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Performance of Socially Responsible Investment Strategies in Funds During Financial Crises

Bachelor Thesis in Finance - 15 ECTS

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Abstract

This paper investigates the performance of socially responsible investment (SRI) funds in northern and continental Europe. The study compares SRI funds to non-SRI funds in different market states by analyzing monthly returns of equally weighted fund portfolios using the Carhart four-factor model and the Fama French five factor model. The results show that SRI funds do not significantly differ in results from characteristics-matched conventional funds in non-crisis periods but appear to offer the investor some protection in crisis periods relative to conventional funds. We conclude that further research is needed and that these should investigate the effects of different screening criteria.

Keywords: Socially responsible investments, fund performance, market states, bull,bear,return

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1 Background

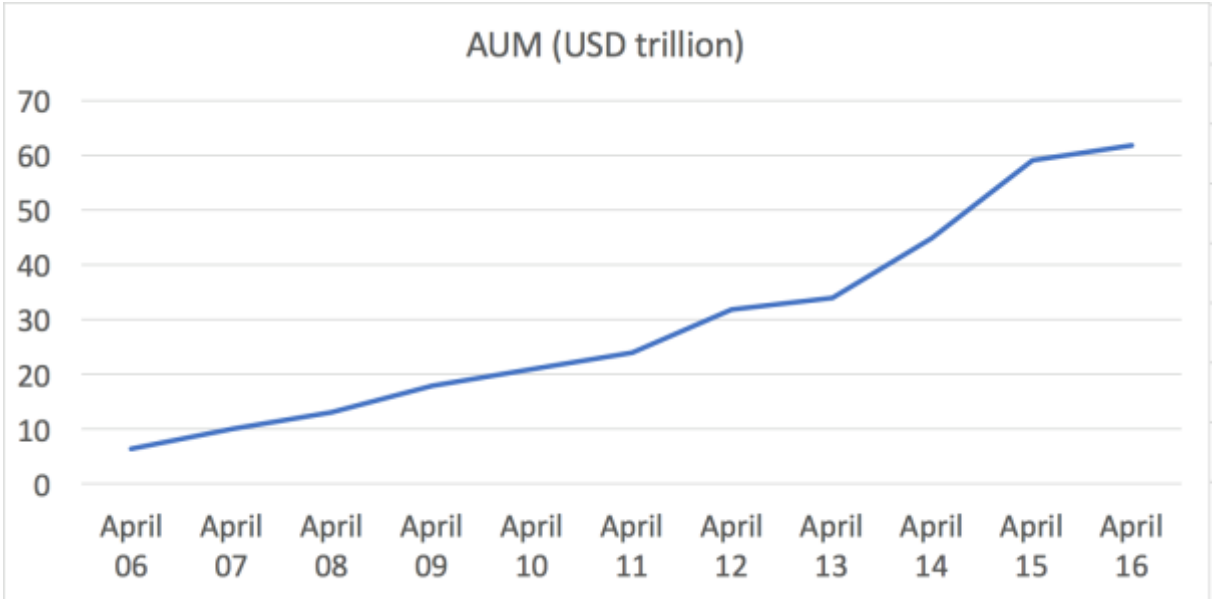
For the past two decades, there has been an exponential increase in the interest for socially responsible investments (SRI), also known as ethical investments or sustainable investments. These types of investments aspire to take a higher degree of responsibility concerning how their portfolio addresses the environmental, social and ethical issues that are connected to their respective line of business. SRI is a process that consists of either negative or positive screenings, or a combination of the two in order to ensure that the investor's funds are invested in companies that fill these criteria. Negative screenings exclude certain businesses that are deemed to be unacceptable or otherwise controversial (e.g. tobacco, alcohol, gambling), whilst positive screenings aim to make sure to include businesses that are considered to be environmentally friendly, responsible or that adopt a best in class approach when selecting individual companies to include in a portfolio (USSIF, 2017). Presently, there is no clear definition of what constitutes as a SRI, but in general the previously stated methods are used in a combination with the ESG factors to identify companies that are considered superior (Eurosif, 2016).

ESG is an umbrella term that includes three main factors: environmental, social and governance. Each factor further includes sub factors that are ever-shifting and constantly updated and renewed. Environmental, for instance, includes climate change, greenhouse emissions, resource depletion, waste and pollution, as well as deforestation. Social, encompasses factors, such as working conditions, health and safety, slavery, child labor and diversity. The final factor, governance, considers bribery, corruption, board diversification, tax strategies and other topics related to corporate governance. In combination the three factors measure the sustainability and ethical impact of a business or company's investment decisions.

The concept of ethical investing is not a new phenomenon and historically the practice of investing ethically has been propagated by numerous religions, such as Judaism, Islam and Christianity. The theme in the early days being the condemnation of usury, putting restrictions on "sinful trade" (alcohol, gambling, weapons), as well as trade that exploits others. Looking back through history, ethical investing developed and oftentimes mimicked the political and social climate and has thus gone from being highly influenced by religion and the restriction on "sinful trade", to women's rights in the late 1920s. Later, the focus of these investments would shift towards the Vietnam War, apartheid in South Africa, Chernobyl and similar hot topics. It is therefore understandable that with the increased awareness of climate change and global

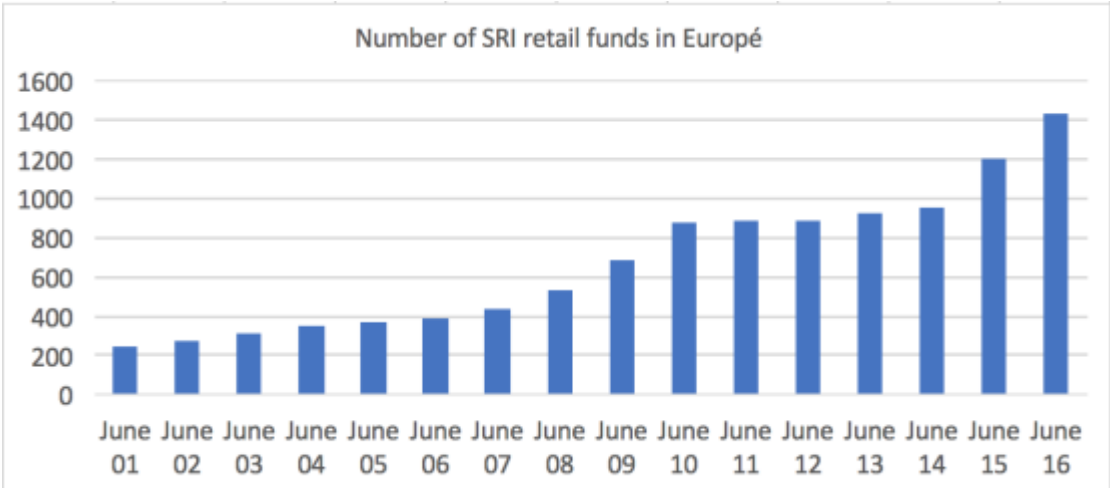
warming the focus today revolves around sustainability, renewable energy sources and human rights (Renneboog, L. Ter Horst, J. Zhang, C. 2008).

