform their conventional counterparts in the same country

H_1: There is no statistical difference in the relative performance between conventional and SRI equity mutual funds.

The second hypothesis tested seeks to investigate if SRI funds should outperform their conventional counterparts. This hypothesis is grounded in the undervaluation of ethical companies due to the lower risk of a negative public event and that the existences of certain ESG screens can help to identify superior corporate performance as shown in Derwall et al. (2005) and Busch & Hoffman (2011).

H_0: SRI equity funds as a whole outperform their conventional counterparts in the same country

H_1: There is no statistical difference in the relative performance between conventional and SRI equity mutual funds

6 Method

This section builds on the previously developed research question, and it gives an overview of the methods applied in order to test the hypotheses and ultimately answer the research question. The mutual performance tools will be individually described to provide an overview of the most commonly employed terms and equations in modern portfolio performance theory (Elton, et al., 2011). This is followed by the tools used most commonly in comparative studies of portfolio performance Renneboog et al. (2011), Bauer et al. (2007), and Schröder (2007). These tools include the Sharpe ratio, the Capital Asset Pricing Model (CAPM) and lastly the Fama and French three factor model.

6.1 Basics of mutual fund performance

To boil the performance of a portfolio down to the basic core is simply to look at the weighted average return on the individual assets (Elton, et al., 2011). Hence, the return of a portfolio, whether an SRI portfolio, a conventional portfolio or any form of portfolio will be directly linked to the performance of the underlying instruments in proportion to their weight of the total portfolio. When holding a single stock, the return would be the price difference of the stock held, plus the dividend, minus the trading costs, divided by the initial investment. Given by the simple rate of return equation (Bodie, et al., 2011):

$$R_t = \frac{P_0 - P_1 + Div - Cost}{P_0}$$

Equation 2 - The return of an asset at time t

Rt is the return on a given asset,

P_0 is the purchase price,

P_1 is the selling price,

Div is the dividend,

the cost is the cost of purchase and selling.

This is the same basic principle used when measuring the performance of mutual funds on a monthly basis as it is done in this thesis. However, it is not possible to use the prices quoted in newspapers or online when conducting performance measurement calculation of the return on an investment in a mutual fund. To perform such calculation the Net Asset Value (NAV) should be

used (Bodie, et al., 2011). The NAV equals the assets minus liabilities (fees etc.) expressed on a per-share basis (Bodie, et al., 2011)

$$Net\ asset\ value = \frac{market\ value\ of\ assets\ minus\ liabilities}{Shares\ outstanding}$$

Equation 3 - The Net Asset Value of a mutual fund

The net asset value can then be applied to compute most common financial tools, one of such the rate of return, which can now be rewritten to be applicable to mutual funds (Bodie, et al., 2011):

$$RoR_{mutual\ fund} = \frac{NAV_1 - NAV_0 + Income\ and\ Capital\ gain\ distribution}{NAV_0}$$

Equation 4 - The return of an individual mutual fund

It is exactly this equation that is needed to undertake the initial task of estimating what the return of the funds studied is on a monthly basis, in order to calculate an expected monthly return. This is a crucial part of the performance measurements needed in order to test the hypothesis developed in the previous section. Throughout this thesis the arithmetic average of rates of returns will be applied when solving for the expected return $E(R_F)$ of the studied mutual funds. The arithmetic mean will provide an unbiased estimate of the expected rate of return based on the historical data in the dataset. The geometric mean is time weighted where each past return is given equal weight as opposed to solely examining the capital gain or loss over a given period in time t (Bodie, et al., 2011).

The risk of a portfolio is given by the standard deviation of the rate of return denominated σ. It is defined as the square root of the variance, which is the expected value of the squared deviations from the expected return (Bodie, et al., 2011).

$$\sigma^2 = \sum_s p(s)[r(s) - E(R_F)$$

Equation 5 - the standard deviation of an asset

p(s) is the probability of the outcome,

r(s) is the return for a specific measurement,

$E(R_F)$ is the expected return of the fund.

6.2 Performance evaluation tools

This subsection gives an overview of the portfolio performance measurement tools applied in this thesis. Other types of tools would potentially also be applicable, however, these will not be introduced as these are not widely used in the body of literature on the performance of SRI portfolios.

6.2.1 Sharpe ratio

The Sharpe ratio or the Reward to volatility ratio was introduced by William Sharpe (1966) and it gives an indication of investment attractiveness through a measurement of the return of an investment minus the risk free rate, divided by the standard deviation of the excess return. The Sharpe ratio is given by (Sharpe, 1994):

$$S \equiv \frac{\overline{D}}{\sigma_d} \rightarrow S = \frac{E(R_F) - R_B}{\sigma_d}$$

Equation 6 - The Sharpe ratio

S is the value of the Sharpe ratio

R_F is the return on fund F

R_B is the return on a benchmark portfolio or security

σ_d is the predicted standard deviation of the difference between R_F and R_B (Sharpe, 1994)

The benchmarks will vary from country to country as the funds will be measured against national risk free rate proxies. For more information on the selected indices used see section 7.2 'Benchmarks'. The Sharpe Ratio is graphically depicted as the slope of the Capital Market Line CML as seen in *Figure 10*. The CML represents an expected return equal to the risk free rate where the risk is zero: by taking on more risk in an investment the expected return will increase.

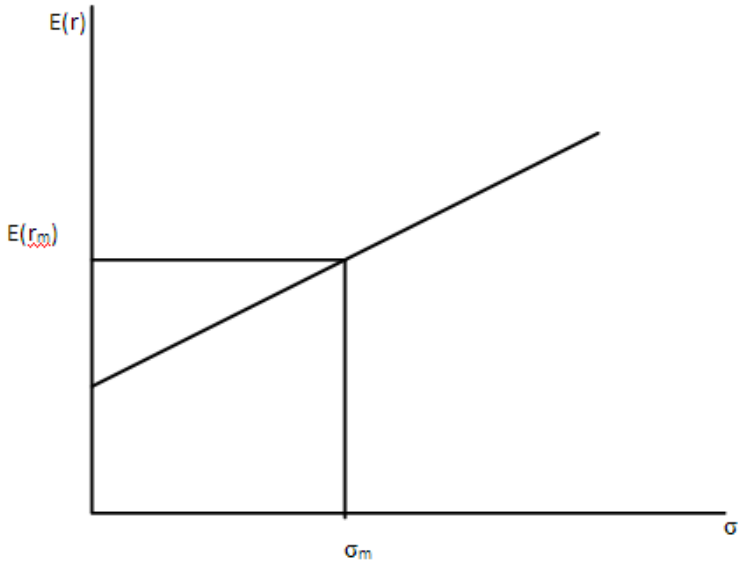

Figure 10 - The Capital Market Line (CML)

If the Sharpe Ratio of an investment is higher than the slope CML, it indicates abnormal returns, if it is lower, it indicates lower return for the same amount of risk (Bodie, et al., 2011).

The risk free rate used is the mean over the sample period following the revision of Sharpe 1994 to his theory.

6.2.2 The CAPM

The Capital Asset Pricing Model (CAPM) is the single most widely used benchmark model in mutual fund performance studies (Bauer, et al., 2007). The CAPM was developed in three papers by Sharpe (1964), Lintner (1965) and Mossin (1966). The model is based on a series of assumptions, and among the more important are that the individual investors are price-takers, there are no transaction costs, all risky assets are publicly traded, and the investor can borrow and lend any amount at the risk free rate. The CAPM is built on the notion that return is awarded for taking higher risk. The risk return relationship on excess risk is given by the difference in return of the market portfolio and the return on the risk free rate and the securities beta coefficient. The CAPM is given by (Bodie, et al., 2011):

$$E(r_i) = r_f + \beta_i[E(r_m) - r_f]$$

Equation 7 - The Capital Asset Pricing Model

where r_i is the return on a security I,

r_f is the return on a local risk-free deposit (i.e. the 1- month treasury bill rate or the inter-bank interest rate),

r_m is the return of a local equity market index,

β_i is the factor loading on the market portfolio,

Beta is given by (Bodie, et al., 2011):

$$\beta_i = \frac{cov(r_i, r_m)}{\sigma_m^2}$$

Equation 8 - The CAPM Beta

The CAPM implies that all securities are priced according to a specified relationship between the beta and the return an asset produces. These are given by the graphical interpretation of the CAPM the Securities Market Line (SML)

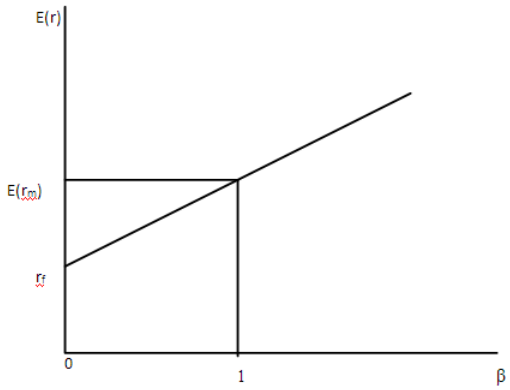

Figure 11 The Securities market line (SML)

The issue with the model is that the market portfolio is not one which can be observed or purchased free of costs, as it must include all risky assets, furthermore these assets should all be avaliable to the public.

