Universidade do Minho
Escola de Economia e Gestão

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Performance Evaluation of European Socially Responsible Funds

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Performance Evaluation of European Socially Responsible Funds

Tese de Doutoramento em Ciências Empresariais

Trabalho realizado sob a orientação da
Professora Doutora Maria do Céu Ribeiro Cortez

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To my parents, Carmo and Beatriz

“PERFORMANCE EVALUATION OF EUROPEAN SOCIALLY RESPONSIBLE FUNDS”

ABSTRACT

The performance of Socially Responsible Investment (SRI) funds has become a very interesting issue of debate in the finance literature. In this work we address several research topics, some of which still unexplored, regarding the performance, performance persistence, investment styles and timing abilities of European SRI funds. Throughout this investigation, several different types of SRI funds, including equity, bond and balanced funds, from eight European markets, are analysed and compared with characteristics-matched portfolios of conventional funds. Performance is assessed using several models, including robust conditional multi-factor models, which allow for both time-varying alphas and betas, and control for home biases and spurious regression biases.

First, we explore the performance of internationally-oriented SRI funds, which have received far less attention in the literature than SRI funds investing in their local markets. To the best of our knowledge, we conduct the first multi-country study, focused on international SRI funds (investing in Global and in European equities), to combine the matched-pairs approach with the use of conditional multi-factor performance evaluation models. Our results show little evidence of significant differences in overall performance, as well as in the selectivity and market timing abilities, of international SRI funds and conventional funds. Besides, SRI equity funds do not seem to offer any additional protection to investors in times of crisis. Nevertheless, we find some significant differences in the investment styles of SRI and conventional funds, which vary considerably between fund categories, as well as significant shifts in funds’ risk exposures across recession and expansion periods. In addition, conventional benchmarks present a higher explaining power of SRI equity fund returns than SRI benchmarks.

Then, we focus our analysis on the French SRI fund market, which is currently the largest in Europe. We evaluate not only the performance but also the performance persistence of French SRI funds. In general, our results show no statistically significant differences in the overall performance of SRI funds and their matched-portfolios. However, SRI funds are significantly better market timers and significantly worse stock pickers than their conventional peers. With regard to investment styles, SRI funds show significantly higher market betas and significantly lower exposure to small-caps than conventional funds, in clear contrast with most previous studies. In addition, although we do not find evidence of a significant relationship between market states and fund performance, we do find several significant shifts in the investment styles of SRI funds (but not of conventional funds) across different market states. Furthermore, we do not find evidence of performance persistence for French SRI funds, whereas conventional funds exhibit significant persistence in performance at short-term horizons. Results are similar no matter which methodology (contingency tables or performance-ranked portfolios) is used to assess persistence. In general, the difference between funds with good past performance and bad past performance is significantly lower for SRI funds than for their conventional counterparts.

Finally, since evidence to date has almost exclusively been conducted within equity markets, this thesis provides new evidence on the potential of SRI for other asset classes, by assessing the performance of SRI fixed-income funds. To the best of our knowledge, this is the first comprehensive investigation of the performance of European SRI fixed-income funds. Altogether, our results show no significant differences in the performance of SRI fixed-income funds and their matched-portfolios, although SRI bond funds from the UK significantly underperform their conventional peers. Also, fixed-income fund performance and investment styles do not seem to be related to market states. Nevertheless, in comparison with their matched-portfolios, SRI balanced funds seem to provide some additional protection to investors against market downturns, unlike SRI bond funds, which perform even worse than conventional funds during recessions than during expansions. Additionally, we find that SRI indices are as powerful as conventional indices in explaining SRI fixed-income fund returns.

In sum, our results show that, in most cases, the performance of SRI and conventional funds is comparable, as well as many of their factor exposures. A probable explanation for these results may be the use of the “best-in-class” approach, the most common screening strategy in continental Europe, which may result in SRI funds having similar portfolio compositions to non-SRI funds.

“AVALIAÇÃO DO DESEMPENHO DE FUNDOS DE INVESTIMENTO EUROPEUS SOCIALMENTE RESPONSÁVEIS”

RESUMO

A avaliação do desempenho de fundos de Investimento Socialmente Responsáveis (ISR) tem-se tornado um interessante tema de debate na literatura financeira. Neste trabalho são analisados vários tópicos de pesquisa, alguns ainda inexplorados, acerca do desempenho, persistência do desempenho, estilos de investimento e capacidades de antecipação dos movimentos do mercado de fundos ISR Europeus. Ao longo desta investigação, diferentes tipos de fundos ISR, incluindo fundos de acções, obrigações e mistos, domiciliados em oito mercados Europeus, são analisados e comparados com fundos convencionais de características semelhantes. O desempenho é analisado através de vários modelos, incluindo robustos modelos multi-factor condicionais, que admitem a variabilidade temporal de alfas e betas e controlam enviesamentos relacionados com investimentos nos mercados locais e com regressões espúrias.

Numa primeira fase, é explorado o desempenho de fundos ISR que investem a nível internacional, os quais têm recebido muito menos atenção na literatura que os fundos ISR que investem nos seus mercados locais. Tanto quanto é do nosso conhecimento, este é o primeiro estudo focado em fundos ISR internacionais (que investem em acções globais ou europeias), oriundos de vários países Europeus, a combinar a abordagem *matched-pairs* com o uso de modelos de avaliação do desempenho multi-factor condicionais. Os resultados mostram pouca evidência da existência de diferenças significativas no desempenho global, assim como nas capacidades de selectividade e antecipação dos movimentos do mercado, entre fundos ISR internacionais e fundos convencionais. Para além disso, os fundos ISR de acções não parecem oferecer qualquer protecção adicional aos investidores em tempos de crise. No entanto, existem algumas diferenças significativas nos estilos de investimento dos fundos ISR em relação aos fundos convencionais, as quais variam consideravelmente entre as categorias de fundos analisadas, bem como mudanças significativas nas suas exposições ao risco durante períodos de recessão e de expansão. Adicionalmente, os índices convencionais apresentam um maior poder explicativo das rendibilidades destes fundos ISR que os índices socialmente responsáveis.

De seguida, foca-se a análise no mercado francês de fundos ISR, presentemente o maior mercado a nível Europeu, e avalia-se não apenas o seu desempenho mas, também, a persistência do desempenho. Em geral, os resultados não mostram diferenças estatisticamente significativas entre o desempenho global dos fundos ISR e dos fundos convencionais. Contudo, os fundos ISR são significativamente melhores na capacidade de antecipação dos movimentos do mercado e significativamente piores em termos de selectividade que os seus pares convencionais. Em relação aos estilos de investimento, os fundos ISR apresentam betas de mercado significativamente maiores e exposições a acções de pequena capitalização significativamente menores que os fundos convencionais, em contraste com os resultados da maioria dos estudos empíricos anteriores. Adicionalmente, embora não se encontre evidência da existência de uma relação significativa entre os estados do mercado e o desempenho dos fundos, há várias mudanças significativas nos estilos de investimento dos fundos ISR (mas não dos fundos convencionais) ao longo dos diferentes estados do mercado. Para além disso, não se encontra evidência de persistência no desempenho dos fundos ISR franceses, ao passo que os fundos convencionais exibem uma persistência significativa no seu desempenho para horizontes temporais de curto prazo. Os resultados são semelhantes seja qual for a metodologia (tabelas de contingência ou carteiras de fundos criadas com base no desempenho passado) utilizada para avaliar a persistência. Em geral, a diferença entre fundos com bons desempenhos passados e maus desempenhos passados é significativamente menor para os fundos ISR do que para os fundos convencionais.

Por último, dado que a evidência empírica até à data tem sido quase exclusivamente direccionada para os mercados de acções, esta tese apresenta nova evidência sobre o potencial dos ISR para outras classes de activos, ao examinar o desempenho de fundos ISR que investem em obrigações. Tanto quanto é do nosso conhecimento, esta é a primeira investigação sobre o desempenho de fundos ISR de obrigações no mercado Europeu. Em geral, os resultados obtidos indicam não existirem diferenças significativas entre o desempenho de fundos ISR de obrigações e mistos e o de fundos convencionais com características semelhantes, embora os fundos ISR de obrigações do Reino Unido apresentem um desempenho significativamente inferior ao dos seus pares convencionais. Para além disso, quer o desempenho quer os estilos de investimento dos fundos de obrigações e mistos não parecem relacionados com os estados do mercado. No entanto, comparativamente aos fundos convencionais, os fundos ISR mistos parecem fornecer alguma protecção adicional aos investidores durante períodos de recessão, ao contrário dos fundos ISR de obrigações, os quais têm desempenhos ainda piores do que o dos fundos convencionais em períodos de recessão do que em períodos de expansão. Adicionalmente, os índices socialmente responsáveis apresentam uma capacidade semelhante à dos índices convencionais para explicar as rendibilidades dos fundos ISR que investem em obrigações.

Em resumo, os resultados mostram que, na maioria dos casos, o desempenho dos fundos ISR é semelhante ao dos fundos convencionais, bem como muitas das suas exposições ao risco. Uma provável explicação para estes resultados poderá ser a utilização da abordagem “*best-in-class*”, a mais comum na Europa continental, a qual poderá levar a que a composição das carteiras dos fundos ISR seja semelhante à dos fundos convencionais.

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CHAPTER 1

INTRODUCTION

1.1 Motivation and Purpose of this Research

Socially Responsible Investments (SRI) may be defined as "*investment processes that combine investors' financial objectives with their concerns about Environmental, Social and Governance (ESG) issues*" (EUROSIF, 2008, p. 6). Also known as ethical or sustainable investments, SRI have become increasingly attractive in the investment arena, having grown significantly in the major financial markets and at considerably higher rates than conventional investments.

In the US, SRI assets rose from $639 billion in 1995 to $3.07 trillion at the end of 2009. This represents a growth rate of more than 380% in a period where the broader universe of professionally managed assets increased only 260% (SIF, 2010). In the European SRI market, assets under management have increased from €1,033 trillion to €4,986 trillion over the period of December 2005 to December 2009 alone (EUROSIF, 2010). In addition, it is also important to emphasise that SRI assets grew considerably more than conventional investments during the recent financial market crisis. In fact, during the period of 2007-2009, in which the universe of professionally managed assets in the US increased less than 1%, SRI assets increased more than 13% (SIF, 2010).

As a consequence of this remarkable growth, SRI assets are already accounting for a significant proportion of the overall asset management industry. At the end of 2009, the European Core SRI market alone[1] was estimated to be worth 10.3% of the European asset management industry (EUROSIF, 2010), while the American SRI market represented about 12.2% of total assets under professional management in the US (SIF, 2010). Another interesting figure is that recent statistics show that Europe is already holding the main share of the global SRI market. According to EUROSIF (2010), by September 2010, the global SRI market was estimated to be worth about €7,594 trillion, with European markets accounting for 65.7% of the global market, against 28.2% of the US.

As a result, the market of SRI mutual funds has increased remarkably worldwide, both in terms of number of funds and assets under management. In the US, SRI funds increased from 55 in December 1995 to 493 at the end of 2009, while assets under management rose from $12 billion to $569 billion (SIF, 2010). In Europe, the number of socially screened funds

[1] Given the many SRI strategies available, the European Sustainable Investment Forum (EUROSIF) splits the SRI market into two segments: (1) Core SRI, which consists of multiple negative exclusions and several positive screens; (2) Broad SRI, which uses simple exclusions and engagement practices.

rose from 159 at December 1999 to 879 at June 2010, with assets under professional management increasing from €11.07 billion to €75.27 billion (Vigeo, 2010).

Inevitably, the performance of SRI mutual funds has become a topic of interest for the academic community, which has produced many empirical studies on this subject, especially over the last decade. Although most of these studies show no significant differences in the performance of SRI and conventional funds, there are still several important research topics in the SRI mutual fund performance literature that have not yet been explored, especially in the European market.

In fact, while most studies examine samples of funds that invest in their domestic markets, the performance of internationally-oriented SRI funds is a far less explored research topic. In addition, studies that assess the decomposition of overall performance in its timing and selectivity components or the performance persistence of SRI mutual funds are also scarce. Furthermore, practically all empirical studies conducted focus on SRI equity funds, whereas the performance of SRI fixed-income funds has only been investigated for the US market, remaining unexplored in the European context. Hence, the main purpose of this research is to fill these gaps and provide new insights on the SRI mutual fund performance debate.

This investigation comprises three essays on the performance of several types of European SRI funds, included in Chapters 4 to 6. While the first two of these chapters are focused on internationally-oriented SRI equity funds, the last one addresses SRI fixed-income funds. The main objectives of these chapters are the following: (1) to assess if SRI fund performance and investment styles are significantly different from those of characteristics-matched portfolios of conventional funds; (2) to examine if SRI fund performance and investment styles differ across business cycles (i.e., recession and expansion periods); (3) to investigate if SRI indices are as powerful as conventional indices in explaining SRI fund returns. Besides, another important objective of this research, which is addressed in Chapter 5, is to evaluate and compare the performance persistence of SRI and conventional funds. Furthermore, Chapters 4 and 5 also include an investigation of the selectivity and timing abilities of international SRI equity fund managers.

We contribute to the literature on several ways. As far as we are aware of, this is the first multi-country study, focused on internationally-oriented SRI equity funds, to combine the use of a matched-pairs approach with robust conditional multi-factor performance evaluation models, which allow for time-varying alphas and betas and, simultaneously, control for home biases and spurious regression biases. Besides, to the best of our knowledge, this is only the second investigation worldwide to assess the performance persistence of SRI mutual funds and the first to do so using conditional models. Furthermore, this work also comprises the first assessment of SRI fixed-income fund performance in the European market. Finally, as far as we are aware of, this is also the first investigation worldwide to examine if SRI fixed-income fund performance and investment styles differ across business cycles, as well as the first study to perform a similar analysis for European SRI equity funds.

1.2 Socially Responsible Investments

1.2.1 A Brief History of SRI

The origins of SRI trace back centuries and are associated to religious practices. As pointed out by Kreander (2001), thousands of years ago, the Judeo-Christian religion had already several instructions on how to use money ethically, namely in the context of loans (e.g.: the book of Deuteronomy). Also, in the 17th and 18th centuries, some well-known Christian groups, like the Quakers and the Methodists, already included certain non-financial values in their investments, specifically by refusing to profit from trades involving weapons or slaves (Renneboog, Horst and Zhang, 2008a).

Although SRI has ancient origins, records of the first SRI fund date back to 1928, year in which the "*Pioneer Fund*" was created in the US (Renneboog *et al.*, 2008a). Though not widely available to investors, this was the first fund to employ investment screens, based on religious values.

In the 1970s and 1980s, SRI funds started to shift from pure moral / religious concerns towards more societal concerns, following several social and environmental movements that alerted investors to the potentially negative consequences of their investments. According to Kreander (2001) and Renneboog *et al.* (2008a), these movements played a significant role in the development of the industry.

In 1971, the increasing pressure of anti-war movements, as a consequence of the Vietnam War, contributed to the creation of the first US-based ethical retail fund, the "*Pax World Fund*", which avoided investments related to the armaments industry. In the 1980s, the growing concern for the respect of human rights, supported by anti-racist movements, led to the avoidance of investments in oppressive regimes, like the South African apartheid regime.

In addition, following several environmental disasters, such as the Chernobyl nuclear power plant accident in 1986 or the Exxon Valdez spill in 1989, environmental movements gained strength and media coverage and contributed to increase investor's awareness of the negative environmental impacts associated with industrial development (e.g.: Kreander, 2001; Renneboog *et al.*, 2008a).