The rapid growth in SRIs that has been witnessed from the early 21st century and onwards can be contributed to the fact that investors demand investments that take the moral and environmental aspect of ownership into consideration. None of the previous studies have been able to present any aggregated data on assets under management (AUM) and/or number of SRI funds worldwide which makes it difficult to show the global development. The following two graphs give an indication of the development of SRI funds.



Aggregated assets under management by signatories of PRI in the years of 2006-2016.

The data is based on the signatories of the UN supported organization PRI and European SRI funds identified by the French organization Vigeo. Besides the apparent increase in total AUM in SRI, there has also been a dramatic growth in the number of funds classified as SRI.



Aggregated number of SRI retail funds in Europe. Data gathered from Vigeo Eiris.

This trend has mainly been driven by large institutions, such as pension funds, and primarily those that have some element of government control guiding them in their decision making. This control can to some extent be observed through governmental regulation and legislation that has been put into place in order to direct and incentivize certain types of investments (Renneboog et al. 2008).

The following table has been copied from Renneboog et al. (2008) and contains a brief summary of regulations related to SRI that has been introduced in various countries to promote ethical or green investments.

Table 1 - SRI regulations

Country	SRI regulated regulations
Australia	In a 2001 bill it is stated that all investment firms' product disclosure statements should include a description of "the extent to which labor standards or environmental, social or ethical considerations are taken into account". Since 2001, all listed companies on the Australian Stock Exchange are required to make an annual social responsibility report.
Belgium	In 2001, Belgium passed the 'Vandebroucke' law, which requires pension funds to report the degree to which their investments take into account social, ethical and environmental aspects.
France	In May 2001, the legislation "New Economic Regulations" came into force requiring listed companies to publish social and environmental information in their annual reports. Since February 2001 managers of the Employee Savings Plans are required to consider social, environmental or ethical considerations when buying and selling shares.
Germany	Since 1991, the Renewable Energy Act gives a tax advantage to closed-end funds to invest in wind energy. Since January 2002, certified private pension schemes and occupational pension schemes 'must inform the members in writing, whether and in what form ethical, social, or ecological aspects are taken into consideration when investing the pain-in contributions'.
Italy	Since September 2004 pension funds are required to disclose non-financial factors (including social, environmental and ethical factors) influencing their investments decision.
Netherlands	In 1995, the Dutch Tax Office introduced a 'Green Savings and Investment Plan', which applies a tax deduction for green investments, such as wind and solar energy, and organic farming.
Sweden	Since January 2002, Swedish national pension funds are obliged to incorporate environmental and ethical aspects in their investment policies.
UK	In July 2000, the Amendment to 1995 Pension Act came into force, requiring trustees of occupational pension funds in the UK to disclose in the statement of Investment Principles "the extent (if at all) to which social, environmental and ethical considerations are taken into account in the selection, retention and realization of investments" In 2002, The Cabinet Office in the UK published the Review of Charity Law in 2002, which proposed that all charities with an annual income of over £1 m should report on the extent to which

social, environmental and ethical issues are taken into account in their investment policy. The Home Office accepted these recommendation in 2003.

The Association of British Insurers (ABI) published a disclosure guideline in 2001, asking listed companies to report on material social, environmental and ethical risks relevant to their business activities.

US Section 406 of the Sarbanes-Oxley Act, which came into effect in July 2002, requires companies to disclose a written code of ethics adopted by their CEO, chief financial officer and chief accountant.

This table summarizes the regulatory initiatives regarding SRI taken by national government in western countries.

There is plenty of research available that covers the performance of SRI funds. The general view of these studies is that the motives for investing ethically is either or a combination of three reasons. The first reason is that investors see a high level of corporate social responsibility (CSR) as an indicator of high quality of management and therefore the firm is more likely to be superior to less responsible firms. The second view is similar to the first and says that responsible companies are exposed to less risk than companies that do not take as strong of a social responsibility. This is due to the lowered chance of litigation- and reputation costs in case of malpractice and accidents. The final reason is that investors have an altruistic motive, meaning that they take a moral approach when deciding where to invest. They receive utility from doing “good” by investing in companies that try to make society better (Cortez, M, C. Silva, F. Areal, N. 2009; Renneboog et al. 2008; Oikonomou, I. Brooks, C. Pavelin, S. 2012).

Two of the oldest and most developed SRI markets are the US and the UK markets. This has resulted in the fact that most of the research up to date has been performed in these markets exclusively, hence creating an information-gap compared to the rest of the other developed SRI market.

Edward Greene concludes in his study from 2007 that structural differences exist between US and European capital markets. These differences are not directed directly at mutual funds but involve regulatory issues such as accounting standards, auditing processes, non-financial disclosure, intermediaries and exchanges. He found that by harmonizing these differences the markets can reach a higher level of efficiency, as well as lower cost of capital and decreasing transaction costs. On basis of this argument it is fair to assume that there currently exist different obstacles between the two markets that potentially could explain the difference found by various studies. In their study on the development of CSR practice and theory Doh and Guay (2006) identifies several conceptual and practical differences in the field of CSR between the US and Europe. This could influence the way that investment decisions are made by fund managers and further explain the differences between studies on SRI performance. Finally, in

their study from 2008, Renneboog et al. show that in their sample the European based SRI funds (excluding the UK) are more likely to use positive screening compared to the US and the UK. In the US and the UK the use of negative screening is more common than in the rest of Europe. The study investigates SRI funds worldwide and is based on a sample including almost all SRI funds active at the time. This indicates that there might be differences in the selection process between the two areas, which provide further evidence for structural differences. Therefore, we want to expand the previous research made on the performance of SRI funds, which is mainly US and UK based, to see if the results hold under different capital market conditions and CSR frameworks.

1.1 Research Question

The question that this paper will attempt to answer is:

“How do European SRI funds perform compared to conventional funds and do they, as some research claims, offer investors downside protection?”

In doing so, we investigate whether investments in funds with ethical standards are inconsistent with the traditional wealth maximization paradigm of finance, and portfolio theory. Further, we will investigate if our findings deviate substantially from the results of Leite and Cortez (2015) who performed a similar study on explicitly French SRI funds.

1.2 Purpose

The main purpose of this thesis is to expand on the existing research performed by Nofsinger and Varma (2014) and Cortez and Leite (2015) who analyzed the performance of SRI funds compared to conventional funds. By extending their research we hope to contribute to the general understanding of SRI funds and discover if Leite and Cortez’ findings hold true for the rest of the European SRI fund market. In doing so we aspire to bridge the existing information-gap that currently exists regarding the European fund market (excluding U.K), as well as investigating whether SRI can be said to offer any downside protection in times of economic distress, as CSR literature claims.