6.2.3 Jensen's alpha

Jensen's alpha introduced by Michael C. Jensen in 1968 is a single factor model based on the CAPM. Jensen (1968) introduces an addition to the equation, the alpha, which measures the difference between the return on the mutual fund and the return on the single factor benchmark. The equation measures the average return on the portfolio's over- or underperformance predicted by the Capital Asset Pricing Model (CAPM), given the portfolio's beta and the average market return (Bodie, et al., 2011). Hence, the alpha shows the difference in expected return whether positive or negative of a given portfolio relative to a benchmark market. Jensen's alpha has since its introduction as a performance tool been widely used to conduct portfolio performance (Renneboog, et al., 2011). The equation is given by (Jensen, 1968):

$$\alpha_P = \bar{r_P} - [\bar{r_f} + \beta_P(\bar{r_M} - \bar{r_f})]$$

Equation 9 - Jensen's alpha

Where α_p measures the over/underperformance of a fund relative to its benchmark.

The rest of the parameters of the equation are the same as the above and introduced in the CAPM. The issue with this performance model is that it requires a long history of consistent management with steady levels of performance (Bodie, et al., 2011). Furthermore, economic cycles should be well represented in the data set to provide ideal conditions for the model to accurately determine if deviations from the market exist. Furthermore, it is worth considering the hypothesis proposed by Rudd (1981). It is assumed that an ethically screened portfolio has greater extra market co-variation in returns thereby making the standardized unsystematic risk for the socially responsible funds significantly greater than that of conventional funds. And this will make it difficult to use a performance measure that does not account for risk.

Jensen's alpha has an inherent problem similar to the CAPM. The model is largely reliant on the market portfolio or a proxy to act as a market portfolio. However, there are a wide variety of applicable benchmarks, and the individual estimations of the market portfolio will create different alphas, as the beta and the expected return of the market must be expected to differ depending on the proxy selected.

When conducting linear regressions on time series data, the risk of autocorrelation of the residuals should be considered (Gujarati & Porter, 2009). The assumption of no autocorrelation of the residuals implies that the deviations of the y values in a linear regression should not exhibit a general pattern given an X value (ibid). Through the regressions conducted in the analysis of the thesis the probability of autocorrelation will be tested and included in the statistical output for the Jensen's alpha analysis. The Durbin-Watson d test is the method employed for the autocorrelation test in the time series data. This is the most widely used statistical test for the presence of autocorrelation (Gujarati & Porter, 2009). The d statistic is calculated by utilizing the following equation: (Durbin & Watson, 1951)

$$d = \frac{\sum_{t=2}^{t=n} (u_t - u_{t-1})^2}{\sum_{t=1}^{t=n} u_t^2}$$

Equation 10 - Durbin & Watson d statistic

The d statistic reported by the analysis will then serve as an indicator of whether or not the data exhibits autocorrelation. If d values are between 0-4 there is no evidence to suggest negative or positive autocorrelation (Gujarati & Porter, 2009).

6.2.4 Fama and French three factor model

The Fama and French three factor model is currently the most widely used multifactor model (Bodie, et al., 2011). The objective of the further development of the CAPM was to identify common risk factors that help improve the relationship between risk and return (Fama & French, 1993). This multi factor model turns up in most academic literature on SRI mutual fund performance, to name a few Renneboog et al. (2008), Bello (2005) and Galema et al. (2008). Fama and French (1993) finds that there are three stock-market factors that impact the risk return relationship: 1. An overall market factor, 2. A factor related to firm size and 3. A factor related to the book-to-market equity. The objective of the factors is to achieve a more correct estimation of what the return on a security should be. Following an empirical study the following model was estimated by Fama and French (1993)

$$r_i - r_f = \alpha_i + \beta_{iM}(r_M - r_f) + \beta_{iSMB}SMB + \beta_{iHML}HML + e_i$$

Equation 11 - Fama and French Three Factor Model

Where:

Small Minus Big (SMB) known as the firm size factor. Is defined as, the return of a portfolio of small stocks in excess to the return of a portfolio of large stocks (Fama & French, 1993). The categories small and large are created from two portfolios. The large portfolio contains the return of the 30% largest stocks based on market cap, and the small portfolio the return of the 30% smallest stocks based on market cap. As this is the excess return it is calculated from the difference in return between the "small" portfolio minus the "big" portfolio.

High Minus Low (HML) known as the book-to-market ratio is defined as, the return of a portfolio of stocks with a high book to market ratio in excess of the return on a portfolio of stocks with a low book-to-market ratio (Fama & French, 1993). In the HML the same approach is applied where the return on a portfolio of the 30% of the stocks with the lowest book-to-market ratio is subtracted from a similar portfolio with the 30% highest book-to-market stocks.

Note that: The other factors not further described are identical to the ones seen in Jensen's Alpha and the CAPM above.

The core of the model is to capture sources of risk in excess of the market risk, to accurately estimate future return performance based on average previous returns. However, the problem with a

method such as the Fama-French model lies in its application of proxies for extra market sources of risk, just as it was noted with the single factor in the CAPM (the market). In a paper by Black (1993) it was found that none of the factors in the proposed model can clearly be identified as hedging a significant source of uncertainty. Hence, the patterns discovered and utilized to predict average returns are actually purely due to chance and not an actual risk that is priced by the market (Black, 1993). However, the model is still widely used as well as the similar four factor model introduced by Carhart (1997) despite the criticism of the models.

When conducting a multifactor analysis there is a potential risk of the model exhibiting multicollinearity, and it is a crucial assumption that must be tested to ensure the validity of a utilized statistical model (Gujarati & Porter, 2009). Informally no collinearity implies that there is no exact linear description of factors in the model i.e. the HML factor cannot be linearly used to describe the SMB factor used in the Fama-French regression. To identify possible multicollinearity and test for the possibility the Eigenvalues and condition index will be reported in the analysis. The Eigenvalues allow the calculation of the condition index which indicates the probability of a statistical multifactor model exhibiting strong or severe multicollinearity. The condition index is defined as (Gujarati & Porter, 2009):

$$CI = \sqrt{\frac{Maximum\ Eigenvalue}{Minimum\ Eigenvalue}}$$

Equation 12 - The condition index

If the index is between 100 and 1000 there is moderate to strong multicollinearity in the model (ibid).

This section of the thesis presented the basic concepts of portfolio performance, listed three tools used for performance measurement, and described the potential pit falls in the statistical regression that should be reported as a part of the data output.

7 Data

In this section of the thesis the process of collecting and sorting the data used in the analysis is described. Initially the data collection through Bloomberg is presented along with an overview of the total number of conventional and SRI funds constituting the basis of the analysis. Secondly the SRI selection process is described in order to specifically understand the classification used in this thesis. Third, the presentation of a special Swedish and Norwegian tendency related to the research objective fund in the data is described. Fourth, the selection of Indices and risk free rates used for the analysis is justified and the data collection through DataStream is explained.

7.1 Creating the dataset

The construction of the dataset containing the mutual funds was undertaken by utilizing the Bloomberg fund screener tool which provides lists containing open-ended mutual funds based on the country where the fund is issued. The list of funds was created by filtering out any funds not 100% invested in stocks, and ensuring that all funds are open for purchase through exchanges for all. This created an initial gross list containing 676 mutual stock funds issued in Denmark, Sweden and Norway. This dataset was then manually screened for the presence of SRI funds. This led to the identification of 49 Scandinavian SRI and 627 conventional funds. A complete list of the SRI funds, along with Bloomberg tickers and country of issue can be found under heading 12 Appendix.

	No of funds	No of SRI funds	No Conventional funds
Denmark	248	10	238
Sweden	261	32	229
Norway	167	7	160
Total	676	49	627

Table 5 - Distribution of SRI funds

The data collection was conducted using the Bloomberg Excel API add-in, which requires the access to a Bloomberg Terminal. The change in monthly net asset value including dividends has been collected through the total return holding period function, see Equation 13 below. This function is based on historical values and calculates the total return for an investor over a custom holding period, in this case 12 monthly periods per year, for the last 114 months, approximately 10 years, similar data extractions are used by Renneboog et al. (2008), Schröder (2007), Bauer et al.