Since the 1990s, SRI have become even more attractive and grown significantly in the major financial markets. As pointed out by Renneboog *et al.* (2008a), some important factors that may help to explain this growth are issues such as ethical consumerism (i.e., consumers willing to pay more for products that are coherent with their personal values) or the introduction of new SRI criteria, such as those associated with transparency and corporate governance, which have emerged as a consequence of several relatively recent corporate scandals (e.g.: Enron, Parmalat).

1.2.2 SRI Implementation: Investment Screens and Strategies

Socially responsible investors integrate non-financial considerations into the investment process by applying a set of investment strategies / screens, designed to select (positive screens) or to exclude (negative screens) assets from their portfolios.

The first screens used by SRI mutual funds were mainly negative screens, designed to avoid investments in the so-called "sin" sectors, i.e., companies whose businesses were related to alcohol, tobacco, gambling or weapons. Currently, these filters also address topics such as animal testing, violations of human rights, pornography, violations of labour rights, production of genetically modified organisms (GMOs) or products that are dangerous for the environment, among others.

Positive screens appeared afterwards, with the aim of selecting securities from companies with a commitment to responsible business practices. The most common positive screens used by SRI funds include issues such as corporate governance, environmental protection (e.g.: environmental policies and monitoring systems), labour relations, human rights protection (e.g.: measures to prevent and control human rights violations) or the responsible management of relations with customers (e.g.: product safety, transparent communication).

A special case of positive screening is the "best-in-class" approach, which consists of selecting leader companies on environmental or Corporate Social Responsibility (CSR) issues within each sector. The main objective of this strategy, which clearly benefits portfolio diversification, is to emphasise the behaviour of companies and not the products or services they provide, since only companies from the same sector face similar challenges.

In general, most SRI funds use a combination of the above mentioned screens. As Renneboog, Horst and Zhang (2008b) point out, US SRI funds use an average of 8 screens, while SRI funds in Continental Europe and in the UK employ an average of 7 and 10 screens, respectively.

Another interesting issue is that screening practices vary considerably in geographic terms. European SRI funds are more focused on positive screening, especially the "best-in-class" approach, though they also use negative screens, especially the UK-domiciled funds (EUROSIF, 2006). In fact, positive screens are considerably more popular in the UK and in the rest of Europe, where they are used by 87% and 92% of the funds, respectively, than in the US, where the same statistic reaches only 69% (Renneboog *et al.*, 2008b). So, the tendency in Europe is to reduce negative screening to a minimum (Louche and Lydenberg, 2006). On the other hand, US-based funds are mostly focused on negative screens, with tobacco being the most commonly applied one, followed by alcohol and gambling (SIF, 2005). In addition, European funds are much more focused on environmental issues than their American counterparts. This tendency is reflected by the strong growth of European funds focusing on themes such as climate change, water or renewable energies (EUROSIF, 2008).

More recently, and apart from using positive and negative screens, SRI investors are turning to other strategies, such as shareholder engagement policies, which consist of trying to influence companies to more responsible business practices through direct dialogue with the management (shareholder activism) or by using voting rights at General Meetings (Renneboog *et al.*, 2008a). However, due to cultural and regulatory reasons, this type of SRI practices focused on public engagement and filing shareholders' resolutions is used mainly in the US.

Another SRI strategy that has gained significant importance in the US is community investing, which focuses on promoting the economic and social development of underserved local communities by providing capital for small businesses or fundamental community services (e.g.: child care, social housing). However, as mentioned by Louche and Lydenberg (2006), community investment in Europe is not usually regarded as part of the same field as SRI.

1.2.3 Recent Trends: The Screening of Fixed-Income Securities

Initially, the concept of SRI was applied to equity selection only. However, although equities remain the preferred asset class worldwide, the proportion of portfolio managers applying SRI criteria to bonds has grown significantly over the last years.

According to the European Sustainable Investment Forum, investments in socially responsible bonds were already representing 39% of the total SRI assets under management by 2008, but equities remained the preferred asset class, representing 50% of the market (EUROSIF, 2008). However, by 2010, bonds have become the favoured asset class at the European level, with a weight of 53%, while equities have dropped to 33% (EUROSIF, 2010). These figures clearly illustrate the huge potential for SRI in the fixed-income area, especially in the Continental European markets, which are traditionally more oriented to fixed-income investments.

The shift from equity to corporate bonds seems quite logical and does not create many challenges for analysts. Since many of the social, environmental and ethical criteria applied to equities also represent material risks and opportunities in the context of bond investments, it is possible to apply both positive (including "best-in-class" approaches) and negative screens to corporate bonds (EIRIS, 2006).

On the other hand, screening publicly issued government bonds has required the development of new SRI methodologies, which are clearly less developed than for corporate bonds. When dealing with government debt, the SRI approach is more focused on sustainability and environmental criteria. The objective is to evaluate a country's performance in relation to these criteria and, then, compare it with other countries' performance or against international norms and conventions (EIRIS, 2006).

In this way, there is an increasing number of research agencies that provide the so-called country sustainability ratings. Country rankings are produced on the basis of a considerable number of environmental, social and governance indicators, collected from several international organisations (e.g.: United Nations, World Bank, World Health Organisation, UNICEF) and also non-governmental organisations (e.g.: Amnesty International), to give asset managers a tool for SRI involving publicly issued government bonds.[2] Some of these indicators include the use of death penalty, CO_2 emissions,

[2] Some examples of these research agencies include Vigeo, the leading Corporate Social Responsibility Ratings Agency in Europe, who provides country ratings for a universe of 160 countries based on 124 indicators, the UK-based agency Ethical Investment Research Services (EIRIS), who uses more than 40 indicators for about 70 countries, and the German firm Oekom Research.

international treaties that have been ratified (e.g.: Kyoto protocol), deforestation rates, spending on health and education, the use of child labour, the protection of civil rights, gender equality and the quality of governance (including corruption), among others.[3] Although these criteria can be applied to both emerging and developed economies, it is important to mention that the latter approach may be more about changing the weights of a bond portfolio, in order to go overweight or underweight on certain country's bonds, rather than avoiding it (EIRIS, 2006; Novethic, 2007).

1.3 Plan of Presentation

This research is organized into seven chapters. After a brief introduction (provided in Chapter 1), Chapter 2 presents the main characteristics as well as the evolution of the European SRI fund market, highlighting its most recent developments and identifying the factors that should contribute to further stimulate its growth in the future.

In Chapter 3 we review and discuss prior research on the field. We begin by reviewing the literature on the performance of both equity and fixed-income SRI funds, as well as on other important issues currently in debate in the SRI field. These include the market timing abilities of SRI fund managers, the performance persistence of SRI funds and the relationship between SRI fund performance and both fund flows and screening activities.

Our empirical analysis is structured into three chapters (Chapters 4 to 6), which represent three essays. Each of these chapters starts with an introduction, which includes a brief literature review, describing its main motivations and contributions. Then, we present the performance evaluation methodologies used, followed by the description of the data. Afterwards, we report and discuss our empirical results and, finally, present the main conclusions of each essay.

In Chapter 4 we investigate the performance, investment styles and market timing abilities of a sample of 55 internationally-oriented SRI equity funds, from eight European markets, in comparison with characteristics-matched portfolios of conventional funds. Performance is measured (and, subsequently, compared) using several models, including conditional multi-factor specifications, which allow for time-varying alphas and betas, and control for both home biases and spurious regression biases. In addition, we also analyse if

[3] More details are available at http://www.eiris.org/managers/ps_country_ratings.html and http://www.vigeo.com/csr-rating-agency/en/nos-produits-isr/gamme-obligataire/country-ratings.html, accessed in January 2009.

performance and investment styles are somewhat related to market states (i.e., recession and expansion periods). Furthermore, we investigate if SRI indices are as powerful as conventional indices in explaining SRI equity fund returns.

In Chapter 5 we focus our analysis in the French market, which is currently the most important European SRI fund market in terms of assets under management. We begin by comparing the performance and investment styles, as well as the selectivity and timing abilities (including both market timing and style timing), of a sample of 33 SRI funds with that of conventional funds with similar characteristics. As in the previous chapter, the relationship between market regimes and both fund performance and investment styles is also analysed. Then, we evaluate and compare the performance persistence of our samples of SRI and conventional funds, over both short and longer-term horizons, by means of contingency tables and also performance-ranked portfolio strategies.

In Chapter 6 we evaluate the performance of a sample of 38 European SRI fixed-income funds, domiciled in eight European markets, in comparison with characteristics-matched conventional funds. In addition, we also examine SRI fixed-income fund performance and investment styles during recession and expansion periods. Furthermore, we evaluate if SRI benchmarks (including equity and, especially, bond indices) are as powerful as conventional benchmarks in explaining SRI fixed-income fund returns.

Finally, in Chapter 7, we summarise the results of our three essays, point out their main limitations and present some suggestions for future research.

CHAPTER 2

THE EUROPEAN SOCIALLY RESPONSIBLE FUND MARKET

2.1 Introduction

In this chapter, we describe the origins as well as the evolution of the European SRI fund market, which is currently the second largest in the world, after the US, in terms of assets under management, but clearly the leading world market in terms of number of socially screened funds. Besides providing a description of the main characteristics of the European SRI fund market, highlighting its most recent developments, we also identify the factors that should contribute to further stimulate its growth in the future.

2.2 The European Socially Responsible Fund Market

Although SRI has ancient origins, it was only in the late 1960s and early 1970s that SRI funds started to arise. According to Kreander (2001), the first European SRI fund available to all investors was the Swedish fund "*Ansvar Aktiefond Sverige*", launched in 1965.

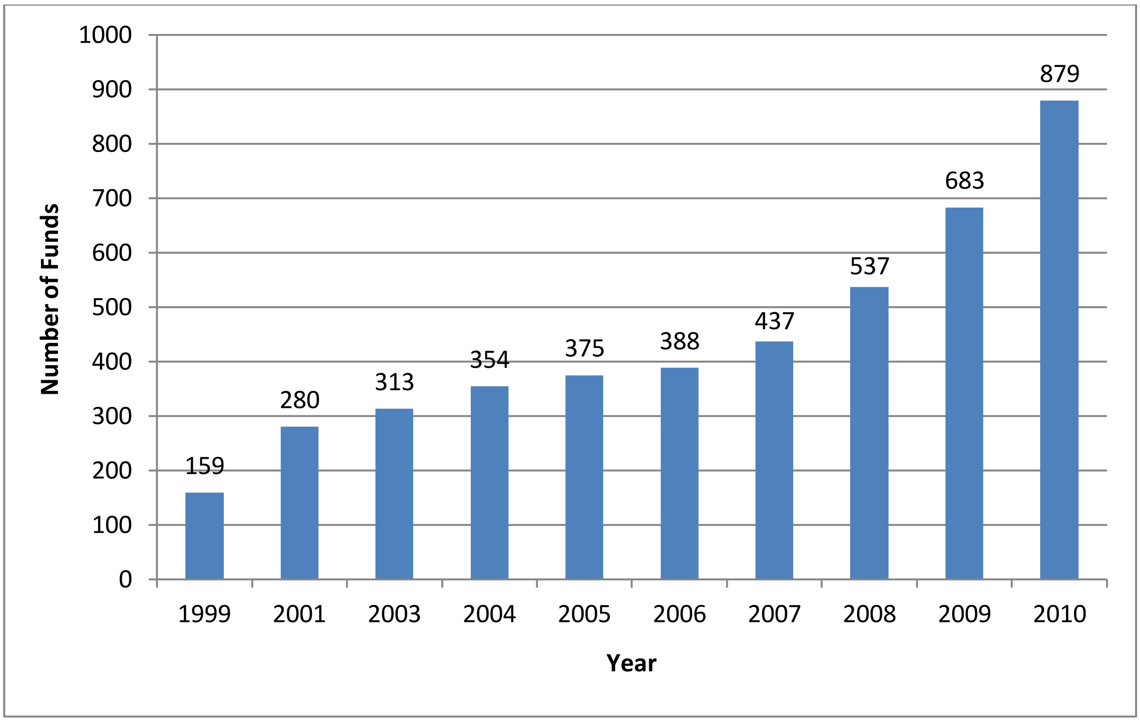
Until 1989, there were only 18 SRI funds in Europe and all were located in Scandinavian countries (more precisely, in Norway and Sweden) and in the UK. It was only in the 1990s that SRI funds became common in Europe, with the launch of the first French, German and Dutch funds in 1990, the first Swiss and Belgian funds in 1992 and the first Spanish and Finnish funds in 1999 (Kreander, 2001).

Since then, there has been a remarkable growth in the number of European SRI retail funds. As we can see in Figure 2.1, the number of European socially screened funds has been increasing gradually over the years, rising from 159 in December 1999 to 879 in June 2010.[4]

After a very significant increase of approximately 76% from 1999 to 2001, growth rates have remained relatively steady (around 9% per year, on average) until 2007. Afterwards, the number of European SRI funds started to increase at considerable higher rates again, reaching an average of 26% per year during the recent 3-year period of 2008 to 2010. These growth rates are particularly interesting because they coincide with periods of crisis in the financial markets, during which one might expect a certain reluctance of asset managers in launching new products.

[4] According to Vigeo (2010), all of these funds have to conform to three characteristics: (1) use ethical, social or environmental screening for stock and bond issuers' selection; (2) be available to the public (retail funds); (3) be marketed as socially responsible investment products.

Figure 2.1 – Number of European Socially Responsible Funds



Source: Vigeo (2010).
Notes: Due to data availability, figures for the years of 1999 and 2001 refer to the month of December; from 2003 to 2010, figures are related to the month of June. Annual statistics are only available from 2003.

An important contribution to the development of the European SRI fund industry was given by several regulatory initiatives from national European governments, especially over the last decade, which emphasise the importance of social, environmental and ethical issues on the investment policies of mutual funds.

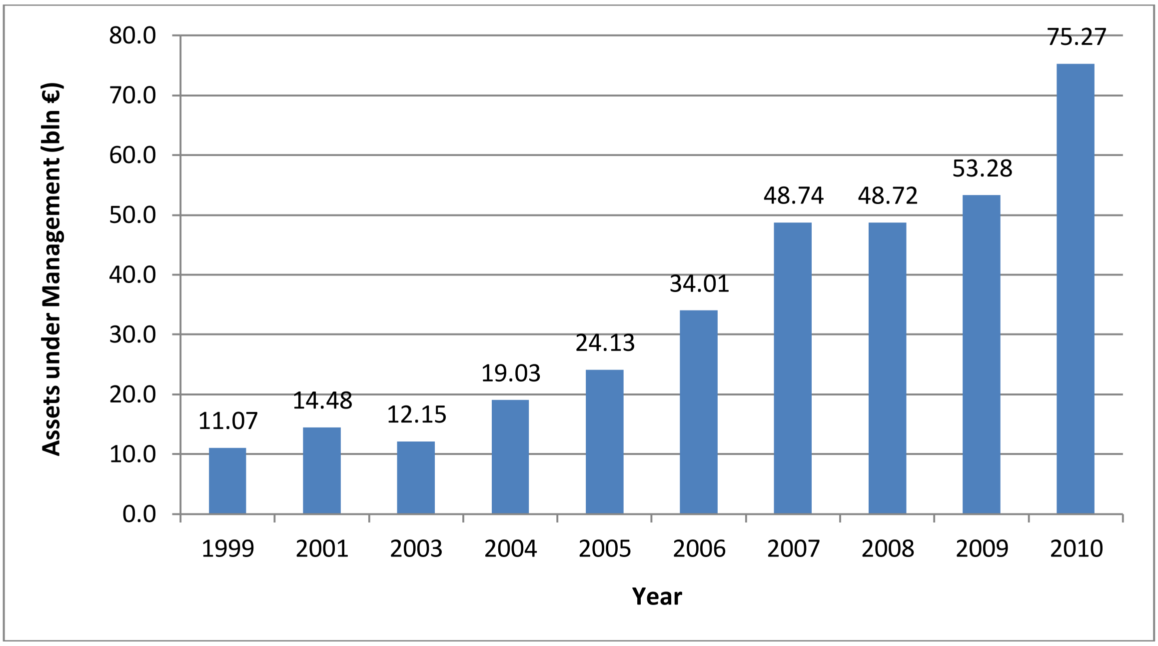
The UK was the first country to set up legislation (the UK Amendment to the 1995 Pensions Act, approved in 2000) that requires pension fund managers to reveal the extent to which social and ethical considerations are accounted for in their investment decisions. This type of initiative was followed by other European countries, namely Belgium, in 2001, Germany and Sweden, both in 2002, and Italy, in 2004. On the other hand, France was the first European country to make ethical reporting mandatory. As a matter of fact, since 2001, all listed companies have to publish information on their social, environmental and ethical initiatives in their annual reports (Renneboog *et al.*, 2008a). In 2008, Denmark has also adopted regulations about ESG reporting for companies (EUROSIF, 2010).