In contrast to the massive growth this sector has experienced, research on the European SRI fund market is scarce. Subsequently making this type of study important for the institutional investors who are driving the growth, as well as for the individual whose funds they are managing.

1.3 Delimitations

The timeframe of the data in this thesis spans from the beginning of 2005 to the end of 2016. This restriction on time allows for testing before and after crisis periods, but removes the crisis of 2001-2003. The removal of the crisis in 2001-2003 was required in order to acquire a sufficiently big sample from the Bloomberg database. The reason for this is that funds tend to either merge with other funds over time or die. Subsequently, it would have reduced the pool of funds available for selection. Furthermore, the recent growth in both, AUM and number of funds, started somewhere around the beginning of the 21st century, thus the restriction in time allows us to gather a larger sample.

When constructing the two portfolios we put a geographical restriction on which funds to include. Funds that had their country of origin in Europe were viable as candidates, excluding the UK. More countries were intended to be represented in our final dataset but in the process of collecting data it turned out that only funds from Austria, Belgium, France, Germany, Luxembourg, Norway, Sweden and Switzerland could meet our selection criteria, therefore the European SRI portfolio is represented by funds from eight countries. A possible explanation for this might be that being able to invest capital ethically is a luxury good reserved for the wealthiest countries (Kurtz, L. 2005). We did find SRI funds from other countries in other databases, but as we did not have access to the return data from these we chose to use the data gathered from Bloomberg.

Consistent with similar studies, we have limited our universe of funds to mutual funds that invest in equity exclusively. This is primarily because we wish to investigate the performance of the underlying stock of the funds and not dilute the performance by including a significant amount of bonds or other fixed income assets.

Due to the limitation in time and resources, this study, unlike some of the larger contemporary studies only analyzes the performance of selected funds. Thus, it does not offer insight on the effect of factors such as fund strategy, managerial ability, market timing strategies, investment styles or type of screening procedure.

The rest of the paper is organized as follows; Section 1 will introduce the reader to findings from previous studies and literature as well as the theoretical framework of the thesis. Section 2 explains the methodology, models and data used. Section 3 presents the empirical results and discusses our findings. Section 4 gives a summary and offers conclusions about the study as well as suggestions for future research

2 Theoretical References and Findings

The paper is based on the theory formulated by Eugene Fama about “Efficient Market Hypothesis” (EMH). The hypothesis states that there is a perfect market where the price of a security reflects its true value. The assumptions of the hypothesis are that there are no transaction costs, information is without costs and investors have all available information. This leads to prices of securities to fully reflect the available information, and that investors have homogenous expectations. Meaning that the average expectation of the security by investors is the true value of the security, and that investors are rational. Providing that these assumptions hold true, investors make decisions on a rational basis in order to maximize utility.

In reality, this hypothesis and whether its assumptions hold is questioned. In this study we will specifically look whether we can find proof against it when looking at the returns of SRI funds. Some of the research done on the performance of SRI funds and stocks shows that they behave differently in bull and bear markets. The authors argued that this was based on discrepancies in information asymmetry, where normal stocks were found to have a higher volatility during bear periods. The explanation for this was that they were subject to a higher level of information asymmetry (Oikonomou et al. 2012; Nofsinger, J. Varma, A. 2014).

Additionally, we use the Portfolio Theory by Harry Markowitz from 1952. The theory states that investors are risk averse, meaning that when choosing between two portfolios with the same return the investor will always prefer the less risky portfolio, the portfolio with the lowest volatility. An investor will only take on more risk if the return is higher and will choose its risk level with regard to the personal risk aversion. In Markowitz’s theory investors gain by diversifying, the more stocks that is held by the investor the less firm specific risk the investor will be target of by each individual firm. If the investor is fully diversified the investor will only be subject to the market risk and the volatility will be minimized relatively to the return the investor receives. In order for a stock to contribute to a portfolio the stock cannot be perfectly correlated with any of the other stocks in the portfolio.

However, Oikonomou et al. (2012) find evidence that the performance of firms with strong corporate social performance (CSP) is weakly negatively related to systemic risk compared to other firms. Further, they find that during times of high market volatility firms that are socially irresponsible experience higher levels of financial risk. This shows that even though SRI funds might incur a cost of lost diversification, SRI firms have a lower downside risk. This finding together with the Prospect Theory formulated by Kahneman and Tversky (1979) might explain why investors are willing to accept lower return due to loss of diversification. The Prospect Theory states that investors value a loss higher than a gain of the same magnitude. Thus, investors trade the gains of diversification against downside protection and are equally or better off. In this study, we will look at whether the screening process when investing might constrain SRI investors from gaining the benefits of full diversification as stated by the Portfolio Theory or if the downside protection offered by SRI counterweighs this cost.

2.1 Empirical Evidence

Historically, most studies that have focused on measuring SRI performance have been performed mainly on the US and the UK fund market. This has left a gap regarding the European fund market. Recent studies have attempted to bridge some of this gap and investigate whether the different markets behave in a similar fashion.

The first study that focused on Europe and spanned over several countries was the one performed by Kreander, Gray, Power and Sinclair (2005), in which a comparative analysis of the weekly returns of 40 SRI funds and 40 non-SRI funds was made over the span of 1996-1998. The performance was measured by comparing the average Jensen's alpha where they found that the returns of the funds were very similar, but not significant. They also tested for market timing ability of the managers and found it to be negative, implying that managers tried to time the market, but did so at the wrong time.

In addition, Renneboog et al. (2008) analyzed 440 global funds to test their hypothesis that investors were willing to pay a price for ethics. Their results supported this theory as they found that many of the European and Asian SRI funds underperformed compared to their benchmark portfolios. On average, the SRI funds underperformed by 5% annually, implying that ethical investors are willing to forego returns in exchange for CSR behavior. Further, they found that a fund's risk-adjusted returns and loadings on risk factors were significantly impacted by its screening activities.

In the paper published by Cortez et al. (2009), the authors tested the performance of SRI funds from seven European countries during the period of 1996-2007 and compared them to a set of conventional and socially responsible benchmark portfolios. Using unconditional and conditional models they found that SRI funds on average perform on par with conventional funds and that adding a layer of social screening will not reduce the return of an investor's portfolio that carries European funds. Meaning that investors are able to invest according to social values without having to compromise the financial performance of their portfolio. These findings are in contradiction with the Portfolio Theory that argues that any imposition on a portfolio's ability to diversify will result in a reduction in adjusted returns.