(2005), and Bauer et al. (2007). As seen in Turtle & Zhang (2012) monthly returns are not adjusted for brokerage or load fees, but they are adjusted for management fees per default by Bloomberg. The data can be extracted by using the following equation through the Bloomberg API:

"=bdp("Security ID"; CUST_TRR_RETURN_HOLDING_PER; CUST_TRR_DVD_TYP;1; CUST_TRR_START_DT;DATE; CUST_TRR_END_DT;DATE"

Equation 13 - Bloomberg data selection equation

The individual security IDs were used to gather the monthly financial performance from the last 10 years. However, full data extraction was not a possibility for all funds as they had not been in existence for the entire timeframe. Funds younger than one year or with less than twelve months of data in Bloomberg have been removed from the gross list as done in Bauer et al. (2007) and Renneboog et al. (2008). Following the exclusion of funds younger than 1 year the end data selection had the following characteristics:

	No of funds	No of SRI funds	No Conventional funds
Denmark	233	9	224
Sweden	250	32	218
Norway	159	7	152
Total	642	48	594

Table 6- Number of funds used in the analysis following a screen excluding all funds with less than 12 data points

7.1.1 Selecting the SRI funds

In order to classify which equity funds are labeled SRI, a specific distinction had to be selected in order to apply the same screen in all three countries. It was therefore decided that an individual fund must specify the use of either ethical or ESG filters as a basis for selecting equities. Hence, for a fund to be classified in this dataset it must be publically known if specific ethical guidelines are applied to the funds screening process, this is done in accordance with Renneboog et al (2008) and Bauer et al. (2007) . This is also in accordance with the definition of an SRI fund as specified in the literature review in this thesis. Here it was stated that an investment was a SRI if non-financial considerations were made prior to financial considerations. The potential pitfalls of this approach are raised in section 9.

For each SRI fund it has been investigated what types of filters are applied to select equities to invest in. It was found that the majority of all funds that specifically listed filters utilized a process which negatively screened for the presence of alcohol, tobacco, weapons manufactures, and pornography companies or similar internal ethical guidelines. The thematic funds utilize a positive filter to identify the best performers within a specific area. These include human rights and environment/nature.

	Specification ESG filters	Specified usage of Thematic filter
Denmark	9	6
Sweden	32	7
Norway	7	3
Total	48	16

Table 7 – Distribution of filters applied to SRI funds

A debate of the selection process of the SRI funds along with a perspective on the challenge of studying SRI in a Scandinavian model context is presented in the discussion part of this thesis.

7.1.2 Special findings

It was found that 16 portfolios specifically listed the usage of positive filters to identify the best performing companies within certain industries. 14 portfolios used a positive environmental filter, while two funds use positive employee rights filters. In the Swedish market two portfolios exhibited traits not seen in other areas. These funds applied positive environment filters defined by the World Wide Fund for Nature (WWF) hence, these filters applied to a stock portfolio are not defined by the investment managers or bought from external firms specializing in the area. This is an interesting observation as a nonprofit NGO focusing on conservation and sustainability has a say in the holdings of a mutual fund.

	Denmark	Sweden	Norway
Environmental	6	3	3
Environmental (WWF)		2	
Employee/Human Rights		2	
Total	6	7	3

Table 8 - Types of positive/thematic filters

During the process of classifying the funds based on published prospects through Bloomberg, it became apparent that a small group of funds exhibited one rather unique characteristic. Nine of the Swedish and one of the Norwegian SRI funds donate either a fixed percentage of their total assets to charity, 1 or 2 percent, or donate part of the management fees to different charitable organizations. This is not a practice that the author has come across in any of the literature on SRI mutual fund performance, and it is a possibility that this is a rather unique practice found in the Swedish and Norwegian investment market. A full list of the funds applying this practice and the amounts donated can be found under heading 12 'Appendix'. It is also worth observing that the ages of the funds vary greatly. The topic of fund age and the return is further debated in the discussion of this thesis.

The descriptive statistics for the selected groups of funds are reported below to enable a later discussion of the selected mutual funds.

	Mean number of data points	Standard deviation
Denmark all funds	85,63	30,64
Denmark conventional	86,14	30,43
Denmark SRI	70,5	35,17
Sweden all funds	97,82	29,14
Sweden conventional	97,05	29,70
Sweden SRI	103,09	24,72
Norway all funds	99,17	27,48
Norway conventional	98,69	27,80
Norway SRI	95,29	32,18

Table 9 – Descriptive statistics of the mutual fund groups dependent on age – max number of data points 114 months or 10 years and 2 months.

From the descriptive statistics it is evident that the Norwegian and Swedish SRI funds are more prevalent through the entire data time series. The Danish SRI funds are the youngest and the standard deviation of the age is substantially higher than for the other funds. The implications of the descriptive statistics are raised in the discussion.

7.2 Benchmarks

This section presents all the individual benchmarks required to undertake the analysis of the performance of the mutual funds, with respects to both the CAPM and the multifactor model used.

7.2.1.1 The market index

In order to estimate the CAPM and Fama-French multi factor model as a performance measurement, an appropriate market index must be selected. In this study three separate all share country indices are used. In other studies the MSCI All Country World Index (ACWI) has been selected as the world market portfolio which is used for all countries. However, in this thesis there is a too great bias towards own countries which would produce incorrect results. The bias originates from the utilization of all mutual funds and not only globally focused mutual funds. The utilized market portfolios are the Copenhagen all share index (KAX) the Stockholm all share index (SAX) and the Oslo all share index (OSEBX). The application of alternative indices was considered as a part of this thesis and the justification for the application of three national indices is given in the discussion part of this thesis.

The total return of the selected indices has been collected over the same ten year period as the full selection of mutual funds. This was done by using Equation 13 seen above. All indices have been extracted denominated in local currencies.

Using an ethical index as a market proxy has also been considered. However, this would not be a suitable choice as the goal is the see how SRI funds perform compared to conventional funds. Conventional funds should be tested against a market proxy, as such, so should the SRI funds. Furthermore, it should be noted that using an ethical index does not produce results that are higher in statistical relevance (Bauer, et al., 2007).

7.2.1.2 Risk-free rates

The risk free rates should represent the return that an investor would expect to receive on a completely risk free investment and the risk free rates are applied in all performance measurements utilized in this thesis. In most studies on mutual fund performance the risk free rate is represented by the US 1-month T-bill, due to the fact that many studies focus on the US. In this study that would not be a suitable option as this would require that full hedges were created for each of the three currency pairs to eliminate the currency risk. Instead the path chosen is similar to that of Bauer (2005) and Renneboog et al. (2008) where local 1-month interbank overnight rates are used as a proxy for risk free deposits outside the US. The risk free rate proxies chosen are:

Copenhagen Interbank Offered Rate (CIBOR) in Denmark,

Stockholm Interbank Offered Rate (STIBOR) in Sweden and the

Norwegian Interbank Offered Rate (NIBOR) in Norway.

The risk free rates have all been collected through DataStream, all results are denominated in local currencies. The rate is published as an annualized rate which has been converted to a monthly rate to match the data collected through Bloomberg for the mutual funds.

7.2.1.3 The Sharpe ratio

From Sharpe (1996) the process of calculating the Sharpe ratio is given when using a spreadsheet program. The exact same process will be utilized to minimize the risk of error. The returns of the selected funds are listed in one column and those of the desired benchmark, the risk free rate in the same country as the fund, in the next column. The differences in returns between the two are computed in a third column. Standard functions are then utilized to compute the components of the ratio.

The average risk free rates are calculated using the arithmetic mean as previously introduced in the method section of the thesis, as the Sharpe ratio is not independent of the time period over which it is measured (Sharpe, 1994). Sharpe ratios are only comparable when comparing results achieved using the same benchmark (the risk free rate). Hence, a result from Denmark is not directly comparable to a Swedish, however, returns with in the same currency are.

7.2.1.4 The SMB & HML factor

The SMB & HML factors as defined by Fama and French are not calculated using own portfolios as this would require the creation of dynamic portfolios susceptible to changes dependent on time and the corresponding market caps for each stock in the respective countries. This task is simply too great for this thesis, and as a consequence for this a proxy solution has been applied. The paper by Faff (2003) presents the process of using proxies for the HML and SMB factors. In the paper this is done by using "off-the-shelf" US portfolios. It is found that it is possible to show results similar to those seen in the literature where the SMB and HML factors are utilized based on dynamic portfolios (Faff, 2003). The paper finds that value and growth indices are good proxies for the factors in the Fama-French model. Given these finding the same approach will be used in the three Scandinavian countries. As in the article by Faff (2003) all proxies will be based on the total return of an index. Hence, the price change including dividends paid over the time period. The following indices have been selected for the HML and SMB proxies for the individual countries:

	Denmark	Sweden	Norway
Big	MSCI Denmark Large cap	MSCI Sweden Large cap	MSCI Norway Large cap
Small	MSCI Denmark Small Cap	MSCI Sweden Small Cap	MSCI Norway Small Cap
High	MSCI Denmark value	MSCI Sweden value	MSCI Norway value
Low	MSCI Denmark growth	MSCI Sweden growth	MSCI Norway growth

Table 10 - SMB and HML factor proxies

The total return for the indices have all been collected through DataStream denominated in local currencies. Following the monthly data extraction the percentage return has been calculated.

This sums up the processes used to collect data through Thompson Reuters DataStream, the Bloomberg fund selector tool, and the Bloomberg API add in for excel. The funds selected have been selected based on availability through the respective data sources and should be collected through the specified sources in this section. In the following section the collected data will be processed to form the analysis of this thesis.

8 Analysis

After the data was collected from the appropriate sources, organized by country and SRI status, and filtered depending on the number of data points, the analysis is ready to be conducted. This section of the thesis reports the results of the conducted data analysis. The first results covered are the Sharpe ratios for the combined different versions of the Danish, Swedish and Norwegian portfolios. Following this the results from the CAPM and Jensen's alpha are published indicating relative performance of all investment portfolios including difference portfolio as defined by Bauer et al. (2007). Following the single factor model the results of the Fama-French three factor models are reported which will be related to the specified hypothesis. The data output will be discussed in section 9.