In comparison with the US, the increase in the number of SRI funds has been much higher in Europe. In fact, the number of SRI funds in the US has increased from 168 in

December 1999 to no more than 493 at the end of 2009 (SIF, 2010). Therefore, the European market is, since 2001, the leading market in the world in terms of number of socially screened funds, although the US market is still the first when considering the amount of assets under management.

The significant growth of European SRI funds can also be confirmed in terms of total assets under professional management. As we can see in Figure 2.2, from December 1999 to June 2010, assets under management rose an astonishing 580%, from €11.07 billion to €75.27 billion.

Figure 2.2 – Total Assets under Management of European Socially Responsible Funds



Source: Vigeo (2010).
Notes: Due to data availability, figures for the years of 1999 and 2001 refer to the month of December; from 2003 to 2010, figures are related to the month of June. Annual statistics are only available from 2003.

Over the years, this growth has been gradual, except for the periods of 2001 to 2003 and 2007 to 2008. In the former, the total amount of SRI assets dropped by 16%, as a consequence of bearish financial markets (Avanzi SRI Research, 2003). In the latter, assets under management remained practically unchanged, despite the financial crisis. From 2003 to 2007, the positive evolution of financial markets benefited SRI fund assets but, according to Vigeo (2007), a considerable part of the increase in assets is actually driven by new funds.

It is also noteworthy that from 2008 to 2009, despite very difficult times for financial markets, SRI assets under management grew more than 9%. This increase may be associated with the superior stability and safety that investors associate to SRI and that should be more clearly seen during market downturns. In fact, some empirical studies have provided evidence that stocks of socially responsible companies are a better investment during periods of crisis (e.g.: Jones, Jones and Little, 2000; Schnietz and Epstein, 2005). Another fact that may help to explain this increase, as well as the increase in the number of SRI funds over the same period, was the conversion of several conventional funds into SRI products (Vigeo, 2009). From 2009 to 2010, the growth rate in SRI assets under management reached more than 41%, reinforcing the sustained growth of the industry.

In terms of individual markets, the leading European SRI fund market was, for many years, the UK, both in terms of number of funds and assets under management. However, France and Belgium have recently surpassed the UK market and became the leading European markets.[5]

Figure 2.3 presents the number of SRI funds domiciled in several European markets over the period of June 2007 to June 2010. In this figure we can see that the number of SRI funds has increased in most European markets, but especially in the cases of France and Belgium. In France, the number of funds has increased 131%, from 93 in June 2007 to 215 by June 2010; in a similar but even more remarkable way, the number of Belgian SRI funds over the same period has grown 260%, from 63 to 227. By June 2010, Belgium became the leading European SRI fund market in terms of number of funds, a position that was previously occupied by the UK, until 2005, and France, from 2006 to 2009 (Avanzi SRI Research, 2006).[6]

The only exceptions to this growing trend in the number of SRI funds are Spain, where the number of funds has remained practically unchanged, and Italy, where there has been a significant decrease from 29 to 16 funds. According to Vigeo (2009, 2010), this decrease in the number of Italian SRI funds may be due to mergers between asset managers and a subsequent redefinition of the products offered.

Another interesting observation is that the number of SRI funds is becoming more concentrated in the major markets. Since 2007, the weight of the four major markets has increased every single year. Consequently, by June 2010, France, Belgium, Switzerland and the UK were already accounting for 72% of the total of European SRI funds.

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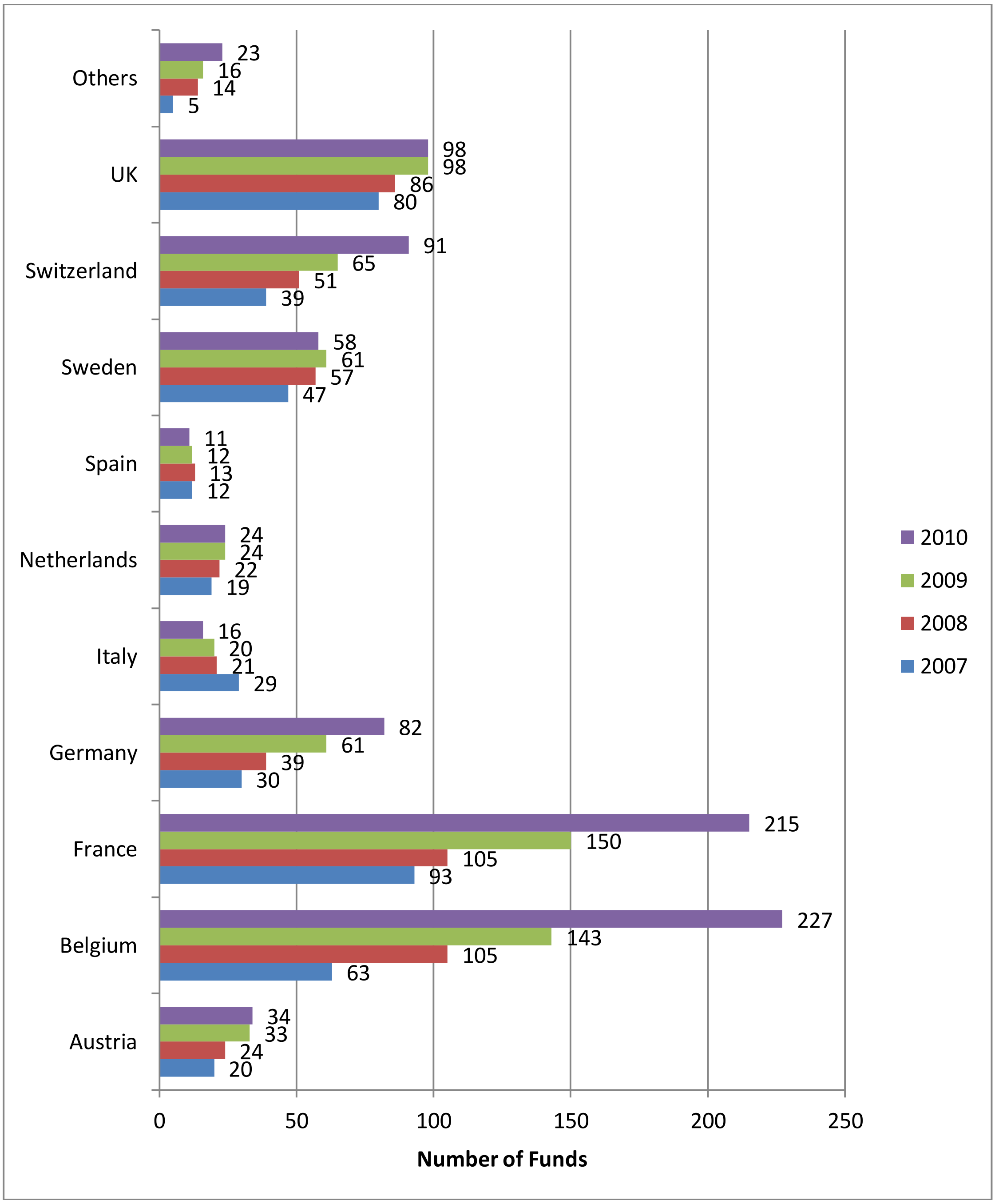
[5] According to Vigeo (2009, 2010), the allocation of funds to countries is made taking into account where the fund is domiciled. Luxembourg funds are usually allocated to the country where the parent company of the fund retailer is located. In fact, it should be noted that many European fund managers choose Luxembourg as domicile for their funds, because of more favorable tax laws. However, Luxembourg is mainly a distribution center, whose funds are sold across Europe, as mentioned by Khorana, Servaes and Tufano (2005).

[6] At the end of 2006, Avanzi SRI Research was integrated into Vigeo and redenominated Vigeo Italia.

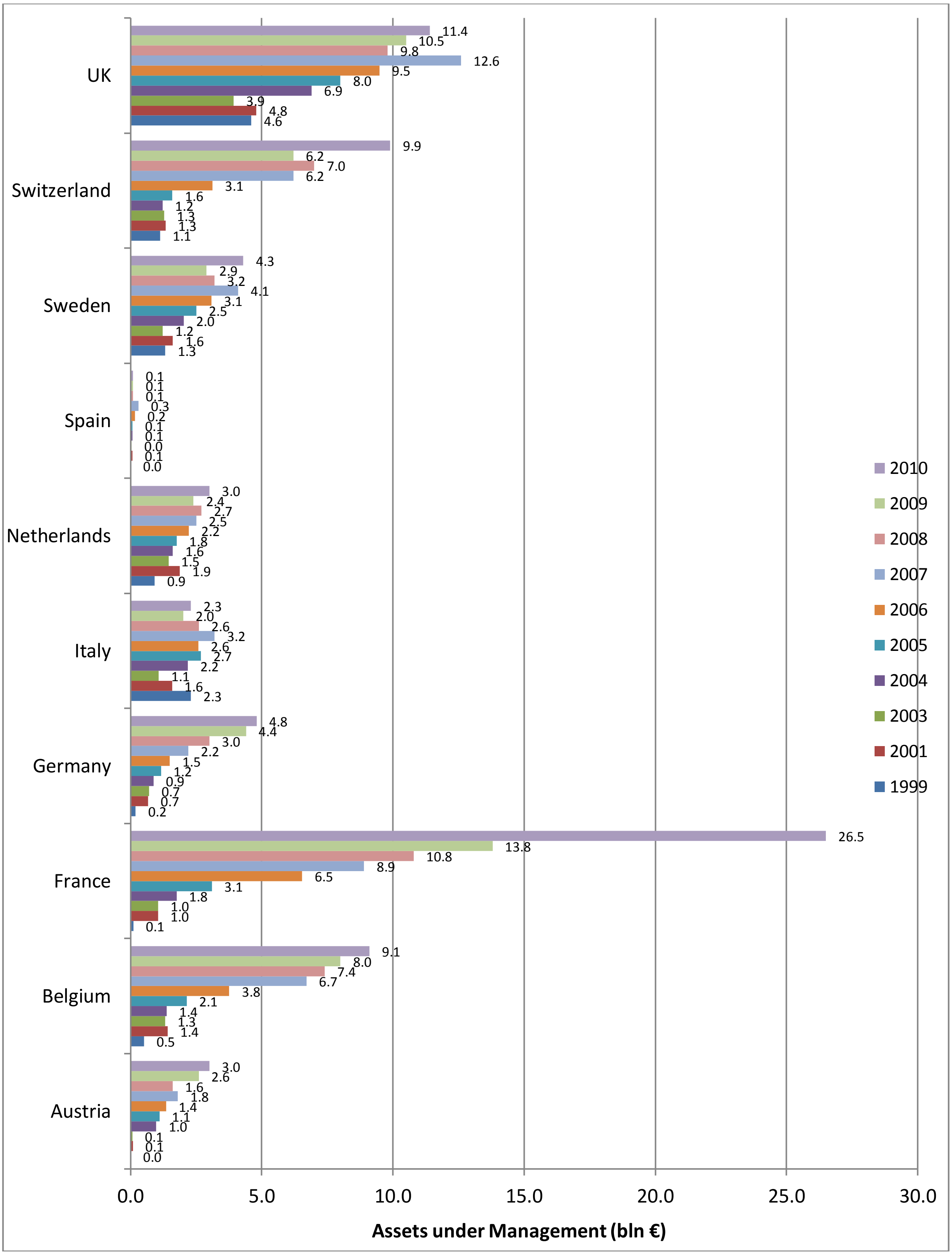
Figure 2.3 – Number of European Socially Responsible Funds per Country



Sources: Vigeo (2009; 2010).
Notes: "Others" include Denmark, Finland, Norway and Ireland. All figures are related to the month of June.

Figure 2.4 presents the amount of assets under management of European SRI funds over the period of December 1999 to June 2010. In this figure we can see a growing trend in most individual markets. The only exceptions are Italy and Spain, where assets remain at the same level over this 10 and a half year period.

Figure 2.4 – Total Assets under Management of European Socially Responsible Funds per Country



Sources: Avanzi SRI Research (2003, 2006), Vigeo (2010).
Notes: Due to data availability, figures for the years of 1999 and 2001 refer to the month of December; from 2003 to 2010, figures are related to the month of June. Annual statistics are only available from 2003.

From 1999 to 2007, we can observe that assets under management have grown in practically every European market, except for the year of 2003. In this bearish market, we observe decreases in SRI assets under management for most markets (the only exceptions were France and Germany, where the figures remained practically unchanged).

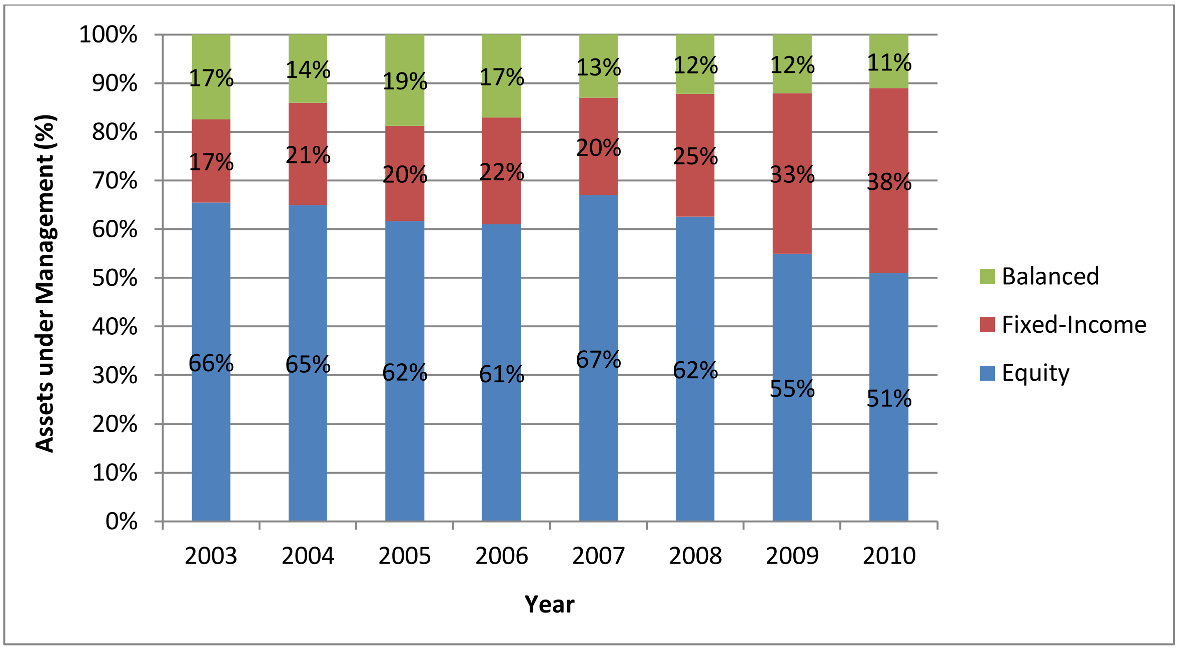
In the turbulent period of 2007 to 2008, we see a bit more evidence of heterogeneity among the several countries: SRI assets under management have decreased in Austria, Italy, Spain, Sweden and the UK, most probably as a consequence of the financial crisis, but have increased in Belgium, France, Germany, the Netherlands and Switzerland, whose SRI markets reacted better to the adverse conditions. In 2009, most SRI markets started to recover from the crisis, but assets under management have still decreased in Italy, the Netherlands, Sweden and Switzerland. From 2009 to 2010, with the exception of Spain, every market considered showed significant increases in assets under management, ranging from 9% in Germany and the UK to 92% in France. This may reflect a recovery of the SRI segment that is certainly (at least partially) linked with the behaviour of financial markets.