More recently Leite and Cortez (2015) undertook an extensive investigation of the French SRI market, which currently is the leading European market on SRI funds. In the study, they look closer at the performance, investment styles and managerial abilities of these funds. Inspired by Areal, Cortez and Silva (2013) and Nofsinger and Varma (2014) who analyzed the US market during crisis and non-crisis periods. Leite and Cortez theorized that if a company's good reputation protects their stock price in economic downturns, a portfolio of ethical companies should in theory generate higher returns compared to non-ethical portfolios in times of crisis. What they found, however, showed that SRI funds match the performance of conventional funds in times of crisis, but significantly underperform conventional funds in non-crisis periods. Leite and Cortez (2015) concluded that the underperformance in good times was primarily driven by the negative screening process, as the funds that use positive screening perform similarly with conventional funds independent of market state. Further, they found significant differences in investment styles during good times but very little difference in bad times. The same results were observed in managerial ability.

These results differ from the original American study by Nofsinger and Varma (2014) who found that SRI funds outperform conventional funds in the US market during crises, but underperformed in non-crisis periods. The higher return in economic downturns was primarily attributed to funds that used positive screening.

Summarizing previous research, there is an increasing amount of published material on the subject, but consensus regarding SRI performance is still lacking. Numerous studies from both, the US and Europe, have been made on the topic of performance of SRI funds compared to traditional funds but no general statement can be made. The results vary across different periods of time, long and short term, as well as when comparing portfolios of funds to the individual funds in financial results. Some suggest that SRI underperform during times of economic crisis while some suggest the opposite and some indicate that they outperform the

traditional funds in the long perspective. Which is one of the theories that proponents of ethical investments use to explain why it is advantageous with SRI in comparison with conventional investments. The general theme is that SRI funds perform on par or underperform slightly when comparing to conventional funds but they differ in regards to money-flows and in some studies, there was a lower volatility of returns in SRI funds compared to that of conventional funds (Bollen, N. 2007; Renneboog et al. 2008 & 2011).

Over time, the general approach of estimating performance in studies that investigates SRI funds has also developed. One of the earliest methods of measuring fund performance was a simplified version of the one used today. This approach was mainly comparing the Jensen's alpha of SRI funds and conventional funds in order to find differences in returns between the two categories (Mill, G. 2006). Over the years, there has been a long and pertinent debate on the topic of appropriate benchmarks when measuring performance of mutual funds. Although, recent evidence indicates that a multi-factor model is more useful than a single-factor model when it comes to measuring portfolio returns (Cortez et al 2009). This evidence is consistent with the literature referred to in our thesis, where more and more studies are using a multi-factor model in which control variables and different variations of fund traits are considered. Some of the most commonly used models include the CAPM, the Fama French multifactor model and the Carhart four factor model. The two latter models are the ones applied to our study.

3 Methodology

In order to investigate whether there is a difference in financial performance between SRI funds and conventional funds we use a time series analysis where we compare the monthly returns of SRI funds and conventional funds to each other and over time. Furthermore, we compare the returns in times of economic crisis and in the "normal" state of the economy, we consider these mutually exclusive. We look at monthly returns during the period of January 1, 2005 until December 31, 2016. This gives data before, during and after the identified crisis periods. By using data from this period, we are able to distinguish any potential differences related to the returns of the two types of funds and any potential differences during crisis periods and non-crisis periods. This approach is similar to the one used by Leite and Cortez (2015) who studied French SRI funds and Nofsinger and Varma (2014) who studied US SRI funds, the latter we follow more closely during our study.

When collecting data for our sample we had difficulties matching conventional funds to SRI funds which no longer were active due to being liquidated or merged. This resulted in a

restriction of our sample on funds that are currently active, and therefore our sample is subject to survivorship bias. However, in our sample the bias is present in both the SRI funds and the conventional funds. We make the assumption that the bias does not differ between the two types of funds. There is to our knowledge no study showing that the survivorship bias is different between SRI funds and conventional funds, thus making this a fair assumption.

3.1 Data

The data used was collected from Bloomberg. In a few funds, some of the data was missing and in these cases, we complemented by using data from Morningstar. In order to find an appropriate sample, we started limiting our search. As the study is concentrated to funds with their domicile in Europe, excluding the UK, we began by excluding funds which do not have their domicile in these countries. We then screened on funds with the classification ESG within Bloomberg. This is a very wide definition, as discussed in the introduction, which captures either positive and negative screening or a combination of the two. Furthermore, we restricted our search to funds with an inception date of the latest January 1, 2005 and that the funds were still active as of December 31, 2016. We also limited our search to mutual funds investing in mainly equity. This gave a sample of 102 funds. 25 funds were excluded, since these funds were suspiciously similar to other funds in the sample. These excluded funds were usually funds of the same fund family, investing in the same geographical area with marginal differences to each other in regards of their holdings. After the screening process, we reached our final sample that consisted of 77 funds in total, which differed in level of risk, geographical focus and investment focus.

With a complete sample of SRI funds, we started by constructing our sample for the comparison group, the conventional funds. The process was similar to the collection process of the SRI funds but instead we looked at funds that were not classified as ESG. We ensured to include funds with their domicile in countries that matched our sample of SRI funds. The selected funds had their origin in Austria, Belgium, France, Germany, Luxembourg, Norway, Sweden and Switzerland. We used the same restriction in time, an inception date of the latest January 1, 2005 and that the funds were still active as of December 31, 2016. The comparison group was also limited to funds mainly investing in equity. These restrictions rendered a sample of 3408 funds. From these funds, we matched two funds to every SRI fund. The pairing of funds depended on whether the funds matched each other in terms of size and characteristics. These

steps were taken for each SRI fund. The first restriction in the matching process was that the two matched conventional funds had to have the same domicile as the SRI fund to which they are matched. As a next step, we matched based on geographical focus, this means that the two conventional funds had to have the same restriction on where they invest. The geographical focus could for example be funds only investing in Europe, Asia, North America, OECD countries or Global funds with no restrictions. The next criteria for matching was investment focus, the conventional funds had to have the same type of investments. This was in almost all cases a “broad market” focus, which means that the fund could invest in any stock from the geographical area they were active in. There were 7 funds deviating from the “broad market” investment focus. These were funds with focus on small capitalized stocks, mid capitalized stocks, emerging markets or developed markets. The last criteria used for matching was the risk level of the SRI fund. This was proxied by a combination of median market capitalization of holdings and average price per earnings for each fund. By going through these steps for each of our SRI funds we reached the final sample which therefore contained 231 funds, of which 77 were SRI funds and 154 were conventional funds. We continued by collecting the monthly returns including reinvested dividends and management fees from Bloomberg. The following table gives a summary of the funds in the sample.

Table 2 - Summary of funds

Domicile	SRI	Conventional	Total
Austria	2	4	6
Belgium	5	10	15
France	26	52	78
Germany	3	6	9
Luxembourg	8	16	24
Norway	14	28	42
Sweden	17	34	51
Switzerland	2	4	6
Total	77	154	231

This table summarizes the funds in the sample

Although the starting point of the financial crisis is quite commonly thought of as the bankruptcy of Lehman Brothers there is still deviations in opinions of when it ended. This, together with various definitions of the starting and end point of the Euro crisis, actualized that we needed to define these periods. In order to define the starting and end dates for the Financial crisis and the Euro crisis we used existing data on crisis periods derived by the algorithm created by Pagan and Sossounov (2003).