8.1 The performance of Scandinavian mutual funds

The combined portfolios used for the performance analysis are in equally weights of all the portfolios in the corresponding category. This is done in accordance with Renneboog et al. (2008) and Bauer et al. (2007). National indices are used to perform Jensen's alpha and Fama-French linear regressions. The appropriateness of the selected indices for the data analysis is discussed in section 9.1 of this thesis.

8.1.1 Sharpe Ratios

The first presented results are the Sharpe ratios, these serve as a measurement of the risk adjusted performance of the different combined portfolios studied as well as the national indices used for benchmarking purposes. The calculations give an indication of how the groups of portfolios perform relatively within the same country. The output is entirely based on monthly return data hence, the return listed is the expected monthly return in percent. The Sharpe ratio is calculated by utilizing national risk free rates which are deducted from the return of the portfolio/index, and the difference in standard deviation as the risk free rate has a non-zero standard deviation.

	Return	St.Dev.	St.Dev R_f	Sharpe Ratio	Number of funds
Denmark all	0,59	4,71	0,21	0,083	211
Denmark SRI	0,06	4,79	0,21	-0,032	8
Denmark conventional	0,60	4,72	0,21	0,085	203
Index Denmark	0,87	5,30	0,21	0,128	N/A
Sweden all	0,60	4,54	0,20	0,089	250
Sweden SRI	0,46	4,56	0,20	0,057	32
Sweden conventional	0,62	4,55	0,20	0,093	218
Sweden index	0,84	5,55	0,20	0,119	N/A
Norway all	0,91	5,59	0,27	0,117	158
Norway SRI	0,80	6,06	0,27	0,089	5
Norway conventional	0,91	5,56	0,27	0,118	153
Norway index	1,15	7,22	0,27	0,125	N/A

Table 11 Sharpe ratios calculated for all combined portfolio and national indices. Expected returns are reported in monthly percentage. The expected return is based on 114 months of data.

Over the entire sample period the results suggest that the conventional funds outperformed the SRI funds on a risk to return basis. In one case the expected SRI return is almost zero percent pr. month. Danish SRI funds have an expected monthly return of just 0,06% resulting in the only negative Sharpe ratio in the data output (0,032). Unsurprisingly the data indicated that the relatively best performers in the different national categories are the stock indices. The respective stock indices all deliver relatively higher expected monthly return and higher standard deviation. Despite the higher standard deviation, the indices still deliver a better result according to the risk adjusted returns. Furthermore, the calculated Sharpe ratios indicated for all countries that the best risk return relationship is found when investing in conventional mutual funds relative to investments in the combined SRI portfolio.

8.1.2 CAPM

The following CAPM and Jensen's alpha calculations have all been conducted in SAS enterprise 4.3. The empirical results are published in Table 12, Table 13, and Table 14. All tables contain the alpha and beta values obtained from the linear regressions along with the derived t statistic. The difference portfolios have been created in SAS by subtracting the return of the conventional mutual funds from the return on the SRI portfolio to determine a potential statistical difference in the returns of the two combined portfolios similar to the method employed by Bauer et al. (2007).

8.1.2.1 Sweden

	OMX Stockholm Index All shares				
	α	t value	β	t value	Adj. R^2
Sweden all funds	-0,1073	-0,78	0,7778**	31,49	0,8976
Sweden SRI	-0,26214*	-2,63	0,8018**	45,01	0,9471
Sweden Conventional	-0,08283	-0,56	0,7741**	29,54	0,8852
Sweden SRI (donation)	-0,2634*	-2,52	0,8786**	46,98	0,9513
Difference (SRI-Con)	-0,1791*	-2,10	0,02760	1,81	0,0198

Table 12 CAPM-based regression output with the OMX Stockholm all share index as the x value and the risk premium of individual portfolios as the dependent variable. * denotes 5% significance, ** signifies that a result is significant at a 1% level

The Swedish results indicate that the group of studied SRI funds underperform the general stock index with a statistically significant negative alpha of -0,2621 on a monthly basis. The same goes for the special Swedish group of SRI funds donating to charity which also has a statistically significant negative alpha -0,2634. For all regressions besides the difference portfolio, the index has very high explanatory power with R^2 adjusted values ranging from (0,8852-0,9513). The difference portfolio indicated that there is a statistical significant difference in returns between the studied group of SRI funds and the conventional funds with a negative alpha of -0,1791. The conventional funds in Sweden do not exhibit a statistically negative alpha. The Durbin Watson D statistics are respectively 2,143, 2,061, 2,146 & 2,218 for the combined return portfolios. This implies that there

is no reason to reject the H_0: No positive/negative autocorrelation, hence, there is no serial autocorrelation of the first order present in the dataset.

8.1.2.2 Denmark

	OMX Copenhagen Index All shares				
	α	t value	β	t value	Adj. R^2
Denmark all funds	-0,1248	-0,55	0,7675**	17,94	0,7396
Denmark SRI	-0,6379*	-2,42	0,7385**	14,95	0,6632
Denmark Conventional	-0,1133	-0,49	0,7685**	17,94	0,7395
Difference (SRI-Con)	-0,5247**	-3,49	-0,0300	-1,07	0,0012

Table 13 CAPM-based regression output with the OMX Copenhagen all share index as the x value and the risk premium of individual portfolios as the dependent variable. * denotes 5% significance, ** signifies that a result is significant at a 1% level

The Danish results indicate that the Danish group of SRI funds performs statically worse than the group of studied conventional portfolios. This is evident both from a statistically significant alpha when analyzing the SRI portfolio (-0,6379) and when examining the difference portfolio (-0,5247). This is a very significant difference and this does indicate that a further investigation of the SRI portfolios selected for study is needed. The Danish portfolios all exhibit lower adjusted R^2 (0,6632-0,7396) compared to the other studied countries this specific finding along with the alpha values are discussed in section 9.2.3. Durbin Watson D statistics are respectively 2,088, 1,995, & 2,164 for the combined portfolios. This implies that there is no reason to reject the H_0: No positive/negative autocorrelation, hence, there is no serial autocorrelation of the first order present in the dataset.

8.1.2.3 Norway

	Oslo Stock Exchange Index All shares				
	α	t value	β	t value	Adj. R^2
Norway all funds	-0,0139	-0,09	0,7401**	33,47	0,9083
Norway SRI	-0,1776	-0,96	0,79637**	31,31	0,8966
Norway Conventional	-0,00695	-0,04	0,7382**	33,38	0,9078
Difference (SRI-Con)	-0,1706	-1,82	0,0581	4,52	0,1464

Table 14 CAPM-based regression output with the Oslo Stock Exchange all share index as the x value and the risk premium of individual portfolios as the dependent variable. * denotes 5% significance, ** signifies that a result is significant at a 1% level

The empirical results from Norway indicate that none of the alphas for both conventional and SRI funds are negative albeit not being statistically significant. The negative alphas follow the same trend seen in both Denmark and Sweden. The t statistics for the calculated alphas range from -0,04 to -0,96 indicating no form of significance. The difference portfolio's alpha is also negative as seen in the two other Scandinavian countries, with a t stat of -1,82 the value is not significant at a 5% level but it is at a 10% level. The Index has a very high explanatory power indicated with the high R^2 adjusted values very similar to the results seen in the Swedish regression. Durbin Watson D statistics are respectively 2,01, 2,134 & 1,999 for the combined portfolios. This implies that there is no reason to reject the H_0: No positive/negative autocorrelation, hence, there is no serial autocorrelation of the first order present in the dataset.

8.1.3 Fama and French three factor

The Fama and French three factor model calculation has like the CAPM calculations all been done in SAS enterprise 4,3. The indices used for the SMB and HML factors were listed in section 7.2.1.4. The discussion about the use of the three factor model and not the two factor model is raised in section 9.1.