In terms of assets under management, the UK remained the most important European SRI fund market until 2007, but was then surpassed by France, which is now the leading European market. From December 1999 to June 2010, the weight of the UK market has decreased from 42% to 15%, while the weight of the French market has increased from 1% to 35%. Besides, it is also worth mentioning that, during the same period, the Belgian market has more than doubled its weight (from 5% to 12%). The rising importance of the French and Belgian SRI fund markets are clearly reflected in the substantial growth rates of their assets under management over the recent period of 2007 to 2010: 198% for France and 36% for Belgium. During the same time frame, the UK market has lost 10% of its assets under management, a fact that may be related to the higher exposure to equity investments, which have been more penalised by the financial crisis.

If we examine the concentration levels of the European SRI fund industry, we can see that they are relatively high, with the weight of the four major markets accounting for 66% to 84% of total assets under management. From December 1999 to June 2003, the weight of the four major markets has decreased from 84% to 66% and, during the following three years (2004 to 2006), remained practically unchanged. However, from 2006 to 2010, the European SRI fund industry has increased its concentration levels every year and, by June 2010, the four major markets (Belgium, France, Switzerland and the UK) accounted for 76% of European assets under management.

If we decompose European SRI assets by type of fund, as shown in Figure 2.5, it is interesting to see that, in contrast with conventional funds, equity and balanced funds account for the vast majority of SRI assets under management, with a relative weight that fluctuates between 83% by June 2003 and 62% by June 2010. Nevertheless, from 2007 to 2010, the relative weight of equity funds has decreased 16%, as a consequence of the financial crisis and the subsequent search for more conservative investment instruments, while the weight of fixed-income funds has grown from 20% to 38%. The weight of balanced funds has been decreasing gradually from 19% in 2005 to 11% in 2010.

Figure 2.5 – Total Assets under Management of European Socially Responsible Funds by Type of Fund



Sources: Avanzi SRI Research (2003, 2006), Vigeo (2010).
Note: All figures are related to the month of June.

It is also important to mention that the weights of SRI assets by fund typology change significantly among European countries, with equity funds being predominant in countries like Sweden, Switzerland and the UK, and fixed-income funds prevailing in Austria and France. In fact, by June 2010, the weight of SRI fixed-income funds was already very significant in some European markets, especially in Austria (76%), France (61%) and the Netherlands (41%). This indicates that the proportion of fund managers applying SRI criteria to fixed-income instruments has clearly increased over the last years. At the same point in time, there were already 126 European SRI fixed-income funds, although they still represented only 14% of the number of European SRI funds (Vigeo, 2010).

2.3 Conclusions

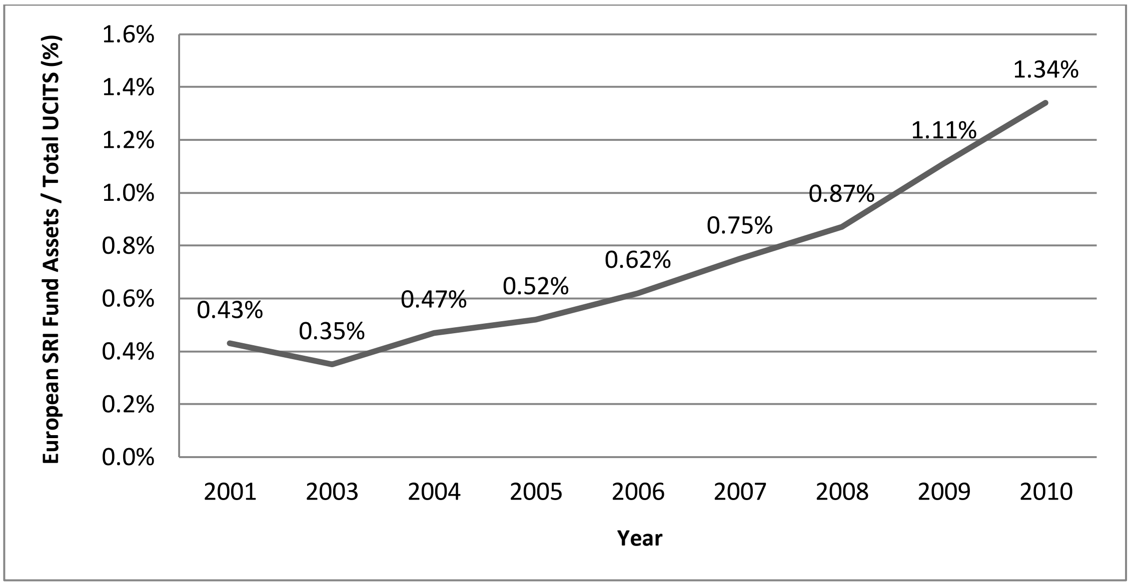
The European SRI fund market has grown considerably over the last years, both in number of funds and in assets under management, proving to be more dynamic than the overall industry and reflecting investors' increasing awareness of the underlying principles of SRI.

However, in spite of this remarkable growth, the SRI fund market covers only a fraction of the overall European fund market, estimated in 1.34% by June 2010. Nevertheless, if we compare the assets of SRI funds with the total assets of managed European funds, as shown in Figure 2.6, we can see that the weight of SRI funds in relation to the total UCITS[7] funds has been increasing consistently since 2003.

The reduction of the ratio between UCITS assets and SRI funds' assets from 2001 to 2003 was most likely related to the fact that the weight of equity and balanced funds in the SRI industry (83% of total assets) was considerably higher than that of the overall industry (45%), with the bearish tendency of equity markets penalizing the SRI segment more than the overall industry (Avanzi SRI Research, 2003). From 2003 to 2010, the weight of European SRI funds' assets has increased every single year, certainly influenced by the higher share of equity and balanced funds in the SRI segment compared to the overall industry, especially in the bull market period that preceded the recent financial market crisis. However, this was not the only factor accountable for this increase.

[7] Vigeo defines UCITS in the same way as the European Fund and Asset Management Association (EFAMA): publicly offered open-end funds that invest in transferable securities and money market funds. However, it should be mentioned that the data are not completely comparable since Vigeo also includes some life insurances and pension funds. Also, some of the countries considered in EFAMA statistics aren't considered by Vigeo, although their weights on total European assets under management are marginal.

Figure 2.6 – Relationship between European Socially Responsible Fund Assets and Total UCITS

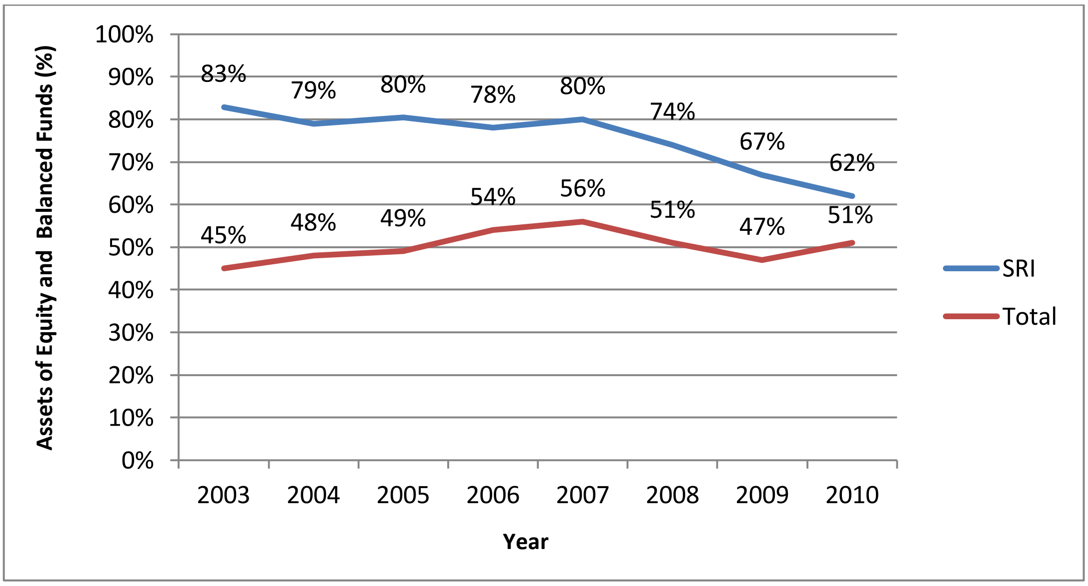


Sources: Vigeo (2009, 2010).
Notes: All figures are related to the month of June. Annual statistics are only available from 2003.

Figure 2.7 relates the proportion of equity and balanced funds of the total European UCITS assets with that of the SRI segment and confirms that, between 2003 and 2010, the percentage of equity and balanced funds in the SRI segment was always higher than that of the overall industry, although differences between the two decrease along the years (from 38% in June 2003 to just 11% in June 2010). So, even during the recent crisis, which has clearly penalised the equity market to a larger extent, the weight of SRI funds in relation to the total UCITS funds has continued to increase (0.12% from June 2007 to June 2008 and 0.24% from June 2008 to June 2009). This suggests that these increases might be driven by the creation of new SRI funds and/or the conversion of traditional funds into SRI products and not just due to the higher exposure of the SRI segment to equity investments.

Moreover, recent statistics show that in some European countries the percentage of SRI funds' assets in relation to conventional assets is substantially higher, especially in the cases of Belgium, Switzerland and the Netherlands, where they reach 9.9%, 4.3% and 3.8%, respectively (Vigeo, 2010). When we compare these figures with those of June 2001, and see that these same weights were of only 1.47% for Belgium and Switzerland and 1.45% for the Netherlands (Avanzi, 2002), we find additional evidence of the sustained growth of SRI in Europe over the last decade.

Figure 2.7 – Proportion of Equity and Balanced Funds on the Total European UCITS Assets and on the SRI Segment



Sources: Avanzi SRI Research (2003, 2006); FEFSI (2003, 2004), EFAMA (2005, 2006, 2007, 2008, 2009, 2010b), Vigeo (2010).
Note: All figures are related to the month of June.

In the near future, EUROSIF (2010) identifies several drivers for SRI demand that should contribute to further stimulate the growth of the European SRI market. First, an increased demand from institutional investors, following the success of the United Nations Principles for Responsible Investment (PRI) initiative (which already had 808 signatories by September 2010) and its active implementation by recent signatories. Second, an increased demand for SRI from retail investors, who are more and more interested in issues like global warming or the Kyoto protocol, which stimulate the creation of environmentally-themed funds. Third, the external pressure from NGO's and the media, in times where social and environmental disasters (e.g.: the BP Deep-water Horizon oil spill, in April 2010) are highly broadcasted and may function as "wake-up calls" for a lot of investors. Fourth, an increase in the number of regulatory initiatives by European governments, not only related to specific National SRI regulations to protect their pension systems, but also to the launch of ambitious programmes related to renewable energies.

In fact, despite the recent crisis in financial markets, the European SRI fund industry has continued to gain importance and recognition, proving that SRI is far more than a fashionable wave (Vigeo, 2009).

CHAPTER 3

LITERATURE REVIEW

3.1 Introduction

Research on the relationship between social and financial performance has been addressed in the literature in three different ways (Cortez, Silva and Areal, 2009): (1) comparing the financial performance of individual companies with high CSR scores with that of companies that are considered less socially responsible; (2) comparing the performance of socially responsible and traditional indices; (3) comparing the performance of SRI funds with conventional funds (or market indices).

The first area of research focuses on the relationship between social and financial performance at the individual firm level. According to the neo-classical view of Milton Friedman, this relationship should be a negative one, because the sole responsibility of a firm is to maximize profits. From this point of view, social concerns represent additional costs to its shareholders. Critics of this perspective support the stakeholder's theory, according to which good social performance improve a firms' public image and leads to a superior financial performance. Empirical studies on this issue have been conducted for more than four decades, but results are mixed. Nevertheless, recent review studies (e.g.: Orlitzky, Schmidt and Rynes, 2003; Margolis, Elfenbein and Walsh, 2009) argue that the relationship between social and financial performance tends to be a positive one.

The second area of research compares the performance of SRI and conventional market indices. Generally, most studies find that the performance of social and conventional indices is similar (e.g.: Statman, 2000, 2006; Schröder, 2007; Statman and Glushkov, 2009).

The third area of research focuses on comparing the performance of SRI and conventional mutual funds. In fact, the impact of social screens on fund performance has been widely debated in the academic literature. Two conflicting perspectives present different arguments to support under or over-performance of SRI funds in relation to their conventional peers.

On the one hand, critics of SRI argue that imposing additional constraints to the investment process not only generates further expenses, associated with monitoring social performance, but also reduces a funds' investment universe in a way that can limit the benefits of diversification. As Rudd (1981) pointed out, restrictions to the investment universe may generate inefficient diversification and raise the non-systematic risk of a portfolio. Therefore, SRI screens may not allow the construction of an optimal portfolio and lead to lower risk-adjusted returns of SRI funds in comparison to conventional funds. This view, labelled by Kurtz (1998) as the "Markowitz view", is consistent with the well-known expression of investors "paying a price for ethics". For example, a recent study by Hong and Kacperczyk (2009) shows that "sin" stocks (i.e., stocks from companies involved in producing alcohol or tobacco) have been significantly under-priced by the markets and, consequently, investment strategies that exclude these stocks should provide inferior risk-adjusted returns.

On the other hand, SRI supporters claim that firms who are engaged in CSR practices will end up having a superior economic performance over the long run, given that high levels of CSR reflect a better quality of management. According to this point of view, labelled by Kurtz (1998) as the "Moskowitz view", screening practices should allow fund managers to obtain a more complete view of a company's financial risks and help to identify companies with higher potential profits. For example, a study by Kempf and Osthoff (2007) shows that, even after taking into account transaction costs, a strategy of buying stocks with high socially responsible ratings and selling stocks with low socially responsible ratings may generate significant abnormal returns. As suggested by Moskowitz (1972), the expected returns of SRI stocks may be higher than the returns of conventional stocks because markets may not price social responsibility correctly. Consequently, SRI funds should outperform conventional funds in terms of risk-adjusted returns.

Besides these two conflicting perspectives, there is also a "no effect" hypothesis, which supports that SRI and conventional stocks provide similar expected returns. In line with this argument, Statman and Glushkov (2009) show that return advantages related to SRI portfolios, as a result of their tilt toward stocks of companies with high social responsibility ratings, can be largely offset by return disadvantages associated with the exclusion of stocks of companies with low social responsibility ratings (i.e., related with tobacco, alcohol, gambling, firearms, military and nuclear operations).