This approach was used by Leite and Cortez (2015), which we replicated when defining our crisis periods. The algorithm identifies bull and bear markets by looking at a window length of plus, minus eight months and locating peaks and troughs. Bull and bear markets are then identified as increases or decreases in the stock market index by at least 20% measured from given peak to trough, or vice versa. A peak is for example identified by equation (1) and a trough equation (2).

$$Peak = [\ln P_{t-8}, \dots, \ln P_{t-1} < \ln P_t > \ln P_{t+1}, \dots, \ln P_{t+8}] \quad (1)$$

$$Trough = [\ln P_{t-8}, \dots, \ln P_{t-1} > \ln P_t < \ln P_{t+1}, \dots, \ln P_{t+8}] \quad (2)$$

In order to use the algorithm, we needed to choose a stock index to measure peaks and troughs, the index chosen was MSCI EMU. The two rationales behind this index were firstly, that half of our funds are investing only in European and Eurozone equities. The second rationale was that it is the most appropriate index to capture the effect of the Eurozone debt crisis.

Table 3 - Identification of crisis periods

	<i>Start date</i>	<i>End date</i>	<i>Change in market index</i>	<i>Length of periods (months)</i>
Financial Crisis	2007/06	2009/03	-57,57%	21
Euro Crisis	2011/05	2012/05	-24,23%	13
	2015/03*	2015/09	-19,7%	7
	2015/12	2016/10	-22,2%	11

Identified bear markets according to the methodology used by Pagan and Sossounov (2003). Market index used is MSCI EMU.

*Not a crisis, as it does not meet the criteria of -20%.

By using this method, we were able to identify three bear markets. The first one is the “Financial Crisis” that occurred in June 2007 and lasted for 21 months. The second one was the “Euro Crisis” that began in May 2011 and ended 13 months later. A third bear period was, unexpectedly, identified in December 2015 and lasted for 11 months. This last bear period was not robust when using other indices and was excluded when controlling the robustness of our findings. The Financial crisis and Euro crisis were robust when using other indices. There are some slight differences in dates but these differences did not affect our final result. Another

potential crisis period was pinpointed for the period of 2013-2014 but was not included in the data due to it falling short of the 20% decrease in the stock market index that defines a bear market. The period measured a 19,7% decrease and was thus removed but was used in the robustness check of our results.

When measuring our excess return, our benchmark market index was the MSCI World Total Net Return. Even though half of the funds in the SRI and Conventional portfolio have a regional focus in Europe, about 40% of them invest globally. Further, investors are not bound by borders and thus returns should be compared to the return an investor could gain by investing in a well-diversified portfolio. We used a total return index because it treats dividends the same way as our funds do, they are continuously reinvested and not compounded. Later on, we also changed this index in order to control the robustness of the results.

3.2 Model

Similar to Renneboog et al. (2008), Nofsinger and Varma (2014) and Leite and Cortez (2015), we used a multifactor model to analyze the collected data. This is considered to be the most accurate method of measuring performance of portfolios (Mill, G. 2006). The multifactor models were based on the findings from Fama and French (1993) where they found that including additional risk factors to the traditional CAPM model is a more successful way to measure portfolio performance. The strength of a multifactor model is that it deals with problems arising from endogeneity to a larger extent than the CAPM model does, since it explains more of the variation found in the returns of stocks. When the effect of the risk factors is taken into account the remaining, unexplained (also called the alpha), effect will show. We compared this effect between the SRI funds and the conventional funds to see if we could find any significant differences, which can be derived to our classification of SRI.

Nofsinger and Varma (2014) and Leite and Cortez (2015), are both using Carhart's Four Factor Model to measure risk-adjusted abnormal return, where Leite and Cortez have included a fifth local factor in order to capture the regional effect of exclusively measuring French SRI funds (Carhart, M. 1997). As our area of interest is funds with domicile in the whole of Europe, excluding the U.K, we did not include a regional factor, since having European local factor would not likely explain the bias. The bias originated in the fact that investments tend to be made in firms in which the investor, in this case the fund manager, is more familiar with. Therefore, the bias is more likely to be country based or even regional within the country and not European (Merton, R. 1987). Including a local factor dependent on the domicile of the fund

we neither found appropriate as some of the funds have geographical restrictions which does not include its own domicile.

Further, Nofsinger and Varma measured the risk-adjusted abnormal return with three different models. These models are CAPM, Fama and French three-factor and Carhart four-factor where they also included a dummy variable for crisis periods for all models. We chose to exclude the CAPM, as this model has shown weaknesses when explaining average return of an asset. This is due to the exclusion of other risk factors, which has been shown relevant for asset pricing. (Fama, E. French, K. 1993) As for the three-factor model we used the extended version derived by Fama and French in their paper from 2015. This model is shown to better explain the returns of portfolios with large and mid-capitalized stocks than their original three-factor model and is therefore a more appropriate model (Fama, E. French, K. 2015). We used the two models to calculate the risk-adjusted abnormal return of the SRI portfolio and the portfolio consisting of conventional funds. Then we analyzed the differences between these returns.

The first model used is Carhart's extended version of the Fama and French three-factor model, more commonly known as the Carhart four-factor model:

$$R_{i,t} - R_{F,t} = \alpha_i + \beta_1(R_{M,t} - R_{F,t}) + \beta_2HML_{i,t} + \beta_3SMB_{i,t} + \beta_4MOM_{i,t}$$

$R_{i,t}$ = Monthly return on the individual portfolio i at time t

$R_{F,t}$ = The risk – free rate at time t

α_i = Four-factor alpha – the risk-adjusted return for portfolio i

$R_{M,t} - R_{F,t}$ = Monthly excess return of the market at time t

$HML_{i,t}$ = The monthly premium of the book-to-market factor at time t

$SMB_{i,t}$ = The monthly premium of the size factor at time t

$MOM_{i,t}$ = The monthly premium of the momentum factor at time t

The model contains four factors in order to adjust the returns of the assets with regards to the level of risk associated with the asset. These factors are: the monthly market excess return (EXMKT), monthly premium of a portfolio of value stocks (HML), monthly premium of a portfolio of small capitalization stocks (SMB) and the monthly momentum factor (MOM), which is the premium of a portfolio of past winners.