8.1.3.1 Sweden

	OMX Stockholm Index All shares				
	α	β	SMB	HML	Adj. R^2
Sweden all funds	-0,1256	0,7845**	0,0979*	-0,0723*	0,9081
Sweden SRI	-0,2684*	0,8043**	0,0352	-0,0287	0,9479
Sweden Conventional	-0,1031	0,7814**	0,10789**	-0,0791*	0,8979
Sweden SRI (donation)	-0,2678*	0,8832**	0,0391	-0,0516	0,9531
Difference (SRI-Con)	-0,1653*	0,0229	-0,0726*	0,0504*	0,1657

Table 15 – Empirical results corresponding to the multifactor regressions conducted for the Swedish portfolios and indices. The portfolios have been individually used as the dependent variable with the stock index, SMB and HML all used as independent variables. * denotes 5% significance, ** signifies that a result is significant at a 1% level

The empirical results of the multifactor model from Sweden indicate that the two groups of SRI funds still have a negative alpha -0,2684 and -0,2678 with both results being statistically significant at a 5% level. The conventional funds also have a negative alpha, however the alpha is not statistically significant. The negative difference portfolio is statistically significant for the Swedish market indicating a statistical difference in the performance of SRI mutual funds compared to conventional. This result indicates a rejection of H_1 no difference in return of mutual funds, and an acceptance of H_0 from hypothesis 1 indicating underperformance of SRI mutual funds. The R^2 adjusted values are at a comparable level to the CAPM calculation albeit slightly higher. The higher values indicated that the multifactor model could be better than the CAPM at explaining the return of the studied portfolios. None of the two SRI groups indicate that the loading factor (SMB and HML) are statistically significant which is an interesting result as this is a large difference compared to the conventional portfolio. The risk of high multicollinearity is low for the above Fama

French regressions given a CI lower than 10 (Gujarati & Porter, 2009). The Eigenvalues are included in the appendix section 12 under eigenvalues

8.1.3.2 Denmark

	OMX Copenhagen Index All shares				
	α	β	SMB	HML	Adj. R^2
Denmark all funds	-0,1186	0,7183**	0,2040*	0,01983	0,7734
Denmark SRI	-0,6393*	0,68806**	0,2218	0,00605	0,6991
Denmark Conventional	-0,1068	0,7194**	0,2035	0,02034	0,7731
Denmark (SRI-Con)	-0,5325**	-0,0313	0,0183	-0,01429	0,0144

Table 16 Empirical results corresponding to the multifactor regressions conducted for the Danish portfolios and indices. The portfolios have been individually used as the dependent variable with the stock index, SMB and HML all used as independent variables. * denotes 5% significance, ** signifies that a result is significant at a 1% level

The only significant alpha in the Danish statistical output is the alpha associated with the SRI funds, -0,6393. The alpha is again highly negative compared to any of the other results indicating a very large difference in returns compared to the conventional peers. This result also separates itself from those found in the other two Scandinavian countries. The loading factors are non-significant with the exception of the SMB factor when studying all Danish investment funds. The R^2 adjusted results for the regression, indicates that the multiple factor regression has a higher explanatory power than the CAPM for the Danish portfolios. However, the values are still very low compared to the Swedish and Norwegian results indicating that the OMX Copenhagen all share index might not be the index with the highest explanatory power when it comes to the mutual investment funds studied. The difference portfolio is highly negative -0,5325 and statistically significant at a 1%. The negative alpha was expected given the CAPM results combined with the performance of the SRI portfolio in the multifactor regression. This result indicates a rejection of H_1 no difference in return of mutual funds, and an acceptance of H_0 from hypothesis 1 indicating underperformance of SRI mutual funds. The risk of high multicollinearity is low for the above Fama French regressions given a CI lower than 10 (Gujarati & Porter, 2009). The eigenvalues are included in appendix section 12 under eigenvalues

8.1.3.3 Norway

	Oslo Stock Exchange Index All shares				
	α	**β**	**SMB**	**HML**	**Adj. R^2**
Norway all funds	-0,0152	0,7194**	0,1328*	0,0367	0,9275
Norway SRI	-0,1840	0,7784**	0,1192**	0,0587	0,9104
Norway Conventional	-0,008	0,7147**	0,0247**	0,0359	0,9272
Difference (SRI-Con)	-0,1760	0,0609**	0,01625	0,02286	0,1416

Table 17 - Empirical results corresponding to the multifactor regressions conducted for the Norwegian portfolios and indices. The portfolios have been individually used as the dependent variable with the stock index, SMB and HML all used as independent variables. * denotes 5% significance, ** signifies that a result is significant at a 1% level

The empirical results from Norway indicate that none of the achieved alphas are statistically significant. This is an interesting result as both Denmark and Sweden has exhibited statistical significant differences between the return of the conventional and the SRI mutual funds. However, the alpha -0,0152 was significant at 10% level for the entire group of studied Norwegian funds. The difference portfolio alpha -0,1760 was significant at a 10% level. This result leads to a rejection of H_0 from both developed hypothesis significant under-/over performance compared to conventional mutual funds. The adjusted R^2 all indicates that the explanatory power of the model is high, especially compared to the levels seen in the Danish study. The SMB factor is the only load factor that appears to be statistically significant in the Norwegian study. The HML factor is not significant even at a 10% significance level. The risk of high multicollinearity is low for the above Fama French regressions given a CI lower than 10 (Gujarati & Porter, 2009). The eigenvalues are included in appendix section 12 under eigenvalues

This ends the data analysis part of the thesis. The Sharpe ratios were presented for all the studied groups of mutual funds for the three Scandinavian countries. The Sharpe ratios all indicated a positive relationship between risk and return except for the Danish SRI mutual funds where the Sharpe ratio was Negative. Throughout the conducted data analysis the Danish SRI mutual funds performed surprisingly negative compared to their conventional counterparts, also when examined relatively in the other countries. The performance of SRI mutual funds was fund to be statically worse in both Denmark and Sweden using both the CAPM and the Fama and French three factor models. The highest significant difference alpha value was the difference between Swedish

conventional mutual funds and Swedish SRI funds. None of the statistical models utilized show high indication of either multicollinearity of autocorrelation of residuals. The Norwegian study was the only which lead to a rejection of the H_0 as there was no statistically significance over or under performance. In Denmark and Sweden H_0 was not rejected as there was significantly lower SRI performance compared to the conventional portfolios.

9 Discussion

This section of the thesis debates the results reported in the analysis with respect to relative performance and the results found in other studies on the relative performance of SRI funds. Attention is paid to the choices made regarding the stock indices used for the analysis. The fact that the four factor model is not used in the analysis is discussed with respect to the considerations made when selecting stock indices. The last part of the discussions raises issues regarding comparing performance studies across borders and regions while proposing the need for a range of universal SRI classifications to enable higher consistency in conducted performance studies.

9.1 Data choices

This part of the discussion focuses on the choices made with regard to the data used in the analysis of the Scandinavian market, and it compares the choices made to similar relative performance studies.

In the data section there is a difference compared to other studies such as Renneboog et al. (2008). In their study the utilized world market benchmark is an all-world stock index used for all studied regions. This approach was considered in the data analysis section; however, this would not be appropriate since the focus areas of this study are the Scandinavian countries. A Scandinavian stock index was considered for the analysis which would be similar to the approach used by Bauer et al. (2007) where a Canadian index was used for a purely Canadian analysis. However, it quickly became apparent that the best index fit, the OMX Nordic was not an applicable solution as the index only covers Danish, Swedish and Finnish stocks. The only possible option was then to split the survey up into three categories based on country where the national all shares indices would serve as the appropriate benchmark. This does however bring about one very important consideration. Due to the data choices made to enable the analysis, it is not possible to directly compare the performance of mutual fund groups across borders. The reached conclusions based on the hypothesis testing can only be compared where the same market portfolio benchmark is utilized. It is possible to examine the comparative performance to benchmarks, but it is not possible to simply compare the performance of Swedish SRI funds and their Norwegian counterparts and conclude which is the better.

In the analysis the reported R^2 adjusted from both the CAPM and Fama-French regressions indicate that the explanatory power of the selected stock indices was satisfactory for Sweden and Norway and the results are highly comparable to the studies of Bauer et al. (2005) and Bauer et al. (2007).

The high R^2 adjusted values indicate that the Swedish and Norwegian mutual funds as a whole are largely structured in a way that highly reflects the performance of their national stock indices. This could very likely indicate that the mutual funds on the market in the two countries are weighted highly towards stocks found within their respective countries, and furthermore, that most of their performance can be explained by a national all share index. The R^2 adjusted values reported from the Danish linear regressions are substantially lower than the Swedish and Norwegian counterparts. However, this does not imply that the values are consider too low for practical analytical reasons such as hypothesis testing conducted in order to answer the research question. The fit of the model is still substantially higher than the reported values found in Renneboog et al. (2008) where the results are utilized for the same purposes as in this thesis. The Danish R^2 adjusted values imply that the weighted and/or composition of the total amount of mutual funds may not be, as focused on national stocks as it was indicated in the two other Scandinavian countries based on the explanatory power of the linear regressions. This is potentially an area that could lead to further investigation of the composition of the mutual funds markets in Scandinavia and the market demand for national or non-nationally weighted mutual funds. This is however outside the scope of this thesis.