The vast majority of empirical studies on this subject have not found statistically significant differences between the performance of SRI and conventional mutual funds (e.g.: Gregory, Matatko and Luther, 1997; Statman, 2000; Bauer, Derwall and Otten, 2007). However, SRI and conventional funds do seem to have significant differences in terms of their investment styles and these differences tend to vary considerably between countries and fund categories.

Since the main subject of this research is the evaluation of the performance of European SRI mutual funds, this chapter begins with a review and discussion of the literature on equity and fixed-income SRI fund performance studies, including those that focus on the decomposition of overall performance into selectivity and market timing abilities. Subsequently, given that we also wa

nt to address the topic of performance persistence, we review the existing literature on this topic within the SRI context, as well as the fund flow-performance relationship. Finally, we discuss the impact of screening intensity, as well as the nature of screens used, on SRI fund performance.

3.2 The Performance of Socially Responsible Equity Funds

3.2.1 Empirical Evidence from the UK Market

The first assessment of SRI fund performance we are aware of was conducted by Luther, Matatko and Corner (1992). The authors investigated the performance of 15 UK SRI funds for several periods comprised between 1984 and 1990. Although they found little evidence of outperformance from SRI funds using Sharpe (1966) and Jensen's (1968) measures, their results were hard to interpret because significance levels were not reported. Additionally, they found that SRI funds were very exposed to small caps.

Luther and Matatko (1994) have also reported evidence of neutral performance (Jensen's alphas not statistically different from zero) for a sample of 9 UK SRI funds, during the period of 1985 to 1993. The small cap bias, first documented by Luther *et al.* (1992), was also observed by the authors, suggesting that screening processes may imply excluding larger companies.

Luther *et al.* (1992) and Luther and Matatko (1994) did not make any comparisons between SRI and conventional funds. The performance of their samples of SRI funds was measured against the FT All-Share index, the MSCI Perspective World index or against a small cap benchmark. However, separating the effects of size and screening on fund performance may be a difficult task. To control for size when evaluating performance, Mallin, Saadouni and Briston (1995) suggested the use of a methodology known as matched-pairs analysis, which consists of comparing the performance of SRI funds with that of a reference group of conventional funds with similar characteristics. The main advantage of such methodology is that it allows controlling for biases related to specific fund characteristics, such as age, size or investment policy.

Mallin *et al.* (1995) evaluated the performance of a sample of 29 SRI funds, over the period of January 1986 to December 1993, relative to a sample of 29 conventional funds matched on age / inception date and fund size at the beginning of the period, using the traditional portfolio performance evaluation measures of Treynor (1965), Sharpe (1966) and Jensen (1968). Their Jensen's alphas estimates suggested that UK ethical funds (weakly) outperformed conventional funds, with 4 ethical and 3 non-ethical funds having positive and statistically significant alphas at the 5% level and no fund presenting statistically significant negative performance.

Gregory *et al.* (1997), in turn, argued that the best way to address the small size effect was to consider a two-factor model to evaluate performance, including a size factor. Using a sample of 18 SRI funds and a matched-sample of 18 conventional funds matched according to fund type (general, growth or income), area of investment, age and size at the end of the formation year, the authors did not find any significant differences in the performance of both groups of funds. The superior performance of UK ethical funds found in previous studies disappeared, with all but one of their 1-factor alphas and all of their 2-factor alphas being not statistically different from zero, at the 5% level, over the period of January 1986 to December 1994. For the conventional funds, the results were similar: all but two of their 1-factor alphas and all but one of their 2-factor alphas were statistically insignificant. Once again, SRI funds showed a significant exposure to small caps. Additionally, Gregory *et al.* (1997) analysed (by means of cross-sectional regressions) possible variables that could influence a fund's performance and concluded that age was an important factor, while size was not significant.

More recently, Gregory and Whittaker (2007) assessed the performance and performance persistence of a sample of 32 UK SRI funds (including 12 international funds) from January 1989 to December 2002. Unlike previous studies on the UK market, which have used traditional performance evaluation measures, Gregory and Whittaker (2007) used a more robust multi-factor model, which accounted for size, book-to-market and momentum effects.[8] Additionally, they used a matched-pairs analysis in which each SRI fund was matched with a portfolio of 5 conventional funds, instead of a single one, according to age and investment category. The authors found no evidence of significant differences between the performance of SRI and conventional funds (on average, both presented alphas that were not statistically

[8] The authors have also used the Treynor and Mazuy (1966) test for market timing abilities and the partial conditional model of Ferson and Schadt (1996), but neither of these specifications changed their inferences.

different from zero) but did find significant differences in terms of investment styles, with SRI funds presenting a lower exposure to the High minus low (HML) factor and higher exposures to the Small minus big (SMB) and momentum factors. Furthermore, they found strong evidence of time-varying performance and also of significant home biases from UK international SRI funds.

3.2.2 Empirical Evidence from the US Market

The financial literature includes several studies on the performance of US SRI funds. The first we know of is the study of Hamilton, Jo and Statman (1993), who examined the performance of 32 SRI funds and 320 randomly selected conventional funds, during the period of January 1981 to December 1990. Using Jensen's (1968) measure, they found that the 17 SRI funds established before 1985 had higher average alphas than conventional funds (the difference was 0.08% per month), whereas the 15 SRI funds with a shorter history (i.e., established after 1985) had lower average alphas (the difference was 0.24% per month). However, differences in performance were not statistically significant.

Based on a cointegration analysis, Reyes and Grieb (1998) found that the temporal behaviour of 15 US SRI funds and their conventional peers was different, although these differences were not reflected on performance. In fact, they found no statistically significant differences in the Sharpe ratios of both fund groups over the period of January 1986 to December 1995.

Goldreyer, Ahmed and Diltz (1999) focused on the performance of a sample of 49 SRI funds, including 29 equity funds, in comparison with 180 randomly selected conventional funds. Most SRI funds in their sample, which was divided by portfolio size and systematic risk, had records for the period of September 1994 to June 1997, while the two oldest SRI funds covered the period of January 1981 to June 1997. Overall, their results were mixed: while Jensen's (1968) alphas and Sharpe (1966) ratios favoured conventional funds, Treynor (1965) ratios favoured SRI funds.

To the best of our knowledge, the first study to use the matched-pairs approach in the US market was conducted by Statman (2000). In this study, the performance of 31 SRI funds was compared to the performance of 62 conventional funds, over the period of May 1990 to September 1998, using a matched-pairs analysis in which each SRI fund was matched to the two conventional funds with closest asset sizes. The author concluded that there were no statistically significant differences between Jensen's alphas of SRI and conventional funds, although SRI fund returns were, on average, 0.2% per month higher. Statman (2000) also showed that using the Domini Social Index (DSI) as benchmark, instead of the S&P 500, did not produce any significant changes in the results.

Bello (2005) investigated the extent to which ethical screening affected not only overall performance but also the level of diversification of 42 US SRI equity funds, during the period of January 1994 to March 2001. His results showed that SRI funds did not differ significantly from a group of 84 conventional funds (randomly selected, but with similar net assets) in terms of the characteristics of assets held and the degree of portfolio diversification. In terms of investment performance, Bello (2005) found similar risk-adjusted returns and no statistically significant differences between Jensen's alphas of SRI and conventional funds, with both types of funds underperforming the benchmarks used (specifically, the DSI 400 and the S&P500 indices). However, he also found that, using the Sharpe (1966) ratio and the S&P500 as benchmark, conventional funds significantly underperformed SRI funds. Therefore, the results were sensitive to the performance measure and the benchmarks used.

Using a different approach, Geczy, Stambaugh and Levin (2005) constructed optimal portfolios of SRI and conventional funds for mean-variance investors, in order to evaluate the diversification cost of investing in SRI funds. Their investigation was conducted over the period of July 1963 to December 2001 and included 34 no-load SRI funds and 894 conventional funds. The results showed that the costs of imposing an SRI constraint, measured by the difference between the certainty-equivalent returns of both portfolios, can be substantial, since SRI funds presented, in certain conditions, significantly lower returns. In fact, Geczy *et al.* (2005) showed that the financial costs of SRI depend critically on investors' beliefs about the validity of asset pricing models and also of the stock-picking skills of fund managers. For an investor who believes in the CAPM and rules out selection skills, this cost was estimated in just a few basis points per month. For an investor who believes in multi-factor pricing models, such as the Fama and French (1993, 1996) 3-factor model or the Carhart (1997) 4-factor model, and still disallows selection skills, the cost was much higher, reaching at least 30 basis points per month. For investors whose beliefs allow significant stock-picking skills from fund managers, the cost was even higher, reaching more than 1500 basis points per month in some cases. Additionally, restricting the initial SRI fund sample to the 18 funds that avoided "sin" stocks generated an additional increase in the cost of the SRI constraint.

In a similar way to most prior studies, Geczy *et al.* (2005) have also compared the performance of SRI and conventional funds. Using a 4-factor Carhart (1997) model extended with seemingly unrelated assets, they found that SRI funds outperformed their conventional peers by 0.13% per month, but this difference was not statistically significant. Moreover, the exposures to size, book-to-market and momentum factors were similar for both portfolios, with evidence of significant small-cap biases and momentum strategies.

On the other hand, unlike most previous studies, which put emphasis on fund performance, Benson, Brailsford and Humphrey (2006) focused on the portfolio composition of US SRI and conventional funds. The authors found evidence that the two fund groups really had different portfolio compositions, i.e., SRI funds were not just "conventional funds in disguise", as suggested by Bauer, Otten and Rad (2006). More precisely, in the period of 1999 to 2002, SRI and conventional funds exhibited significantly different industry allocations (measured by betas) for the telecommunications and utilities industries, with SRI funds being more sensitive to returns in telecommunications than conventional funds, but less sensitive to returns in utilities. In the same period, the stock-picking skills (measured by alphas) of SRI and conventional funds was similar. Furthermore, the authors have also reported evidence of no statistically significant differences in the performance (measured by raw returns and Sharpe ratios across the period of 1994 to 2003) and fund fees (using data of 2003) of SRI and conventional funds.

3.2.3 Empirical Evidence from other Individual Markets

Besides the US and the UK, several studies have investigated the performance of SRI funds in other individual markets, such as the Dutch, the Australian, the Canadian, the Belgian and the French markets.

Scholtens (2005) evaluated the performance of 12 Dutch SRI funds (including 4 sector funds) listed on the Dutch stock exchange, over the period of November 2001 to April 2003, by means of a single-index model and the Carhart (1997) 4-factor model. He found that Dutch SRI funds outperformed conventional mutual funds with the same industrial or regional scope, but differences in performance were not statistically significant. The results of his multi-factor model allowed him to conclude that, consistent with previous findings, Dutch SRI funds were significantly biased towards small-caps. Additionally, Scholtens (2005) found that Dutch SRI funds were more exposed to value than to growth stocks. This result was attributed to the evaluation period, characterized by an expected economic recession and several corporate scandals. In addition, he found that SRI indices were, in most cases, at least as powerful as conventional indices in explaining SRI fund performance, a result that also contradicts most empirical studies.

Bauer *et al.* (2006) analysed the differences in performance and investment styles between 25 Australian SRI funds with different investment universes (15 domestic funds and 10 international funds) and 281 conventional funds, during the period of November 1992 to April 2003. Using a conditional multi-factor model with time-varying betas, their results showed that, on average, domestic SRI funds underperformed conventional funds by 1.56% per annum, while international SRI funds outperformed by 2.9% per annum. However, neither of these differences was statistically significant. Additionally, they also reported that their results were sensitive to the time period chosen, with domestic SRI funds underperforming significantly over the period of 1992-1996 but matching the performance of conventional funds in the 1996-2003 period. This evidence suggests that SRI funds underwent a catching up phase before delivering identical returns to those of their conventional peers, consistent with the results of Bauer, Koedijk and Otten (2005). Additionally, the authors found strong evidence of time-varying betas in all of their portfolios.

On the other hand, Bauer *et al.* (2006) observed significant differences between SRI and conventional funds in terms of investment styles. Australian domestic SRI funds were significantly more exposed to small caps and to value stocks than conventional funds, while for international funds no significant differences were found in their exposures to either size or book-to-market factors. Additionally, international SRI funds presented highly significant home biases in their portfolios. The authors have also documented that SRI funds were smaller in size and younger than conventional funds. In terms of management fees, an interesting finding of this paper was the fact that domestic SRI funds charged higher management fees than conventional funds, whereas for international SRI funds the reverse is true.

Unlike Cummings (2000), who reported no significant differences in the financial performance of 7 Australian SRI equity funds and three market indices (a large cap index, a small cap index and an industry index) over the period of 1986 to 1996, a more recent investigation by Jones, Laan, Frost and Loftus (2008) has yielded significantly different results for Australian SRI funds.

Using a large sample of 89 SRI funds and a more robust 4-factor performance evaluation model, instead of the single-factor CAPM used by Cummings (2000), Jones *et al.* (2008) found that SRI funds significantly underperformed the market by 0.88% per year, on average, over the period of January 1986 to May 2005. In the last 5 years of their sample period (2000 to 2005) this underperformance was even higher, reaching average values of 1.52% per year. Therefore, the authors concluded that investing in SRI funds seems to involve a financial penalty. However, the authors did not compare the performance of SRI with non-SRI funds, although it was mentioned that, since many conventional funds in Australia had only performed as well (or less) than market benchmarks, "… *the relative financial sacrifice of SRI investment in Australia may not be prohibitively high relative to the performance of conventional funds*" (Jones *et al.*, 2008, p. 194). Additionally, the authors have also reported evidence that variables like fund size, fund age, whether the fund was retail (as opposed to wholesale) and the degree of exposure to the local (Australian) market were all positively related with the excess returns of SRI funds.

Bauer *et al.* (2007) focused on the Canadian SRI fund market. They compared the performance of 8 SRI and 267 conventional mutual funds in Canada, during the period of January 1994 to January 2003, using several performance evaluation models (in particular, they used a single-factor CAPM, a Carhart (1997) 4-factor model, a 5-factor model that included an additional US equity index and also a partial conditional multi-factor model). According to their unconditional multi-factor models, both SRI and conventional funds underperformed the market significantly (with SRI funds presenting lower average alphas of approximately 0.3% per year), but there were no statistically significant performance differentials.

In addition, Bauer *et al.* (2007) documented two surprising results that may raise some doubts about the distinctive nature of SRI mutual funds: (1) in the context of the single-factor model, they found that an SRI index had a lower explaining power of SRI fund returns than a standard index; (2) for the whole sample period, none of the differences in factor loadings between SRI and conventional funds was significant, meaning that both types of funds exhibited practically equal sensitivities to the factors. The authors suggested that this last result could have been a consequence of using the "best-in-sector" approach. Nevertheless, they did find significant differences in factor loadings for the sub-period of January 1994 to December 2000, with SRI funds being significantly more value-oriented and with a significantly more positive loading on the momentum factor than their conventional peers. Furthermore, the use of a conditional multi-factor model provided strong evidence of time-varying betas, higher alpha estimates for both SRI and conventional funds and also a higher performance differential between the two (0.39% per year, on average), although differences remained statistically insignificant.

Liedekerke, Moor and Vanwalleghem (2007) studied the performance of Belgian SRI funds over the period of January 1995 to December 2005. Their database included 19 SRI funds with a European focus and 28 SRI funds with a world focus, while the conventional funds sample was composed by 562 funds with a European focus and 725 with a world focus.[9] Based on a partial conditional Carhart (1997) 4-factor model, Liedekerke *et al.* (2007) found that while SRI funds with a European focus underperformed conventional funds by an average of 1.59% per year, SRI funds with a world focus outperformed by 3.27% per year, on average. However, none of these differences was statistically significant.