The data for the factors were gathered from Kenneth French's webpage, Mr. French publishes data of the factors monthly for different regions, these are based on all available equity data from each region. We used the global factors he provides which are calculated in

the same way as in the papers published 2012 and 2015, with one exception, being the market excess return which we constructed ourselves. The market excess return factor was calculated by using the monthly return of the index MSCI World Total Net Return minus the Euribor 1-month rate. The Euribor 1-month rate was recalculated to a monthly basis from an annual basis. This was motivated, as the Euribor 1-month rate is a more appropriate measure of the risk-free rate than the T-bill since all the funds has their domicile in Europe. The HML factor is calculated by taking the average return of all value firms and subtracting the average return of all growth firms. The definition of value and growth is based upon the book-to-market of each firm. The SMB factor is calculated by taking the average return of all small firms and subtracting the average return of all big firms. A small firm is defined by being among the 10% lowest capitalized firms. The MOM factor is calculated by creating a portfolio of the firms with the best cumulative performance over the past 12 months and subtracting the same of a portfolio of the worst performing firms over the same time horizon. Performance is defined as return. Finally, a dummy variable was defined. The variable takes the value 1 during crisis periods and 0 otherwise. This enabled us to measure the effect the crisis had on the portfolios and to investigate whether there is a difference between the SRI funds and conventional funds. Using the data from these factors including the dummy variable for crisis periods we arrived at the following model:

$$R_{i,t} - R_{F,t} = \alpha_i + \beta_1(R_{M,t} - R_{F,t}) + \beta_2HML_{i,t} + \beta_3SMB_{i,t} + \beta_4MOM_{i,t} + \beta_5 Crisis_{i,t}$$

Crisis_{i,t} = Dummy variable that takes the value 1 in times of crisis

The second model is the Fama French five-factor model, which is an extension of the original Fama French Three Factor Model. This model shows weakness when explaining the returns of portfolios with small stocks, therefore we used the four-factor as our main model and the five-factor model as a complementary robustness check. This was justified as there were a few funds, which invested in small stocks exclusively, along with most of our funds being broad market funds. This might mean the five-factor model was not appropriate for measuring our portfolios. Further, our results from the four-factor model showed that both the SRI funds and the conventional funds had a positive and significant loading on the SMB factor. A positive loading on SMB means that the portfolio is more exposed to smaller stocks and this provided further evidence that the five-factor model might be less accurate than the four-factor model (Fama, E. French, K. 2015).

$$R_{i,t} - R_{F,t} = \alpha_i + \beta_1(R_{M,t} - R_{F,t}) + \beta_2SMB_{i,t} + \beta_3HML_{i,t} + \beta_4RMW_{i,t} + \beta_5CMA_{i,t}$$

$RMW_{i,t}$ = The monthly premium of the factor robust operating profits

$CMA_{i,t}$ = The monthly premium of the factor investment style

The model still includes the factors market excess return, HML and SMB, but the MOM factor is not included. The two new factors are robust minus weak and conservative minus aggressive. Robust minus weak (RMW) is the monthly premium of a portfolio with robust operating profits. Conservative minus aggressive (CMA) is the monthly premium of a portfolio with a conservative investment style. The market excess return was calculated the same way as for the 4-factor model and the other factors is gathered from Mr. French's webpage. The RMW factor is calculated by taking the average return of a portfolio with firms that have robust operating profit and subtracting the average return of a portfolio with firms that have weak operating profit. The CMA factor is calculated by taking the average return of a portfolio with conservative investments and subtracting the average return of a portfolio with firms that have aggressive investments. Conservative and aggressive investments are defined by the change of total assets from accounting data between two fiscal years, where conservative is a small change and aggressive a big change in total assets. We included a dummy variable for crisis periods in this model as well, with the variable taking the value 1 during the crisis periods and 0 otherwise. This resulted in the following model:

$$R_{i,t} - R_{F,t} = \alpha_i + \beta_1(R_{M,t} - R_{F,t}) + \beta_2SMB_{i,t} + \beta_3HML_{i,t} + \beta_4RMW_{i,t} + \beta_5CMA_{i,t} + \beta_6Crisis_{i,t}$$

Often time series data suffer from autocorrelation, the error terms are correlated over time. In order to account for any such effect, Newey-West estimators were used on both models when running regressions (Newey, W. West, K. 1987).

4 Results and Analysis

The following table presents descriptive statistics for the monthly returns over the sample period.

Table 4 – Descriptive statistics of monthly returns

	Mean Return	Volatility	Median	Min. Value	Max. Value
Conventional	0,600	4,597	1,045	-30,75	31,69
SRI	0,609	4,619	1,080	-32,83	27,50

This table shows descriptive statistics of monthly returns

Table 5 present the alpha estimates and the factor loadings of the equally weighted portfolios for the entire sample period. The estimates for the alpha and the crisis periods were annualized. Thus, these coefficients show the annual under-/over performance and the annual effect of a crisis.

The coefficients for the differences were included to enhance the comparability between the two portfolios and is found by subtracting the returns of the conventional fund portfolio from the SRI fund portfolio, the other factors remained the same.

Table 5 – Performance and risk estimates*Carhart's Four Factor*

	α Alpha	β_1 MKT	β_2 HML	β_3 SMB	β_4 RMW	β_5 CMA	β_6 MOM	β_7 Crisis	R^2 adj.	Observations
SRI	1,79	0,97***	-0,02	0,22**			-0,09**	-7,23**	0,87	144
Conventional	2,27	0,94***	-0,08	0,28**			-0,07*	-8,46***	0,86	144
Difference	-0,48	0,03***	0,07***	-0,06***			-0,02***	1,23*	0,37	144

Fama French Five Factor

	α Alpha	β_1 MKT	β_2 HML	β_3 SMB	β_4 RMW	β_5 CMA	β_6 MOM	β_7 Crisis	R^2 adj.	Observations
SRI	2,41	0,90***	0,20**	0,11	-0,16	-0,50***		-5,50**	0,88	144
Conventional	2,94	0,87***	0,13	0,17*	-0,13	-0,49***		-6,92***	0,87	144
Difference	-0,52	0,03***	0,07***	-0,06***	-0,04	0,00		1,43**	0,35	144

This table presents the estimates of performance and risk factors for the two equally weighted portfolios of SRI funds and conventional funds for the entire sample period (January 2005 – December 2016). The alpha and crisis coefficients are presented as annualized percentage, whilst the risk factors are presented on a monthly basis. The coefficients β_1 - β_7 represent the factor loadings on the market excess return(MKT), the book-to-market factor(HML), the size factor (SMB), the factor of robust operating profits, the investment strategy factor(CMA), the momentum factor(MOM) and the crisis dummy(Crisis). The asterisks represent the level of statistical significance at the 1%(***), 5%(**) and the 10%(*).

We found that the alphas for both models and fund types were positive, indicating that during this period they outperform the market. But as the alphas are insignificant we cannot conclude that they perform different than the market. When comparing alphas between SRI funds and conventional funds, our results show that conventional funds outperform SRI funds

by approximately 0.5% of annualized return for the non-crisis periods, independent of model. The lack of significant alphas makes it difficult to draw any conclusions about the overall performance of the portfolios, and when comparing the portfolios to each other.

These findings are in line with the findings of Nofsinger and Varma (2014) who neither found significant alphas for the performance or the difference between the portfolios. The results were also similar to Cortez et al. (2009) and Renneboog et al. (2008), which neither found any significant difference in the returns of SRI funds and conventional funds.