When examining the R^2 adjusted value for the conventional and SRI mutual funds studied in the three countries it is interesting to note that the value is noticeably higher for SRI funds in Sweden compared to the full selection of funds and the conventional funds. This indicates that the mutual SRI funds in Sweden are more closely related to the Swedish stock market as a whole compared to their conventional counterparts. This could potentially imply that the more effort a fund puts into being an SRI fund, the more it would make sense to purchase stocks in Sweden. This indicates support for the claim made in the Dansif (2011) and Eurosif (2011) reports about the presence of a Scandinavian model and that the Scandinavian countries are forerunners within ethical conduct. The forerunners may in fact be the listed companies and not the mutual funds as the performance is so closely related to the all share stock index. The special Swedish group of SRI mutual funds where a variable percentage is donated to a charity indicates a marginally higher fit than the SRI group. In Norway and Denmark the R^2 adjusted for the SRI groups is lower than for their conventional counterparts indicating that the exposure to the national stock markets of the SRI funds is lower compared to the conventional mutual funds. This does present a quite interesting perspective to further investigate which warrants a look that the list of SRI funds, prior to the 12 month screen, listed in the appendix section 12 under the SRI funds grouped by country. From the overview it can be concluded that in Denmark there are 6 SRI funds whit a specific focus on Environment and

Climate, and 4 focusing on Global stocks. This could very well explain why the explanatory power of the index used is relatively low. In Sweden 11 of the mutual funds are focused on Swedish stocks and there are other funds where a high weight of Swedish stocks would also be expected. There are 7 funds that are specifically stated to not be focused on Swedish stocks, however the possibility of holding Swedish stocks is not excluded. This could very well explain why there is such a high explanatory power of the all share Swedish index when it comes to the linear regressions conducted. In Norway where the R^2 adjusted values for conventional and SRI funds is almost equal there are 3 funds with a focus on Norway or the Nordic region and two global funds, again giving an indication of why the explanatory power of the linear regressions are relatively high compared to Denmark. The one country standing out again is Denmark, where a closer look at the SRI founds in the country did not reveal any specific Danish SRI as was fund in both Sweden and Norway. Again, this indicates that there may be more similarities between these two markets than their last Scandinavian counterpart. From the analysis of the markets relative to the explanatory power of the indices, it was found that the indices used in the analysis have a good explanatory power compared to the results seen in Renneboog et al. (2008) and they are also highly comparable to Bauer et al. (2005) and Bauer et al. (2007). As there was no available Scandinavian stock index the usage of national indices was the most appropriate option for the analysis. The selection of ethical indices could also have been chosen. However, in the academic literature it has been show by Renneboog et al. (2008) and Bauer et al. (2007) that such indices often have lower explanatory power. Hence, the usage of national indices was the best possible solution.

An important aspect to note with respect to the full data set is that the extracted data selection from Bloomberg does not include data on dead funds. The Bloomberg fund selector tool does not support the identification was dead or delisted mutual. Therefore, it was not possible to get Bloomberg data codes for any no longer existing Scandinavian mutual funds. It is as a consequence of this hard to estimate if there will be any survivorship bias, as the number of dead funds is unknown. However it should be noted that the absence of delisted mutual funds in the sample is likely to bias the mutual fund performance in the study of both conventional and SRI funds upwards (Bauer, et al., 2007). Hence, it is highly plausible that the indicated expected return calculated for each group of funds in all three countries exhibits survivorship bias, hence it may be too high. However, this should not impact the results as it would affect all studied groups of funds, and it is likely that it is not equally prevalent in all three markets. This same issue was raised in Bauer et al. (2007) where it was found not to statistically impact the linear regression when dead funds where included at a later point in

time. (Bauer, et al., 2007). This thesis is forced to assume the same position, however, this should not have a large impact on the results but this may imply that investors may actually expect even lower expected return from mutual fund investments compared to investing in the domestic all share index in the respective countries.

9.2 The relative performance of SRI investments

This subsection discusses the results of the Sharpe ratio, the CAPM and Fama and French multifactor model regressions for each of the three studied countries. Prior to debating the results of the mutual fund performance, it is appropriate to address the lack of one of the most utilized multi factor models, namely, Carhart's four factor model.

The four factor model is used by Bauer et al. (2005), Bauer et al. (2007) and Renneboog et al. (2008) where the model serves as a means for calculating the alpha of a portfolio similar to the Fama and French three factor model used in the analysis. The application of the four factor model would have made the achieved results in the analysis more comparable to the findings in similar surveys. However, this was not an available option. The problem faced in this thesis was that it was not possible to identify an appropriate proxy for the momentum factor which is the fourth factor in the model. It was not possible to select an appropriate factor for each of the three Scandinavian countries, nor was it possible to identify a pan Scandinavian momentum proxy. Due to the lack of an appropriate momentum factor index, a second solution could have been chosen in order to progress with the four factor model. This would imply using a European momentum index denominated in Euros and invested in European momentum stocks and not Scandinavian. Had it been the case that the mutual funds studied had a large European bias, then this could possibly have been an appropriate decision. However, the regression conducted in order to establish the most appropriate benchmarking index indicated that national indices were of a sufficient quality when used to explain overall fund performance. Hence, it would have been damaging to the consistency if an incorrect momentum factor was selected to enable a four factor regression. Furthermore, if a European index had been selected it would also create serious currency issues as the model would contain the performance of an index in a foreign currency. Thereby exposure some currency risk would have to be assumed. Due to the issues associated with identifying a momentum index, it was selected not to conduct four factor regressions as a part of the analysis. This would have been a possibility if a momentum factor was created. This would however be a monumental task as it

would imply creating a 10 year dynamically shifting portfolio of all stocks in the three countries where the weights would be based on past performance over the last 12 months.

It should also be noted that the currency differences between countries were of no major impact as all funds are denominated in local currencies, hence, there is no exposure to foreign exchange rates that affect the performance of the funds other than that of the equities the individual funds may have chosen to invest in. This exposure is reflected in the changes of the net asset values of the fund whether or not funds utilize a currency hedging strategy. The indices chosen for both the CAPM and the additional factors of the Fama and French three factor model were all denominated in local currencies thereby ensuring consistency in all conducted regressions and calculations with respect to the potential pitfalls associated with measuring in differing currencies. It could be argued that currency difference could be neglected by simply assuming a full hedge of currency exposures. This stand point was not adopted as a full hedge would be near impossible. Furthermore, this perspective falls outside the scope of this thesis.

9.2.1 Sharpe ratio

From a look at Table 11 where the calculated Sharpe ratios are reported, there is one clear tendency that is worth noting. In all three countries the stock indices appear to offer the best risk return relationship compared to the mutual funds available to investors. This is not a surprising result as any mutual funds incur management fees as well as some transactions costs associated with purchasing and selling stocks. Furthermore, the results are highly comparable with previous studies by Benson et al. (2006), Bauer et al. (2007) and Derwall et al. (2011) where it was noted that the benchmark had a higher risk return relationship relative to the studied groups of mutual funds. From a closer examination it can be seen that the choice of assuming no risk associated with the risk free rate, was a correct choice as all three countries indicated that there was a significant non-zero standard deviation associated with the risk free rate. In all three countries it was indicated that the risk return performance of the SRI funds was lower than their conventional counterparts. This finding is comparable to Bauer et al. (2007). Sweden appears to be the one country that appears to show the most similar results to other findings in similar studies. Here the lower Sharpe ratio is attributed to lower expected return and roughly equal standard deviation. However, there was one country where the results were highly puzzling. In the Danish study the expected return of the mutual funds was a mere $E(R_{SRI})$ 0,06% per month as opposed to $E(R_{CON})$ of 0,6%. This large discrepancy compared with the results found in the other countries warrants a closer examination of

the SRI funds in the Danish group of mutual funds. From a closer look at the 8 Danish funds it would be expected that the overall performance of the funds would be close to zero. However, this was not the case. The data indicates that there are two of the funds that perform relatively poor compared to their peers. This would not be a big issue if the fund age of the SRI funds was roughly the same, but this is not the case. When combining the Danish SRI mutual fund portfolio, each portfolio is included relative to their age, but if there are only two portfolios in existence at the start of the survey these two would account for 100% of the performance of SRI funds in Denmark. This is exactly the case in the Danish study of SRI, the two worst performers are also the funds that weigh the heaviest in the group of selected SRI funds. This does bring about an important consideration that the sub selection of Danish SRI mutual funds may simply be too small and too heavily dependent on the funds that have been in existence for the entire time series. This indicates that a closer look at the composition of fund age and the standard deviation of fund age may be a highly relevant statistic to examine. The reported statistics found in Table 9 about fund ages indicates that the Danish SRI group was by far the one with the lowest mean age and the highest standard deviation. These observations indicate that there may be some issues with this group as there is a lack of consistency in the data ultimately used for all calculations in the analysis. There is a possibility that the Danish group of SRI is simply to inconsistent to analyze in a combined group and if others should chose to repeat a study of only Danish SRI funds it may be highly beneficial to be aware of these issues and either select a different time horizon or simply analyze the SRI funds on an individual basis.

To sum up the first part, it became evident that there may be some specific issues with the Danish group of SRI funds which goes to explain the significantly worse risk return relationship of this group of funds compared to all others studied. The indices appear to be the best performers in terms of the Sharpe ratios and for both Sweden and Norway the Sharpe ratios for the SRI funds were below their conventional counterparts, whereas the Sharpe ratio for the Danish SRI funds was negative.

9.2.2 CAPM

The linear regressions conducted as a part of the analysis indicated that the difference in alpha values for the Swedish and Danish SRI funds relative to their conventional counterparts was statistically significant at a 5% level. This was not a great surprise in the Danish market taking the issues with the data for the Danish SRI funds mentioned above into considerations. In the case of

the Swedish funds the result is highly comparable to Renneboog et al. (2008). However, the difference between their study and the one conducted here is that the benchmark has shifted. This does not affect the result that there is a statistical underperformance of the SRI portfolios in Sweden relative to their conventional counterparts. This can be viewed as a support of the modern portfolio theoretical perspective that a restricted investment universe does in fact limit the risk return relationship of a portfolio. All Swedish and Danish results reported in the analysis indicate lower performance of mutual funds compared to the stock index, but the results are not statistically significant expect for the SRI funds.