Liedekerke *et al.* (2007) also found that SRI funds were less exposed to the overall market than conventional funds, with evidence of significantly lower betas for funds with a European focus. Both SRI and conventional funds showed evidence of time-varying betas. The fact that funds changed their risk exposures based on publicly available information supports the use of conditional performance evaluation models in SRI fund studies. In terms of investment styles, there were no significant differences in the exposures to the size, book-to-market and momentum factors between SRI and conventional funds in both fund categories. In fact, the only significant factor in the regressions was the SMB factor of the funds with a world focus, indicating a small-cap bias in both SRI and conventional fund portfolios. For the overall period, no tilts towards growth / value stocks or significant exposures to the momentum factor were observed. After splitting their sample period into two sub-periods, covering bull (January 1995 to December 2000) and bear (January 2001 to December 2005) market regimes, Liedekerke *et al.* (2007) did find significant differences in performance, but only for the SRI funds with a world focus and only during the bull period (alphas were significantly higher, although only at the 10% level, for the SRI funds by 7.87% per year, on average). Nevertheless, at the 5% level, the differences in the coefficients of the SMB, HML and Momentum (MOM) factors between SRI and conventional funds remained statistically insignificant in both sub-periods.

Le Sourd (2010) examined the performance of 62 SRI funds distributed in France,[10] during the six-year period of January 2002 to December 2007. The sample included funds

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[9] It should be mentioned that their source for identifying SRI funds was "Netwerk Vlaanderen", an independent non-governmental organization that follows the Belgian SRI market.
[10] It is worth to mention that this sample included equity funds distributed in France, whether they were registered in France, Belgium or Luxembourg.

investing in French (5 funds), Eurozone (25 funds), European (12 funds) and world (20 funds) equities. Although the author has also used Sharpe ratios and Jensen's (1968) alphas, according to the more robust Fama and French (1993, 1996) 3-factor model only the European funds presented statistically significant negative alphas. In all other categories, average alphas were not statistically different from zero. However, without any exceptions, SRI funds presented, on average, lower performance than their SRI benchmarks. In terms of investment style, this research has also documented a clear small-cap bias for SRI funds in France, but no biases towards growth or value stocks. Subsequently, Amenc and Le Sourd (2010) updated the work of Le Sourd (2010) by including the years of 2008 and 2009, but conclusions on performance remained unchanged, with French SRI funds presenting negative, but not statistically significant, alphas in most cases. Nevertheless, an interesting aspect of this update was that the authors found a considerable increase in the risk exposures of French SRI funds, which suggests these funds did not provide any protection from market downturns during the period of the recent financial crisis.

3.2.4 Comparative Studies of Several Markets

Kreander, Gray, Power and Sinclair (2002) evaluated the performance of a sample of 40 SRI equity funds from seven European countries (1 Belgian fund, 4 German funds, 2 Dutch funds, 2 Norwegian funds, 11 Swedish funds, 2 Swiss funds and 18 UK funds), including 20 equity funds with an international investment universe, over the three-year period of 1996 to 1998. Based on weekly data and traditional performance evaluation measures (Sharpe and Treynor ratios and Jensen's alphas) the authors found that the overall performance of SRI funds was essentially neutral, with only 2 funds presenting positive and significant alphas at the 5% level.

In a subsequent work, Kreander, Gray, Power and Sinclair (2005) tried to overcome some of the shortcomings of their previous work by examining a sample of 30 European SRI funds from four countries (17 UK funds, 7 Swedish funds, 4 German funds and 2 Dutch funds), including 16 international equity funds, over the seven-year period of January 1995 to December 2001. Unlike their previous study, in which no comparisons between the performance of SRI and non-SRI funds were made, they used a matched-pairs analysis in which each SRI fund was matched with one conventional fund according to the country of the management company, the investment universe of the fund, fund age and size at the middle of the sample period.[11] Overall, the authors found no significant differences in performance between ethical and non-ethical funds, with SRI funds performing as well as conventional funds according to the Treynor (1965) and Sharpe (1966) measures and somewhat better according to the Jensen (1968) measure. However, all international SRI funds performed better than their matched-pairs, no matter what performance measure was used, suggesting "*that international ethical funds are able to overcome constraints on performance by international diversification, while excluding sectors pose a more difficult challenge for domestic ethical fund performance*" (Kreander *et al*., 2005, p. 1486). The results also showed that management fees had significant (positive) explanatory power of SRI fund performance, while fund size did not seem to be related to performance.[12]

Schröder (2004) analysed the performance and investment style of 30 US and 16 German and Swiss SRI funds during the period of 1990 to 2002. While most US funds invested in their domestic market (only 4 invested world-wide), all German and Swiss funds invested internationally. The author used three performance evaluation models: an unconditional two-factor model that included a blue-chip index and a small-cap index, an unconditional two-factor version of the Treynor and Mazuy (1966) market timing model and a conditional version of this last model, which included two public information variables (a US long-term interest rate and a US term spread). Overall, the results showed that SRI funds did not significantly underperform their benchmarks. However, Schröder (2004) found significant differences in the investment styles of US and European SRI funds, with German and Swiss funds biased towards small-caps and US funds more focused on large-caps.

The research of Bauer *et al.* (2005) was considerably more robust. The authors used multi-factor and partial conditional performance evaluation models, as well as a matched-pairs approach in which each SRI fund was matched to a portfolio of three conventional funds according to fund age and size, to assess the performance of 103 US, UK and German SRI funds. Although their sample was mainly composed by domestic funds (70 in 103), it also included some 33 international SRI funds (more precisely, 16 German funds, 12 UK funds and 5 US funds). Their results showed no evidence of statistically significant differences in the risk-adjusted returns of SRI and conventional funds during the period of 1990 to 2001, either domestic or international (on average, differences range from 0.08% to 3.03% per

[11] However, they did not specify what was the decision rule for the latter two criteria.

[12] The results of Kreander *et al.* (2005) should, nevertheless, be interpreted with caution not only because only traditional performance evaluation measures and a two-index model incorporating a small cap index were used to measure overall performance, but also because the authors used the MSCI World index as benchmark for all funds in their sample, including the 14 domestic funds. The choice of this benchmark can be a significant source of biases.

annum in the context of the 1-factor model, and from 0.15% to 2.41% per annum for the 4-factor model). The authors also found evidence that, in relation to conventional funds, SRI funds seem to have smaller sizes and higher management fees.

In terms of investment style, Bauer *et al.* (2005) found that German and UK ethical funds were more exposed to small caps, whereas US funds were significantly more exposed to large caps. In addition, they reported evidence that SRI funds were more exposed to growth stocks than their conventional peers, although differences were only statistically significant for the UK funds, both domestic and international. Besides, this investigation has also showed statistically significant differences (with a negative sign for German funds and with a positive sign for US and UK funds) in the coefficients of the momentum factor for all portfolios of international funds in their sample. This evidence enhances the importance of using the Carhart (1997) 4-factor model in evaluating the performance of international SRI funds. Another interesting result was that SRI funds were more exposed to conventional indices than to socially responsible indices. Lastly, probably due to learning, they found that SRI funds underwent a catching up phase before being able to deliver financial returns similar to those of their conventional peers. In fact, after underperforming conventional funds significantly in the beginning of the 1990s, SRI funds matched the returns of conventional funds in the period of 1998 to 2001.

Renneboog *et al.* (2008b) examined the performance of 440 SRI equity funds from 17 countries around the world, including European (Belgium, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Norway, Sweden, Switzerland and the UK), North American (US and Canada) and Asia/Pacific (Australia, Japan, Malaysia and Singapore) markets, during the period of January 1991 to December 2003. Consistent with investors paying a price for ethics, the alphas from their Carhart (1997) 4-factor model showed that SRI funds significantly underperformed conventional funds by 4% to 7% per year in a group of Asia/Pacific and European markets (specifically, France and Ireland at the 10% level, Sweden at the 5% level, and Japan at the 1% level).[13] Additionally, since this significant underperformance could be due to management fees, the authors re-estimated their model after adding back management fees to the monthly fund returns and found that the significant underperformance holds.[14]

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13 In spite of this significant underperformance from SRI funds, SRI fund markets in these countries have presented considerable growth rates, in line with the argument that SRI investors may be willing to accept lower financial returns to satisfy their ethical convictions.

14 It is important to refer that fund performance was measured against domestic benchmarks and factors for all funds and a high proportion of these were internationally-oriented, especially in Continental Europe and in the UK. However, the authors reported that they have also used international indices as benchmarks and that their main results remained unchanged.

In terms of investment styles, which varied considerably across countries, several significant differences between SRI and conventional funds were observed. While German and UK SRI funds were significantly more exposed to small caps, US, Canadian, Japanese and Luxembourg SRI funds were significantly more exposed to large caps. Also, Norwegian, Canadian and Japanese SRI funds had significantly higher exposures to the HML factor than conventional funds. Australian SRI funds were significantly more exposed to the momentum factor than conventional funds, while Canadian and Malaysian SRI funds exhibited significantly lower exposures to this factor. In a 5-factor model that also included an "ethical" factor, proxied by a FTSE4GOOD index, Renneboog *et al.* (2008b) found that SRI funds had significantly higher exposures to this factor only in the cases of the Belgian, UK and US funds, meaning that the additional factor had only limited impact on the results.[15] After splitting their sample period into three sub-periods (1991-1995, 1996-1999 and 2000-2003), the authors found evidence of a learning effect associated to German and US SRI funds, consistent with Bauer *et al.* (2005), but no such effect for SRI funds of other countries. Another interesting finding was that fund size eroded the returns of the conventional funds, but there was no evidence of decreasing returns to scale for SRI funds. On the other hand, their results showed a significant negative relation between fund age and SRI fund performance.

Cortez *et al.* (2009) used conditional performance evaluation models to evaluate the performance of 61 SRI equity funds from seven European markets (Austria, Belgium, France, Germany, Italy, the Netherlands and the UK), during the period of August 1996 to February 2007. In general, they found that European SRI funds investing globally or at a European level have neutral performance, although results varied across countries and model specifications. However, even after controlling for time-varying betas, Austrian and Belgium Global funds presented significant negative underperformance. Besides, French funds with an European investment universe presented significant negative underperformance (at the 10% level) even after allowing for time-varying alphas and betas. Furthermore, as in Bauer *et al.* (2005), the authors have also found that SRI funds were more exposed to conventional indices than to SRI indices.

Cortez, Silva and Areal (*forthcoming*) analysed the performance of 7 US and 39 European SRI funds investing globally, over the period of August 1996 to August 2008, using conditional multi-factor models that controlled for home biases. The authors did not find

[15] In fact, the difference between the 4-factor and the 5-factor alphas was economically small, although it is worth to mention that differences in alphas remained statistically significant only for Ireland, Canada and Japan.

statistically significant differences between the performance of SRI funds and their benchmarks for most European markets. However, they found evidence of significant underperformance from US and Austrian funds. Consistent with the findings of their prior study, SRI funds were more exposed to conventional than to socially responsible indices.

In terms of investment styles, and consistent with most previous studies, Cortez *et al.* (*forthcoming*) found that SRI funds were more exposed to small caps and growth stocks. The authors note that this evidence uncovers some misclassification issues in Global SRI funds, since most funds in their sample were classified by Morningstar as "Global Large Cap Blend" funds. The results of this research support the use of conditional performance evaluation models, as there is evidence of time-varying betas (but not of time-varying alphas). Also, these results point to significant home biases associated to global SRI funds, in line with the findings of Bauer *et al.* (2006) and Gregory and Whittaker (2007), meaning that investors may not fully benefit from the increasing diversification provided by international investment universes.

3.3 Timing and Selectivity Abilities of Socially Responsible Fund Managers

The vast majority of the SRI fund performance literature puts emphasis on evaluating the overall performance of SRI funds. However, a fund manager's overall performance can be decomposed in security selection abilities (or selectivity) and market timing abilities. The literature on the performance of conventional mutual funds has for long recognised that estimates of alpha may be biased if managers are engaged in timing strategies (e.g.: Jensen, 1972; Dybvig and Ross, 1985; Grinblatt and Titman, 1989).[16] Nevertheless, investigating the selectivity and market timing abilities of SRI fund managers is still a largely unexplored research topic.

For the US market, Girard, Rahman and Stone (2007) focused on comparing the selectivity cost, the diversification cost and the market timing abilities of 116 SRI fund managers (including equity, bond and balanced funds), during the period of January 1984 to December 2003, against the appropriate Lipper's style benchmarks. The evaluation measures

[16] It is also important to mention that most empirical studies on the timing abilities of conventional mutual fund managers find evidence of neutral or significantly negative ("perverse") timing abilities (e.g.: Cumby and Glen, 1990; Fletcher, 1995; Romacho and Cortez, 2006; Byrne, Fletcher and Ntozi, 2006; Leite, Cortez and Armada, 2009). Besides, it is also common to find a negative correlation between timing and selectivity, especially in the context of unconditional models (e.g.: Henriksson, 1984; Coggin, Fabozzi and Rahman, 1993; Romacho and Cortez, 2006; Leite *et al.*, 2009).

used included Jensen’s (1968) alpha, Fama’s (1972) model, which relates selectivity, net selectivity and diversification, and the Treynor and Mazuy (1966) quadratic regression. Overall, they found evidence of poor selectivity, net selectivity and market timing abilities from SRI fund managers, with most selectivity and net selectivity estimates being negative and statistically significant and all timing coefficients being not statistically different from zero. Furthermore, the authors found some evidence of a lack of diversification of SRI funds, with diversification costs being positive and statistically significant for the longer-term spans (10-years and 5-years) used in their rolling regressions.

Girard *et al.* (2007) have also investigated the relationship between the performance of SRI funds and specific fund characteristics, such as age, size, proxy voting activism and social screening intensity. The results showed a significant positive relationship between diversification and age (meaning that older funds have higher diversification costs) and a significant negative relationship between net selectivity and age, suggesting that a positive learning effect does not seem to exist in SRI fund management. Additionally, their cross-sectional analysis showed no evidence of a relationship between performance and fund size or proxy voting activism. However, they did find a significant negative relationship between selectivity / net selectivity and the number of screens, meaning that the more screens SRI funds use or “*the more “goody-to-shoes” they are*” (Girard *et al.*, 2007, p. 106), the worse they perform in terms of security selection.

More recently, Ferruz, Muñoz and Vicente (2010) analysed the stock-picking and style timing abilities of 162 SRI and 7,927 conventional US funds investing in domestic equities, using conditional and multi-factor versions of the Treynor and Mazuy (1966) and the Henriksson and Merton (1981) models. Their results showed that, during the period of January 1994 to December 2007, both SRI and conventional fund managers did not exhibit any stock selection abilities or any abilities to time the market, size or book-to-market factors. However, they found that SRI fund managers were able to time the momentum factor, while conventional fund managers were not.

For the UK market, Gregory and Whittaker (2007) addressed the timing abilities of ethical and non-ethical funds by means of a multi-factor version of the Treynor and Mazuy (1966) model, which allowed an investigation of the timing abilities of fund managers not only with respect to the market, but also to the size, book-to-market and momentum factors. For their sub-sample of international funds, the authors did not find a single significant timing coefficient. However, for the domestic funds, the authors found that both SRI and conventional funds exhibited significantly negative market timing abilities over the period of

January 1989 to December 2002. In addition, they found no evidence of any timing abilities with respect to the size factor from both fund groups and to the momentum factor from the conventional funds. On the other hand, domestic SRI funds presented significant negative ability to time the momentum factor and both fund groups exhibited abilities to time the HML factor. Differences in the timing abilities between domestic SRI and conventional funds were not significant for the market, size and momentum factors, but SRI funds showed significantly superior ability than their peers to time the HML factor.