Looking more closely at the crisis periods, we observed that the effect of the crisis was strongly negative for both portfolios, although marginally higher in the five-factor model. In the four-factor model, the crisis had an annualized average negative effect of -7.23% for SRI funds and -8.46% for conventional funds. For the five-factor model the results are -5.5% for SRI funds and -6.92% for conventional funds. This effect was significant at the 5% level for the SRI funds and at the 1% level for the conventional funds. The level of significance remained the same for both models and showed that SRI funds perform about 1.35% better returns in bear markets, at the 10% level for the four-factor model and 5% level for the five-factor model. This was in line with the findings of Oikonomou et al. (2012), who found that firms with a high level of CSP perform better during times of higher market volatility, but we observed the pattern at an aggregate fund level instead of the aggregate firm level. Additionally, Nofsinger and Varma (2014) also found that SRI funds perform significantly better than conventional funds during crisis periods.

In contrast, Leite and Cortez (2015) were unable to find any evidence supporting this claim in economic downturns. However, they did find that SRI funds significantly underperform conventional funds in non-crisis periods, whilst matching the performance in crisis periods. This means, that relatively, SRI funds perform better during crisis periods than non-crisis periods, which is in line with Oikonomou et al. (2012).

Subsequently, we could not conclude that SRI funds perform significantly different than conventional funds in non-crisis periods but it appears that they do offer investors some protection in economic downturns. As our results did not find a difference between the performances of SRI funds and conventional funds it was unclear whether an investor who invests long term has to sacrifice any upside in good times in order to get the downside protection that SRI funds offers in bad times.

Even though the focus of this study has been on the risk-adjusted returns of the portfolios, it may be of interest to note that the four-factor model produces significant differences in factor loadings for all four factors, with all factors significant but HML. This suggests that SRI funds

and conventional funds differ in their investment style and investigating the impact of this difference could shed more light upon the differences found in returns, or the absence of differences.

For both models, we found that SRI funds are more exposed to bigger firms than their conventional peers. Although, both of the fund types have a larger focus on small capitalized stocks. SRI funds also follow the benchmark market return more closely for both models. This shows that they follow the benchmark index more closely. Since our benchmark index, MSCI World, contains large and mid-capitalized stocks this makes sense. In addition, we found that for both models SRI funds tends to invest in growth stocks to a higher degree than conventional funds. For the individual portfolios, this coefficient is insignificant and therefore follows the market closely in the growth/value tradeoff. Finally, we found that both portfolios had a negative momentum effect showing that they were not exposed to past winners whereas SRI funds were marginally less exposed.

4.1 Robustness

In order to control the validity of our results and for potential model misspecification we performed robustness controls. These included the exclusion of the third bear period, using the second model, the Fama and French 5-factor model, and controlling the results when using a different benchmark index and risk factors. We found that our results are robust to changes made in the model and the variables that were used.

When excluding the third crisis period the impact from the crisis variable was reduced, but was still negatively significant. The alpha was then negative, indicating that the portfolios underperformed the market but the effect was insignificant. The SRI funds still underperformed the conventional funds but the difference was still insignificant. The loadings of the factors were unchanged for both models with only slight differences.

The additional index used was MSCI Europe, including reinvested dividends. We found that the change of benchmark index did not change the results. Both models and both fund types had a slightly higher and significant coefficient on the excess market return factor, this was an expected result as half of our funds had their focus on European equities only and should therefore follow a European index more closely. Furthermore, we found that the European index lowers the impact of the crisis variable but the variable was still significant. This most likely originated from the fact that the Euro sovereign debt crisis has a stronger effect in the

European index than the world index and therefore some of the variation from this crisis was captured by the market factor. As for the alpha, it changed only slightly and remained insignificant.

5 Conclusion

Even though the European fund market has experienced a surge during the past two decades, when it comes to both, the total number of SRI funds as well as the assets they manage, the topic remains largely unexplored outside of the US and the UK. This study expands the European research performed by Leite and Cortez (2015) further by including additional European countries which were excluded in their paper. This study investigates how SRI funds in northern and continental Europe perform compared to conventional funds in the period of 2005-2016. Nofsinger and Varma (2014) and Oikonomou et al. (2012) argue that SRI practices may decrease downside risk and thus hold up better in crisis periods, therefore a timeframe was chosen as to include both, bull and bear markets.

With data obtained from Bloomberg we were able to construct two equally weighted portfolios where the funds matched certain characteristics that were selected in the screening process. One portfolio consisted of 77 SRI funds and the other of 154 conventional funds. We found that SRI funds significantly outperform conventional funds during crisis periods and slightly, but insignificantly underperform conventional funds during non-crisis periods. This further strengthens the findings of Nofsinger and Varma (2014) on the US market but was not completely in line with Leite and Cortez (2015) who found that SRI funds perform on par during crisis periods and underperform during non-crisis periods. Our study follows the methodology of Nofsinger and Varma (2014) more closely than Leite and Cortez (2015) who computed their own risk factors and added a local factor. This could potentially explain some of the difference in results.

Nofsinger and Varma (2014) argue that the reason for SRI funds outperforming conventional funds in the US during economic downturns were primarily driven by positive screening strategies. We believe that this could be a potential explanation in our study as European SRI funds use positive screening strategies to a larger extent (Renneboog et al. 2008 & 2011).

Revisiting our research question, this study offers some support to the proponents of SRI. The results show that SRI funds do not differ significantly in performance in non-crisis periods while they do offer downside protection in crisis periods. This finding does not support the

Prospect Theory, as an investor does not have to sacrifice returns for downside protection.

Some final comments regarding the potential shortcomings of this study. We are aware of the fact that our sample is exposed to survivorship bias, which might cause a bias in our results. We made the assumption that the bias behaves the same between SRI funds and conventional funds. Since we have a sample of 144 observations per each of our 231 funds, it is reasonable to assume that on average, the effect of the bias should cancel out. If the assumption holds, the bias should not affect our estimates of the difference between SRI performance and conventional performance.

We further acknowledge that the study in its final form only includes funds from eight European countries. As a consequence, our results may not fully represent the remaining European SRI market, as originally intended and our conclusions might not hold for the remaining European SRI markets.

A last reflection regards the selection criteria ESG, that was used for the study. Being an umbrella term, it is inherently wide and makes it difficult to pinpoint what the exact cause to any variation in performance between SRI funds and conventional funds might be. Thus, this study still leaves some questions unexplored for further studies regarding the performance of SRI funds in the European market. Primarily, what effect screening procedures has on SRI performance. The only contemporary European study investigating this is the one by Leite and Cortez (2015) who found that in the French SRI market this had a significant effect when explaining the differences within the SRI segment. Further, we recommend that future research should focus on managerial abilities and how they may differ between SRI and non-SRI funds. This as the difference in risk factors from our study was highly significant, suggesting that some of the variation could be explained by investment styles.