In Norway there was no statistically significant alpha, but it is worth noting that the alpha values are negative for all mutual funds. This result is quite interesting as it appears that an investor will not incur the same penalty on investing in Norwegian mutual funds compared to investors in Denmark and Sweden. This could potentially be due to management fees and it would be an interesting perspective to pursue if a study was to be conducted on the difference in portfolios in Scandinavia.

With respect to the performance of SRI funds relative to conventional funds it appears that investors are better off investing in Norwegian SRI mutual funds as the alpha of the difference portfolio is non-statistically significant at a 5% level. This non statistical significant alpha from a CAPM regression is consistent with the conclusion reached in Bauer et al. (2005).

9.2.3 Fama and French

The CAPM was not the only model used to test the hypothesis in this thesis. The Fama and French multi factor model was used as it has been indicated that this model is more appropriate when conducting performance studies.

The multi factor regression conducted based on the Swedish mutual funds indicated that the only group of funds with a statistically significant alpha value was the SRI group and the special SRI donation group. Seen in the relative perspective that the conventional funds have a non-significant alpha value it serves as a clear indication that SRI investors pay for their discriminatory tastes in Sweden. There is an underperformance of the group of funds and the age difference/number of data points is not significantly different from the conventional group of funds. It is quite interesting to note that the R^2 adjusted for the SRI group is higher than for the conventional funds as this could indicate that there is greater exposure to the same weight of stocks found in the Swedish market. The SMB and HML factors for the SRI group are non-significant indicating no special weight

towards either of the groups of companies found in the factors. For the conventional funds the positive SMB indicates a slight overrepresentation of small cap stocks and the negative HML indicates a slightly higher representation of growth firms. The difference portfolio indicates that the difference in return between conventional funds and SRI funds is in fact negative and it is again confirmed that investors pay for selecting portfolios with specified SRI strategies. As the number of SRI funds in the Swedish market is quite high it could be highly relevant to sub divided the SRI funds into specific categories and test if some groups perform equally to conventional funds or even outperform. This has not been undertaken in this thesis as this would only have been a viable option in Sweden thereby shifting the focus away from being on the entire market. However, this could be a topic for further investigation. The Swedish group of SRI funds was non-statistically related to the HML and SMB factors indicating that there was not specific overrepresentation of any of the factors.

The Danish SRI mutual funds significantly underperform their conventional counterparts and the stock index. This is not a big surprise as there have been continuous problems with the Danish SRI data. The SMB factor indicates that conventional funds in Denmark have a slightly higher representation of small cap stocks. The conventional funds are non-statistically significant different from the performance of the index. The difference portfolio has a highly negative alpha which is not a surprise, however, as this result differs highly from the reported Swedish and Norwegian results it may very well be a further indication of the problems associated with the low number of Danish funds and the very high standard deviation of data points available for the data analysis. It could be argued that in the future it would be more important to analyze with the Danish SRI funds individually seen in the light of the results in this thesis.

In the published results from the Norwegian multi factor regressions it could be seen that none of the alpha values are statistically significant. This result is well in line with Bauer et al. (2005) and Renneboog et al. (2008) as it is all reported that there is a non-significant alpha value for the difference portfolio. This indicates that Norwegian investors are not paying for making a decision to invest in SRI funds. Thereby the Norwegian market distinguishes itself from the other two countries.

The result from the Fama and French regressions indicated that Danish and Swedish investors pay a penalty for investing in SRI funds. In Sweden the difference was 16 basis points per month relative to the conventional funds. In Denmark this was a massive 53 basis points per month relative to the

conventional funds. However, the issues with the average fund age in Denmark could potentially be highly interesting to examine in order to further explain the significant negative results observed. In Sweden and Norway the number of data points for the SRI is substantially higher with much lower standard deviations. Seen in the light of the previous results from Bauer et al. (2007) where a catching up tendency is suggested it may be highly interesting to revisit the data selection in a few years' time when more data points are available, or alternatively conduct a full comparative study based on a 3-5 year time horizon. Overall the results from the analysis are highly comparable to the results from previous studies on the performance of SRI. However, there are a few specific structural differences found in the Scandinavian markets that are crucial to discuss to provide perspective on the full number of funds.

9.3 The Regional Differences

This section of the discussion raises the potential that the current consensus used to identify SRI funds in performance studies may not be applicable in Scandinavia. By altering the definition to more appropriately fit the Scandinavian market it could very well turn out that the range of SRI funds in the three countries may in fact be vastly underestimated by choosing the same strategy chosen by Bauer et al. (2005) and Renneboog (2008).

The offset of this discussion is found in the Scandinavian model described in section 4.3. Here it was stated that the Scandinavian investment managers were highly active with respect to active participation and that this was a core part of a Scandinavian Model. Through a closer look of the challenges to the European SRI market, section 4.2.1, it was identified that a large number of mutual funds were in fact screened twice a year to exclude controversial stocks. This creates one important distinction in the Scandinavian market. This clue may in fact imply that entire ranges of portfolio should be classified as SRI portfolio if a similar definition is used to the one utilized by Renneboog et al. (2008) in their worldwide study of the relative performance of SRI funds. In their study the application of negative ESG filters implied that a mutual fund was classified as a SRI fund. If these criteria are applied to a study which includes the Scandinavian region the number of SRI fund would be largely underestimated. A quick look at both Nykredit invest, Danske Invest, SEB fonder, and Alfred Berg (Norway) reveals that the internal guidelines for ethical investments practices supersedes those used to classify an SRI fund in the study by Renneboog et al. (2008). Hence, if the Scandinavian market is included in any non-Scandinavian study, then a simple look at funds that are classified as ESG or responsible investment funds will not create an equal data

premise. By only selecting the specific SRI funds found in Scandinavia, a study would potentially conduct a massive error. The average amount of attention paid to ethical considerations and the formulation of ESG policies in Scandinavia vastly surpasses what has been described in Renneboog et al. (2008), Bauer et al. (2005) and Bauer et al. (2008). Therefore, it is crucial that a full investigation of each fund provider is conducted in order to distinguish which funds have an SRI policy and the funds that lack one in Scandinavia. This is needed as the funds that are labeled as ethical or SRI funds in Scandinavia bear the label because they carry higher standards than their conventional Scandinavian counterparts. However, the conventional Scandinavian mutual funds very often live up to the international definition of SRI/ethical funds, and they should be treated as such. Hence, the study by Renneboog et al. (2008) which included Sweden was most likely conducted on an incorrect premise as the many of the conventional funds in Sweden should in fact have been classified as SRI funds when using the definition of SRI applied in the paper. It should therefore be very important to note that the performance of SRI funds seen in this study is not necessarily comparable to studies made in other regions of the world. This discrepancy stems from the fact that the ethical requirements for conventional funds in Scandinavia are greater than what has been described in the other papers on SRI performance.

Caution is also required when studying the relative performance of SRI funds within Scandinavia as there are a large number of ethical considerations made in a large amount of the studied conventional portfolios. The ethical requirements set for the studied groups of SRI funds was higher than their conventional counterparts, but this does not in any way imply that all of the conventional funds are created with no ESG/ethical filter. Nor does this strategy ensure that the degree of ethics among the group of SRI funds is homogeneous as there may be a difference in the level of screening and ethical requirements for a fund to be labeled as an SRI depending on the mutual fund provider. In this thesis the applied frame work for the data processing and analysis was done in accordance with the larger paper on SRI performance, Renneboog et al. (2008) Bauer et al. (2005) and Bauer et al. (2007). If a future study of the Scandinavian market in worldwide context should be conducted, there could be a need for an in-depth investigation into the ethical guidelines for each Scandinavia fund provider as opposed to the strategies utilized in the mentioned papers. This highlights the need for a uniform definition of SRI funds on an international level to create more transparency in the market. In order to properly accommodate all the different forms of SRI funds it would potentially be highly beneficial if a proposed classification of SRI funds involved multiple classifications of funds based on total number of screens, the frequency of screening and the ethical

considerations taken. This could lead to more efficiently studies of the performance of SRI funds and create a more transparent market for the investors. Before more efficient classifications are created it would be hard to distinguish a worldwide performance of SRI funds, and one should be careful when conducting studies across regions with large structural differences.

10 Conclusion

This thesis investigated the relative performance of SRI equity mutual funds compared to their conventional counterparts in Denmark, Norway and Sweden. Throughout the thesis the focus has been on two main areas. One specific area was to build an understanding of the SRI concept and to provide a meta study of a selection of papers on the topic of SRI. The second target area was the analysis of the performance of SRI funds in Scandinavia to enable the hypothesis testing and ultimately answer the research question.