Ferruz, Muñoz and Vargas (2010) have studied the selectivity and timing abilities of UK pension fund managers over the period of August 2001 to December 2007. Their sample included 40 SRI pension funds and 733 conventional funds investing in global equities. The authors found that both SRI and conventional fund managers exhibited no selectivity abilities and significantly negative market timing abilities, even when conditional multi-factor versions of the Treynor and Mazuy (1966) and the Henriksson and Merton (1981) models (which also controlled for home biases) were used.

To the best of our knowledge, there are not even a handful of multi-country studies that address the timing abilities of SRI fund managers.

Based on the unconditional Treynor and Mazuy (1966) model,[17] Kreander *et al.* (2002) investigated the timing abilities of a sample of 40 SRI equity funds, from seven European countries (Belgium, Germany, the Netherlands, Norway, Sweden, Switzerland the UK). The authors found that none of the funds exhibited positive timing ability, although a considerable number of funds exhibited significant negative timing coefficients (more precisely, 37 of the 40 timing coefficients were negative and 15 of these statistically significant at the 5% level). Since in the context of the timing model most funds presented positive alphas (in particular, 38 in 40, although only 8 of these were significant at the 5% level), their results seem to indicate that any weaker performance of SRI funds was due to poor market timing abilities rather than poor stock selection. However, the authors did not make any comparisons between SRI and non-SRI funds and the short sample period of just three years (1996 to 1998) is clearly out-dated. Additionally, only unconditional market timing models were used and these might involve some kind of model misspecifications that result in "perverse" timing abilities.[18]

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17 Kreander *et al.* (2002) have also used the Henriksson and Merton (1981) model and obtained very similar results to the Treynor and Mazuy (1966) quadratic regression.

18 In fact, many studies that use unconditional versions of the Treynor and Mazuy (1966) or the Henriksson and Merton (1981) models provide evidence of "perverse" timing abilities from mutual fund managers (e.g.: Cumby and Glen, 1990; Fletcher, 1995; Ferson and Schadt, 1996; Sawicki and Ong, 2000). This implies that they have some timing ability but use it in the wrong way, increasing their market exposure when the market performs poorly and decreasing it when the market performs well. However, the use of conditional specifications seems to

Using a larger sample period (from January 1995 to December 2001), Kreander *et al.* (2005) compared the timing abilities of 30 European SRI funds from four countries (Germany, Sweden, the Netherlands and the UK), with that of a matched-sample of 30 conventional funds (one for each SRI). According to the unconditional Henriksson and Merton (1981) market timing model, there were no statistically significant differences in the timing abilities of ethical and non-ethical funds, with no fund displaying significant positive timing abilities but with 15 of the SRI funds (including 10 international funds) and 14 conventional funds (8 of which international funds) exhibiting significant negative timing abilities at the 5% level. Consistent with their previous findings (Kreander *et al.*, 2002), most funds presented positive alphas in the timing model (specifically 57, 31 of which significant at the 5% level), suggesting that weak performance seem to be a result of poor market timing rather than poor stock selection abilities.

Schröder (2004) used both unconditional and conditional two-factor versions of the Treynor and Mazuy (1966) model to assess the selectivity and timing abilities of 30 US and 16 German and Swiss SRI funds over the period of 1990 to 2002. According to the more robust conditional two-factor market timing model, 42 of the 46 alphas were negative, but only 8 of these (3 from German and Swiss funds and 5 from US funds) were significant at the 5% level, with all other selectivity coefficients being not statistically different from zero. Based on the same model, only 11 SRI fund managers displayed significant market timing abilities at the 5% level, with 7 negative timing coefficients (6 of these from German and Swiss funds) and 4 positive timing coefficients (3 of these from US funds).

Renneboog *et al.* (2008b) analysed the timing abilities of 440 SRI fund managers from 17 countries around the world over the period of January 1991 to December 2003. Based on a conditional version of the Treynor and Mazuy (1966) model, they did not find evidence of significant market timing abilities from SRI fund managers in the UK, US and Continental Europe, but Asia/Pacific fund managers presented significantly negative timing coefficients.

greatly reduce the number of significant negative timing coefficients, as shown by Ferson and Schadt (1996) and Sawicki and Ong (2000), among others.

3.4 The Performance of Socially Responsible Fixed-Income Funds

Considering the fact that the performance of conventional bond funds is way less explored than the performance of conventional equity funds,[19] it is not surprising that there are very few studies of SRI bond fund performance compared to SRI equity funds.

The first authors to address SRI from a fixed-income perspective were D'Antonio, Johnsen and Hutton (1997), although they did not investigate SRI fixed-income fund performance. These authors compared the returns of bonds from firms represented in the Domini 400 SRI index with the return of the Lehman Brothers Corporate Bond Index. Although they concluded that the SRI portfolio had a significantly higher performance than its benchmark, a possible justification for this result can be attributed to differences in bond ratings. In fact, while bonds that belonged to the conventional index were rated at least with an A, bonds in the SRI portfolio were mainly BBB rated.

To the best of our knowledge, Goldreyer *et al.* (1999) were the first to assess the performance of SRI fixed-income funds. The authors investigated the performance of a sample of 9 US SRI bond funds, during the period of January 1981 to June 1997, using the traditional performance evaluation measures of Treynor (1965), Sharpe (1966) and Jensen (1968). Although Treynor ratios favoured SRI funds, Jensen's alphas and Sharpe ratios clearly favoured conventional funds. In fact, the average alpha of the SRI funds was significantly negative (at the 5% level), whereas conventional funds exhibited significantly positive (at the 1% level) alphas. In this way, the results of Goldreyer *et al.* (1999) seem to indicate that US SRI fixed-income funds significantly underperformed conventional funds.

Also in the US market, Derwall and Koedijk (2009) investigated the performance of a sample of 24 SRI fixed-income funds (15 pure bond funds and 9 balanced funds), over the period of September 1987 to March 2003, using several unconditional multi-factor models that included benchmark asset returns and also macroeconomic variables, in the spirit of Elton *et al.* (1995). The performance of the SRI funds was compared to that of matched-portfolios of 5 conventional funds, according to fund age, end-of-period fund size and investment objective. Their results showed no significant differences between the performance of SRI

[19] It is also important to mention that the majority of empirical studies on the performance of conventional bond funds have been conducted in the US market (e.g.: Blake, Elton and Gruber, 1993; Elton, Gruber and Blake, 1995; Ferson, Henry and Kisgen, 2006; Chen, Ferson and Peters, 2010). Some of the few exceptions are Ayadi and Kryzanowski (2011), in the Canadian market, and Silva, Cortez and Armada (2003) and Dietze, Entrop and Wilkens (2009) in the European market. In general, these studies report evidence of underperformance or neutral performance from conventional bond funds (e.g.: Blake *et al.*, 1993; Elton *et al.*, 1995; Silva *et al.*, 2003; Ferson *et al.*, 2006; Dietze *et al.*, 2009). Nevertheless, recent studies by Chen *et al.* (2010) and Ayadi and Kryzanowski (2011) show that the performance of conventional bond funds seems to be significantly negative only on an after-expenses basis (i.e., using net returns), but significantly positive on a before-expenses basis (i.e., using gross returns).

bond funds and their conventional peers, but SRI balanced funds significantly outperformed their matched-portfolios by more than 1.3% per year, on average. In addition, when addressing the relationship between SRI fund alphas and fund-specific attributes, the authors found a significant negative relation between expense ratios and fixed-income fund performance, but no significant relationships (at the 5% level) between performance and fund size or turnover rates.

Outside the US market, we are not aware of any study on the performance of SRI bond funds. However, there are two European SRI studies that include balanced funds in their sample.

For the Spanish market and based on a multifactor regression model with style benchmarks, Fernandez-Izquierdo and Matallin-Saez (2008) found no significant differences between the performance of 13 SRI funds, including 9 funds classified as "mixed fixed-income",[20] and 2051 conventional funds over the 3-year period of June 1998 to June 2001.

Cortez *et al.* (2009) evaluated the performance of 27 SRI balanced funds from six European markets (Austria, Belgium, France, Germany, Italy and Netherlands), during the period of August 1996 to February 2007. Based on unconditional as well as both partial and full conditional single-factor models, they found that European SRI balanced funds exhibited neutral performance, both with SRI and conventional benchmarks. Similarly to the most commonly studied equity funds, the authors have also found that European SRI balanced funds were more exposed to conventional indices than to SRI indices.

3.5 Performance Persistence

The topic of performance persistence is one of the most interesting issues in the finance field. The main question is the following: Can past performance be used to predict future performance? In fact, the existence of performance persistence means that if a fund had a good (bad) performance in the past, it will tend to maintain that good (bad) performance in the future. Besides violating the efficient market hypothesis, evidence of persistence in performance also suggests that investors can obtain abnormal returns if they buy funds with past positive returns and sell funds with past negative returns.

[20] The remainder of their sample included 4 funds investing mainly in stocks (2 "variable income" funds, 1 "mixed variable income" fund and 1 "Global fund").

The performance persistence of conventional mutual funds has been well documented in the finance literature. However, empirical evidence is mixed. In some cases, conclusions differ depending on the time horizon used, with some studies documenting fund return predictability over short-term horizons (e.g.: Hendricks, Patel and Zeckhauser, 1993; Brown and Goetzmann, 1995; Bialkowski and Otten, 2011; Huij and Post, 2011) and others over longer term horizons (e.g.: Grinblatt and Titman, 1992; Elton, Gruber and Blake, 1996; Allen and Tan, 1999). In other cases, conclusions depend on the sample period under evaluation. For example, Malkiel (1995) found evidence of persistence in the US market during the 1970s but not during the 1980s, while Rhodes (2000) found that the performance persistence of UK unit trusts was substantially weaker in the 1990s than in the early 1980s. Additionally, while some studies found evidence of performance persistence only for the best performing funds (e.g.: Hendricks *et al.,* 1993; Elton *et al.,* 1996), most studies have found it essentially a phenomenon driven by the worst performing funds (e.g.: Brown, Goetzmann, Ibbotson and Ross, 1992; Gruber, 1996; Christopherson, Ferson and Glassman, 1998; Silva, Cortez and Armada, 2005; Huij and Derwall, 2008).

On the other hand, several studies (e.g.: Malkiel, 1995) argue that findings on performance persistence could be a result of data related problems, particularly survivorship bias. Brown *et al.* (1992) suggest that survivorship-biased samples can lead to the appearance of performance persistence when, in fact, there is none. In contrast, after empirically comparing their results for survivor-only samples and samples including all funds, Hendricks *et al.* (1993) and Carhart (1997) have both found weaker evidence of persistence in the former. In fact, Carpenter and Lynch (1999) showed that when survival depends on performance over several periods, survivorship bias can create reversal effects and lead to no evidence of persistence. In this way, while some authors suggest that survivorship bias creates an upward bias in measures of performance persistence, others point in the opposite direction.

Additionally, Carpenter and Lynch (1999) also found that even when samples include all non-surviving funds, the use of look-ahead biased methodologies (which require funds to survive for a minimum time period after the ranking period) or data sets with missing final returns could also affect inferences on persistence. Furthermore, Carhart (1997) showed that the persistence phenomenon could almost completely be explained by investment expenses (expense ratios) and by momentum strategies.

Studies on performance persistence use several different methodologies to assess persistence, such as cross-sectional regressions (e.g.: Grinblatt and Titman, 1992; Kahn and Rudd, 1995; Huij and Derwall, 2008), contingency tables (e.g.: Brown and Goetzmann, 1995;

Kahn and Rudd, 1995; Malkiel, 1995; Fletcher and Forbes, 2002; Huij and Derwall, 2008) or performance-ranked portfolios (e.g.: Elton *et al.*, 1996; Carhart, 1997; Blake and Timmermann, 1998; Fletcher and Forbes, 2002; Otten and Bams, 2002; Huij and Verbeek, 2007; Huij and Derwall, 2008; Bialkowski and Otten, 2011; Huij and Post, 2011).

Cross-sectional regressions involve regressing a future performance measure on a past performance measure. If a significant positive *t*-statistic for the slope coefficient is obtained, the null hypothesis that past performance is unrelated to future performance can be rejected, which is evidence of performance persistence. Contingency tables are a non-parametric methodology that consists of classifying funds into winners or losers in each of two consecutive time periods, according to whether they are above or below median performance, which can be measured in several ways (e.g.: raw returns, excess returns, alphas). Statistical evidence that winners or losers repeat means that there is evidence of performance persistence. Performance-ranked portfolio strategies involve ranking funds into portfolios (usually, quartiles, octiles or deciles) based on a prior (ranking) period return and then measuring their performance over the subsequent (evaluation) period. Afterwards, performance persistence is evaluated on the basis of the differences in performance of the top and bottom portfolios or by means of the Spearman rank correlation coefficient.

The only investigation we are aware of that addresses the performance persistence of SRI mutual funds is performed by Gregory and Whittaker (2007). The authors assessed the performance persistence of a sample of 32 UK SRI funds in comparison to that of a control group of 160 conventional funds, matched on age and investment category, over the period of January 1989 to December 2002. Persistence was assessed across several different ranking and evaluation periods (specifically, 1, 3, 6, 12 and 36 months) and by means of different methodologies, such as tests for differences in performance between top and bottom-ranked portfolios (with and without overlapping observations) and also contingency tables.

For their domestic fund samples, Gregory and Whittaker (2007) found evidence of significantly negative (at the 5% level) persistence at the 1-month horizon for the non-SRI control group, but no evidence of reversals in performance amongst SRI funds using both the Fama and French (1993, 1996) 3-factor model and the Carhart (1997) 4-factor model to rank and evaluate performance. On the other hand, at the 3-month horizon, no evidence of persistence was found for both fund categories. Using 6 and 12-month ranking and evaluation periods, the authors found significant positive persistence (at the 5% level) for conventional funds, but not for their SRI counterparts, while at the 36-month horizon both SRI and non-SRI funds exhibited significant positive persistence (at the 5% level) using both 3-factor and

4-factor models. For international funds, there was much less evidence of persistence. In fact, there were only two cases in which the authors found significant differences in the performance of the upper and lower quartile portfolios, with SRI funds showing evidence of reversals at the 1-month horizon and conventional funds presenting evidence of positive persistence at the 36-month horizon.

Overall, the results of Gregory and Whittaker (2007) support the existence of positive performance persistence at the 6, 12 and 36 month horizons, especially when using the test for differences in performance, and mainly for their domestic fund samples. Conclusions on the existence of persistence hold when funds are ranked and evaluated on the basis of the Fama and French 3-factor model (1993, 1996) or the Carhart (1997) 4-factor model, but not when absolute (excess) returns are used.[21] Thus, evidence of performance persistence seems to depend on the performance metric chosen. Additionally, and most importantly, the authors found significant differences between the persistence of SRI and conventional funds: the difference between funds with good past performance and bad past performance was higher for SRI funds than for conventional funds.[22]

3.6 The Fund Flow-Performance Relationship

Several studies in the finance literature (e.g.: Sirri and Tufano, 1998; Del Guercio and Tkac, 2002) have shown an asymmetric relationship between fund flows and performance for conventional mutual funds, which indicates that investors are more sensitive to a good past performance than to a bad past performance. However, this may not occur, at the same level, for SRI funds, since investors' motivations are different than those of conventional investors. Indeed, one might argue that socially responsible investors may care less about a fund's past performance in their investment decisions than conventional investors, because they also have to incorporate non-financial issues. Consequently, the fund flow-performance relationship is a very interesting research topic in the context of SRI mutual funds. Surprisingly, only very recently it started to receive attention in the literature.