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List of Abbreviations

The following is a list of abbreviations used in this study.

AUM	Assets Under Management
CAPM	Capital Asset Pricing Model
CMA	Conservative Minus Aggressive
CSP	Corporate Social Performance
CSR	Corporate Social Responsibility
EMH	Efficient Market Hypothesis
ESG	Environmental, Social, Corporate Governance
EXMKT	Monthly Excess Return
EXR	Monthly Return of Portfolio Minus the 1-month Euribor rate
HML	High Minus Low
MOM	Momentum Factor in our formula
RMW	Robust Minus Weak
SMB	Small Minus Big
SRI	Socially Responsibly Investments

Appendix

This appendix describes our sample of SRI funds

Fund name	Fund ticker	Fund name	Fund ticker
ALLIANZ EURO EQTY CL TRANS-R	ACTFRAN FP Equity	GENERALI INV-SRI EUR EQTY-AX	GENEDAX LX Equity
DNB NORDEN III	AFINDUS NO Equity	TERRASSISI AKTIEN I AMI	GERLG21 GR Equity
ALLIANZ ACTIONS AEQUITAS	AGFFIDA FP Equity	DNB NAVIGATOR II	GFINAVIG NO Equity
ALLIANZ VALEURS DURABLES-R	AGFOPID FP Equity	ALM ACTIONS EUROPE ISR-IC	ISCERAC FP Equity
ATOUT FRANCE-C	ATTFUTC FP Equity	KBC INSTIT FD-SRI EURO EQ	KBC6733 BB Equity
CAN SUSTAINABLE WORLD-C	BAC2700 BB Equity	KBC ECO FUND-SUSTAIN EURLD-C	KBEEEUC BB Equity
SWEDBANK HUMANFOND	BANHUMA SS Equity	KCD-UNION-AKTIEN NACH-DJSG	KCDAKTI GR Equity
BNP PARIBAS ACTIONS EUR RE-D	BNPETHE FP Equity	KLP AKSJGLOBAL INDEKS I	KLPKII NO Equity
BNP PARIBAS RETRA RE HO-P100	BNPREFIX FP Equity	KLP AKSJEUSA INDEKS USD	KLPAUSA NO Equity
AMUNDI ACTIONS EUROPE ISR-P	CACDURA FP Equity	LAZARD EQUITY SRI-C	LOBETHQ FP Equity
OHMAN SMABOLAGSFOND	CARSMAB SS Equity	ABN AMRO EURO SUSTAI EQUI-NC	MAIT100 FP Equity
DNB SVERIGE KONCIS	CARSVKO SS Equity	MEAG NACHHALTIGKEIT-A	MEAGNAE GR Equity
OHMAN UTLANDSFOND	CARUTLN SS Equity	NORDEA-INSTIT AKTIEFOND GLOB	NORIAKG SS Equity
AMUNDI VALEURS DURABLES	CATOUDU FP Equity	ALM ACTIONS ZONE EURO ISR-IC	NSMCRET FP Equity
LCL ACTIONS ETATS-UNIS ISR	CLINGAM FP Equity	ODDO GENERATION-CR-EUR	ODDGENC FP Equity
CANDR EQUITIES L-EMERG MKT-D	CMU3470 LX Equity	OHMAN ETISK INDEX EUROPA	OETIEUR SS Equity
CM-CIC OBJECTIF ENVIRONN-C	CMVALTH FP Equity	OHMAN ETISK INDEX JAPAN	OETIJPN SS Equity
EPARGNE ETHIQUE ACTIONS-C	COCEPET FP Equity	OHMAN ETISK INDEX PACIFIC	OETIPAC SS Equity
DANSKE INVEST HORIZONT AKSJE	DCFOKOP NO Equity	OHMAN ETISK INDEX USA	OETIUSA SS Equity
CANDR EQUITIES L-SUST WRLD-C	DEXLWWC LX Equity	OFI RS EUR GROWTH CLI CHAN-I	OFIMLEA FP Equity
DELPHI EUROPE	DFEUROP NO Equity	OFI INVEST-RS ETH EUREQ-IEUR	OMSSRIE LX Equity
DNB GLOBAL ETISK V	DIGLET4 NO Equity	DPAM INV B FUND-EUR SUSTAI-B	PAMEETH BB Equity
DNB MILJOINVEST	DIMILJO NO Equity	PICTET-ETHOS CH SW SUST-PDY	PICSEQS SW Equity
DNB SMB	DISMB NO Equity	RAIFFEISEN-NCHHLT-AKTIEN-A	RAIETAA AV Equity
DNB USA	DIUSAFD NO Equity	BNP PARIBAS RETRAI RES 75-PD	RETRIAT FP Equity
DNB EUROPA	DKEUROP NO Equity	UBS L E-GLB SUSTAIN USD-PA	SBCWEQI LX Equity
DNB GLOBAL EMERGING MARKET	DKGLEM NO Equity	SEB HALLBARHETSFOND GLOBAL	SEBETGL SS Equity
ALLIANZ GLB SUSTAINBLTY-AE	DREGLSU LX Equity	SEB OSTERSJOFOND/WWF	SEBOWWF SS Equity
DANSKE INV SRI GLOBAL	DSRIGBL SS Equity	SEB UTLAND STIFTELSEFOND	SEBUTST SS Equity
LCL ACT DEVELOP DURABLE-C	DYNDEVD FP Equity	AMUNDI ACTIONS EURO ISR-P	SICEURS FP Equity
ECUREUIL BENEFICES RESPONS-D	ECURLLE FP Equity	STOREBRAND GLOBAL VERDI	SPGLOBA NO Equity
ETOILE DEVELOPPEMENT DURABLE	ETENVIR FP Equity	SPP AKTIEFOND GLOBAL	SPPAKGS SS Equity
S ETHIKAKTIEN-A	ETHIKAT AV Equity	STOREBRAND VEKST	SPSMBFD NO Equity
CB EUROPEAN QUALITY FUND-A	EUREUEA LX Equity	SWISSCANTO CH EF GREEN INV A	SWCGREE SW Equity
FEDERAL ACTIONS ETHIQUES	FEDETHI FP Equity	SWEDBANK ROBUR ETHICA GLOBA	SWESVGB SS Equity
FEDERAL CONVICT ISR EURO-P	FEDFREU FP Equity	SWEDBANK ROB TALENT AKT MEGA	SWTAKMG SS Equity
BNP PARIBAS EUR VAL DUR-CL C	FIMEUOP FP Equity	NORDEA SWEDISH STARS	TRETHI SS Equity
JPMORGAN F-GLB SOCIAL RSP-A	FLEMGSC LX Equity	ATOUT EUROLAND-D	UNIFRAN FP Equity
DPAM INV B FUND-EQY WRL SU-A	FNI4520 BB Equity		