In the section about the basics of SRI it was shown that the concept could be viewed as an investment strategy that emphasizes non-financial aspects of an investment prior to considering financial returns. The way in which these non-financial aspects were incorporated in the creation of mutual funds was through the application of either negative or positive screens. This is done to exclude stocks which are not compliant with the SRI strategy of a funds and the positive screen helps to identify the best performers within a specific focus area. The section introduced the concept of a multivariate utility function. This was used as an explanation to why investors may choose to invest ethically. Hence, it gives an understanding of the potential of extracting higher utility given equal returns from SRI compared to conventional investments. The challenges presented with regards to studying SRI included the crucial perspective that ethics is not a static concept as it is dependent on both time and the individual investor.

The meta study of the selected papers dealt with varying aspects of SRI. It indicated that there were mixed indications of the relative performance of SRI funds, however the dominant indication was a slight underperformance albeit not being statistically significant. The overview of specific ESG filters indicated that positive environmental filters should have a positive effect on the return on individual companies and stock portfolios. However, there was a large variation in the forms of research conducted when investigating performance implications as a result of ESG filter. As such one should be highly cautious when comparing results with varying research methods.

The market size of the world SRI market indicated that the emergence of SRI had made an impact on a global scale. Furthermore, the SRI market section highlighted that the three Scandinavian countries were mentioned as being world front runners within SRI. The ethical position of the Scandinavian countries brought about important considerations when comparing performance results across borders and regions. This is an interesting finding as it is a specific trait in the

Scandinavian mutual fund market that could have large implications when the region is included in worldwide SRI studies.

The research question and the formulated hypothesis sought to investigate the relative performance of SRI funds in Scandinavia. This was chosen because the region had not previously been described in the academic literature with a focus on the performance of SRI mutual funds. Furthermore, the relative size of the SRI market in the three countries was of a sufficient size to allow a comparative study. Two hypotheses were developed to test for the over- or underperformance of SRI funds. The hypotheses were tested using the Sharpe ratio to get an initial understanding of the risk return relationship. Following this the data was tested using the CAPM and the Fama and French Three factor model.

The analysis was conducted on the basis of a total of 642 mutual funds where 48 of the funds were categorized as SRI funds. From the initial data investigation the one of the research objective were completed. It was found that 9 Swedish and 1 Norwegian mutual fund donated to charity each year. This finding has not been described in any of the academic papers covered in the meta study. Thereby the thesis achieved the objective of locating a specific trait found in the Scandinavian Mutual funds market.

The analysis formed the basis for the hypothesis testing and ultimately fulfilling the research objective of this thesis. The Swedish and Norwegian regression results were found to be highly comparable to other SRI studies. The reported outcomes of the analysis showed a positive relationship between risk and return for all studied groups of funds expect for the Danish SRI mutual funds. Here the Sharpe ratio was found to be minus 0,032. The Fama-French multi factor model regression indicated that in both Denmark and Sweden investors paid for their ethical considerations. This indicated an acceptance of the first H_0 hypothesis, that the SRI funds underperform their conventional counterparts. The Norwegian Fama-French regression on the difference portfolio found that there was no difference between conventional and SRI mutual funds leading to a rejection of both of the postulated H_0 hypotheses. Hence, no over or under performance.

The discussion raised the issues of the data selection with regards to the applied indices and found that the selection made was the best option. The topic of issues with the Danish dataset of SRI funds was raised as the results were not comparable to any other studies and that the standard deviation was very high compared to the average number of data points. It is therefore highly cautioned to use

the Danish results as an overall indication of the relative SRI performance and conducting a future study with a different time horizon may be of high value.

The issues associated with studying SRI were raised as ethical standards are very high among mutual fund providers in the Scandinavian countries. This is an important consideration when any one or more of the three countries are included in studies where they are compared to other regions of the world. This is stems from the fact that many of the Scandinavian funds would be viewed as SRI funds in other countries due very high usage of negative screens. Due to the widespread usage of negative screens any research including the Scandinavian countries should be aware of this and an in-depth look at all mutual fund providers would be necessary. This is needed to ensure comparability between regions to reduce the risk of an under-estimation of the number of SRI funds in Scandinavia.

This thesis provided an interesting perspective on the Scandinavian market not because the performance of SRI funds appears to be worse than their conventional counterparts, but because it has been found that the Scandinavian market is not like other SRI markets. Hence, a different approach could be needed to explore the actual performance of SRI mutual funds if the Scandinavian countries are included in pan European or worldwide studies.

Following the completion of the thesis there are a few interesting perspectives worth noticing. In a future study it would be beneficial to alter the time span of the survey in order to optimize the number of funds studied without compromising the validity of the calculated returns. Furthermore, an increased amount of attention dedicated to the mutual fund providers could bring about interesting findings. These findings could be interesting to look at to create a more complete picture of the number of ESG screens utilized in mutual funds not classified as SRI funds. This study focused on equity funds, another interesting topic could be the to examine; pension plans, fixed income mutual funds, or fixed income products as these financial aspects also have a large impact on the financial markets.

11 Bibliography

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12 Appendix

SRI funds grouped by country - Denmark

Fund Name in bloomberg
Afdeling FMS04 - Miljoe & Klima
BankInvest Global Equities Ethical Screening
Jyske Invest Globale Aktier Special
LD Invest Miljoe & Klima
Miljo Teknologi
Nykredit Invest Globale SRI Aktier
Nykredit Invest Klima & Miljoe
Sparindex Dow Jones Sustainability World Index
Sparinvest Klima & Miljoe - A
SYDINVEST Klima & Miljo

SRI funds grouped by country - Sweden

Fund Name in bloomberg		
Aktie-Ansvar Sverige Fund - A	Ohman Etisk Index Europa	SPP Emerging Markets SRI
Banco Etisk Global	Ohman Etisk Index Japan	Swedbank Robur Ethica Global MEGA
Banco Hjalp	Ohman Etisk Index Pacific	Swedbank Robur Ethica Sverige
Banco Ideell Miljo	Ohman Etisk Index Sverige	Swedbank Robur Ethica Sverige Global
Cicero SRI Sverige	Ohman Etisk Index USA	Swedbank Robur Ethica Sverige MEGA
Danske Invest SRI Global	Ohman Hjart- Lungfond	SPP Aktieindex Global Sust
DNB Sverigefond	Ohman Nordisk Miljofond	
DNB Utlandsfond	SEB Etisk Globalfond	
Ethos Aktiefond	SEB Ostersjofond/WWF	
GustaviaDavegardh SolVindVatten	SEB Swedish Ethical Beta Fund - D	
Handelsbanken Sverige Index Etisk	Skandia Cancerfonden	
Humanfonden	Skandia Ideer for Livet	
Nordea Etiskt Urval Sverige	Skandia Varldsnaturfonden	

SRI funds grouped by country - Norway

Fund name in bloomberg
Alfred Berg Humanfond
Alfred Berg Norge Etisk
DNB Global Etisk V
DNB Gront Norden
DNB Miljoinvest
Fondsfinans Alternativ Energi
Nordea Stabile Aksjer Global Etisk

SRI funds where a fixed amount is donated to charity

Bloomberg ticker	Name	Country	Form of Donation
ALFBHUM NO EQUITY	Alfred Berg Humanfond	Norway	Ideally 2% of total assets donated
BANETIS SS EQUITY	Banco Etisk Global	Sweden	1% of assets donated to charity
BANHJAL SS EQUITY	Banco Hjalp	Sweden	Ideally 2% of total assets donated, influenced by investors in the fund
BANHUMA SS EQUITY	Humanfonden	Sweden	2% of total assets donated
BANIDEE SS EQUITY	Banco Ideell Miljo	Sweden	1% of assets donated to charity
CARCANC SS EQUITY	Skandia Cancerfonden	Sweden	2% of total assets donated
CARVARL SS EQUITY	Skandia Varldsnaturfonden	Sweden	2% of total assets each year to the WWF
SEBETGL SS EQUITY	SEB Etisk Globalfond	Sweden	13,5% of the management fee donated to WWF
SEBOWWF SS EQUITY	SEB Ostersjofond/WWF	Sweden	Yearly donations to the WWF given a minimum return of 1%
SKAAIDL SS EQUITY	Skandia Ideer for Livet	Sweden	Ideally 2% of total assets donated

Eigenvalues

Denmark

Collinearity Diagnostics				
Number	Eigenvalue	Condition Index	Proportion	
			Intercept	KAX RP
1	1.44937	1.00000	0.01302	0.21347
2	1.06677	1.16562	0.67385	0.05325
3	0.76695	1.37469	0.29226	0.24755
4	0.71691	1.42186	0.02087	0.48573

Sweden

Collinearity Diagnostics				
Number	Eigenvalue	Condition Index	Proportion	
			Intercept	SAX RP
1	1.20890	1.00000	0.14956	0.31708
2	1.10402	1.04642	0.26656	0.03137
3	0.86537	1.18194	0.57188	0.39255
4	0.82170	1.21294	0.01199	0.25901

Norway

Collinearity Diagnostics				
Number	Eigenvalue	Condition Index	Proportion o	
			Intercept	OSEBX RP
1	1.26057	1.00000	0.11367	0.28280
2	1.03622	1.10295	0.06478	0.18517
3	0.97971	1.13432	0.69145	0.03658
4	0.72350	1.31997	0.13009	0.49544