[21] Using absolute (excess) returns to rank and evaluate performance leads to almost no evidence of persistence. The only exception is the domestic SRI funds, which exhibit significantly positive persistence (at the 1% level) at the 6-month horizon.

[22] At the 36-month horizon, differences in performance between upper and lower quartiles for the SRI funds were almost twice as high as that of conventional funds with the 3-factor model (0.396% per month vs. 0.196% per month, respectively). However, with the 4-factor model, these figures were much more identical (0.397% per month for the SRI funds and 0.307% per month for the conventional funds).

In an investigation of the fund flow-performance relationship and flow volatility for a sample of US socially screened funds, Bollen (2007) concluded that, in comparison with conventional funds, SRI funds exhibited lower flow volatility and that socially responsible investors were more responsive to lagged positive returns and less responsive to lagged negative returns than conventional investors. Bollen (2007) argued that this higher loyalty of socially responsible investors, first suggested by Geczy *et al.* (2005), may result from the fact that they have a multi-attribute utility function, which incorporates not only the conventional risk-return optimization but also a set of non-financial values. In this way, socially responsible investors may hold poorly performing funds because they benefit from a non-financial utility that is provided by those funds' social responsibility features.

Renneboog, Horst and Zhang (2011) analysed the money flows into and out of the SRI fund industry, based on a sample of 410 SRI equity funds, from 17 countries around the world. Consistent with Bollen (2007), they found significant differences between socially responsible and conventional investors over the period of 1992 to 2003, since the former seemed more sensitive to past positive returns and less sensitive to past negative returns than the latter. In addition, the authors reinforced the argument that socially responsible investors are more loyal than conventional investors by showing that the former seem to be less concerned about funds' risks and fees than the latter. Another interesting finding was that SRI funds receiving more money-inflows performed worse in the future, consistent with decreasing returns to scale in the industry. When investigating the existence of a smart money effect for SRI funds, the authors found mixed results, given that socially responsible investors were not able to select funds that would outperform in the future, but had some ability to select funds that would perform poorly.

Benson and Humphrey (2008) focused on assessing the relation between fund flows and returns for 148 US SRI funds in comparison to 5,190 conventional funds, over the period of January 1991 to September 2005. Consistent with prior studies, they found that SRI fund flows were less sensitive to past performance than conventional fund flows and also that socially responsible investors were less likely to switch funds than conventional investors. The fact that investors face increased difficulties in finding alternatives choices that match their social values might help explain these findings.

3.7 The Impact of Investment Screens on Socially Responsible Fund Performance

Another interesting research topic in the SRI mutual fund literature is the relationship between SRI fund performance and the type and intensity of investment screens applied. One of the first studies on this topic was Diltz (1995). Based on a universe of 159 US securities, the author compared the performance of portfolios of socially screened and unscreened stocks, over the period of 1989 to 1991, and found that only environmental and military screens produced statistically significant (positive) differences in performance, with all other screens having no significant impacts on performance.

Also on the US market, Goldreyer *et al.* (1999) found that US SRI funds using positive screens significantly outperformed those who did not, with differences in performance reaching average monthly values of 0.70%.

More recently, Barnett and Salomon (2006) analysed the relationship between screening activities and the financial performance of 61 US SRI funds, over the period of 1972 to 2000. They found a curvilinear relationship (U-shaped) between the number of screens used and financial performance, i.e., with the increase of screening intensity (including both positive and negative screens), returns first decline, but then begin to increase as the number of screens reaches a maximum. This means that the highest returns were obtained with low and high levels of social responsibility, while significantly lower returns were related to moderate levels of social responsibility. According to the authors, "*funds that use few screens gain the benefits of diversification, and those that filter stocks and limit their universe of investments do not handicap their portfolio as much as some contend. The real danger lies in not committing to one strategy or the other – in being "stuck in the middle"*." (Barnett and Salomon, 2006, p. 1119). The authors provided an interesting explanation for this relationship. At first, the use of a small number of screens results in the exclusion of a small number of companies and, therefore, does not affect performance to a great extent. When the number of screens increases, performance will be more affected, given that portfolios will be less diversified. However, when social screening intensifies, only better managed and more stable firms will remain in the portfolios, causing an improvement in performance.

In addition, Barnett and Salomon (2006) have also provided evidence that some types of social screens are linked to higher financial performance than others. In particular, they found that community relations screening had a positive impact on financial performance, while environmental and labour relations screening decreased financial performance. On the other hand, Renneboog *et al.* (2008b) found that screening intensity (measured by the number of screens applied) associated with social and corporate governance criteria had a negative impact on fund performance, whereas screening activities related with community involvement, as well as having an in-house SRI research team, had a positive impact on performance, in line with the argument that investment screens generate valuable information. Additionally, Girard *et al.* (2007) found that increases in the number of screens made SRI funds perform significantly worse in terms of security selection.[23]

Using a different approach, Kempf and Osthoff (2007) showed that a trading strategy of buying stocks with high socially responsible ratings and selling stocks with low socially responsible ratings could yield significantly high abnormal returns. Using ratings data provided by KLD Research Analytics, they showed that, during the period of 1992 to 2004, differences between the 4-factor alphas of the high-rated and the low-rated portfolios could reach a maximum of 8.7% per year, a value which was obtained when investors used the "best-in-class" approach and a combination of several investment screens. Additionally, their results remained significant even after taking into account transaction costs. Another interesting result of this study was that portfolios of stocks with high socially responsible ratings could significantly outperform portfolios with low socially responsible ratings but only if investors used the positive screening or the "best-in-class" approaches rather than using the negative screening approach.

Based on a sample of 61 US equity funds, Lee, Humphrey, Benson and Ahn (2010) showed that screening intensity does not seem to have an effect on the raw returns of SRI funds. However, when using the Carhart (1997) model, they found evidence of a reduction in performance of 70 basis points per screen. Regarding risk, the authors found that increases in screening intensity do not impact non-systematic risk but do appear to reduce funds' total risk (proxied by standard deviation), due to a negative relation between systematic risk and the number of screens. Furthermore, since this relation was curvilinear, they argued that SRI fund managers deliberately choose stocks with lower betas to reduce total risk but, as screening intensity increases, there are fewer stocks with lower betas available and this forces them to hold stocks with higher betas.

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[23] Furthermore, Renneboog *et al.* (2011) found that money-flows were also influenced by the types and intensity of SRI screens used, since funds that used a higher number of screens received higher money-inflows.

More recently, Humphrey and Lee (2011) have examined the impact of the number of screens on the performance and risk of a sample of 24 Australian SRI funds, over the period of January 1996 to December 2008. The authors found little evidence of a relationship between SRI fund performance and the number of positive or negative screens employed. In terms of fund risk, Humphrey and Lee (2011) showed that positive screens seem to significantly reduce funds' total and diversifiable risk, whereas negative screens significantly increase risk and reduce funds' abilities to build diversified portfolios. These results are in contrast with those obtained by Lee *et al.* (2010) for US SRI funds, probably as a consequence of the fewer number of stocks available in the Australian market when compared with the US market.

Using a sample of 116 French SRI funds, over the period of 2001 to 2007, Capelle-Blancard and Monjon (2011) showed that a higher screening intensity does seem to reduce the performance of SRI funds. However, the authors found that these results only hold for sector-specific screens and not for transversal screens, which do not necessarily lead to insufficient diversification. In this way, their results favour the use of a "best-in-class" approach, although they recognise that this strategy can increase the difficulty in distinguishing SRI from conventional funds.

3.8 Conclusions

In this chapter we have reviewed and discussed the literature on SRI fund performance, highlighting some of the main issues currently in debate. Overall, the majority of empirical studies conducted have shown no significant differences between the performance of SRI and conventional funds, although recent studies have found evidence of significant underperformance from SRI funds in some Asia/Pacific and European fund markets (e.g.: Jones *et al.*, 2008; Renneboog *et al.*, 2008b; Cortez *et al.*, 2009, *forthcoming*).

Along the years, the performance evaluation methodologies used in SRI fund studies have improved considerably. The first empirical studies on the performance of SRI mutual funds focused on small samples of funds, especially from the US or the UK markets, during short periods of time. Also, these studies relied mainly on traditional performance evaluation measures to compare the performance of SRI funds against a market index and performed no comparisons with conventional funds (e.g.: Luther *et al.*, 1992; Luther and Matatko, 1994).

Subsequent studies started to perform comparisons between the performance of SRI and conventional funds, either randomly selected (e.g.: Hamilton *et al.*, 1993; Goldreyer *et al.*, 1999; Bello, 2005) or matched according to several fund characteristics (e.g.: Mallin *et al.*, 1995; Gregory *et al.*, 1997; Statman, 2000; Kreander *et al.*, 2005), but remained based on the traditional measures of Treynor (1965), Sharpe (1966) and Jensen (1968). Therefore, the results of these studies should be interpreted with caution, given the well-known limitations of these methodologies.

More recently, the growing sophistication in the area of portfolio performance evaluation has been brought to the SRI field, with the appearance of studies that use conditional and/or multi-factor models. The importance of using such models is supported by findings that SRI fund risk and/or performance appears to be time-varying (e.g.: Bauer *et al.*, 2006; Bauer *et al.*, 2007; Gregory and Whittaker, 2007; Liedekerke *et al.*, 2007; Cortez *et al.*, 2009, *forthcoming*). Conclusions, therefore, may be sensitive to the model (unconditional or conditional) used. Additionally, without a multi-factor model we cannot distinguish between returns that are related with social screens from returns that are based on common investment styles that are not associated with social screening policies.

In fact, empirical studies show that SRI and conventional funds differ significantly in terms of their investment styles and, also, that there are geographical differences in the investment styles of SRI funds. The vast majority of empirical studies conducted so far show that SRI funds are more tilted towards small caps than their conventional peers (e.g.: Luther *et al.*, 1992; Luther and Matatko, 1994; Gregory *et al.*, 1997; Bauer *et al.*, 2006; Gregory and Whittaker, 2007), reflecting the fact that the social screening process may imply excluding larger companies. In addition, while some studies show that SRI funds are more exposed to growth stocks (e.g.: Bauer *et al.*, 2005; Gregory and Whittaker, 2007; Cortez *et al.*, *forthcoming*), others present evidence of higher exposures to value stocks (e.g.: Scholtens, 2005; Bauer *et al.*, 2006; Renneboog *et al.*, 2008b). Besides, exposures to the momentum factor seem to significantly differ from one market to another.

In terms of specific fund characteristics, there is evidence that, in relation to conventional funds, SRI funds seem to be younger (e.g.: Bauer *et al.*, 2006; Renneboog *et al.*, 2008b), smaller (e.g.: Bauer *et al.*, 2005; Geczy *et al.*, 2005; Bauer *et al.*, 2006; Renneboog *et al.*, 2008b) and charge higher management fees (e.g.: Bauer *et al.*, 2005; Geczy *et al.*, 2005; Bauer *et al.*, 2006). However, there is also evidence of international SRI funds charging lower management fees than their peers (e.g.: Bauer *et al.*, 2006). Furthermore, SRI funds around the world seem to vary considerably in size, with US and UK funds being much larger, on average, than funds from the Continental Europe and the Asia/Pacific regions (Renneboog *et al.*, 2008b).

Another common finding in the literature is related to the exposures of SRI funds to conventional and SRI benchmarks. In fact, many studies found that the returns of SRI funds were better explained by conventional than by SRI indices (e.g.: Bauer *et al.*, 2005; Bauer *et al.*, 2007; Cortez *et al.*, 2009, *forthcoming*). This finding is certainly puzzling because SRI indices are constructed using similar social screens than those used by SRI funds and, therefore, one might expect them to have a higher explaining power of SRI fund returns than conventional indices.

While most studies focus on overall performance, there are also a few studies that examine the selectivity and timing abilities of SRI fund managers. Most of these studies concluded that SRI funds exhibit significantly negative or neutral selectivity abilities (e.g.: Schröder, 2004; Girard *et al.*, 2007; Ferruz, Muñoz and Vicente, 2010), although a few studies have also found significantly positive alphas in the timing models (e.g.: Kreander *et al.*, 2005; Ferruz, Muñoz and Vargas, 2010). In terms of market timing, the vast majority of empirical studies showed no evidence of timing or even significantly negative ("perverse") timing abilities of SRI funds (e.g.: Kreander *et al.*, 2002, 2005; Girard *et al.*, 2007; Gregory and Whittaker, 2007; Renneboog *et al.*, 2008b; Ferruz, Muñoz and Vargas, 2010). When compared with conventional funds, SRI funds do seem to exhibit some significant differences in terms of their selectivity and timing abilities (e.g.: Gregory and Whittaker, 2007; Ferruz, Muñoz and Vicente, 2010).

The only study we are aware of that addresses performance persistence of SRI funds (Gregory and Whittaker, 2007) has shown significant differences between the persistence of UK SRI and conventional funds. In fact, differences between funds with good past performance and bad past performance were considerably higher for the SRI funds than for their conventional peers.

While the vast majority of the empirical studies conducted focus on equity funds, there are also a few studies on SRI fixed-income funds. Overall, empirical evidence is mixed. For the US market, while Goldreyer *et al.* (1999) found some evidence that US SRI fixed-income funds significantly underperform conventional funds, Derwall and Koedijk (2009) found no significant differences between the performance of SRI bond funds and their conventional peers and significant outperformance from SRI balanced funds. In the European markets, the performance evaluation of SRI bond funds is still an unexplored research topic. There is evidence that SRI balanced funds seem to present neutral performance (Cortez *et al.*, 2009), this way not performing significantly different than conventional funds (Fernandez-Izquierdo and Matallin-Saez, 2008).

Studies on the fund flow-performance relationship showed that, in comparison with conventional funds, SRI funds exhibited lower flow volatility and that SRI investors were more loyal than conventional investors, in the sense that they were less sensitive to lagged negative returns (e.g.: Bollen, 2007; Benson and Humphrey, 2008; Renneboog *et al.*, 2011). These findings are in line with the argument that socially responsible investors have a multi-attribute utility function, which incorporates non-financial values besides risk-return optimization.

Finally, in terms of the relationship between investment screens and SRI fund performance, studies usually show that a higher screening intensity reduces the performance of SRI funds (e.g.: Lee *et al.*, 2010; Capelle-Blancard and Monjon, 2011), reflecting a curvilinear (U-shaped) relation (Barnett and Salomon, 2006). In addition, while screens associated with environmental and labour relations (e.g.: Barnett and Salomon, 2006), as well as social and corporate governance issues (e.g.: Renneboog *et al.*, 2008b), seem to decrease financial performance, screens associated with community relations seem to have a positive impact on financial performance (e.g.: Barnett and Salomon, 2006; Renneboog *et al.*, 2008b). Furthermore, there is also evidence that socially-screened portfolios can achieve higher performance by using positive screens or the “best-in-class” approach instead of using negative screening (e.g.: Goldreyer *et al.*, 1999; Kempf and Osthoff, 2007).

CHAPTER 4

AN EXPLORATION OF THE PERFORMANCE, INVESTMENT STYLES AND TIMING ABILITIES OF INTERNATIONAL SOCIALLY RESPONSIBLE FUNDS

4.1 Introduction

Following the development of SRI fund markets around the world, the financial literature on SRI fund performance has grown substantially over the last decade. Most empirical studies conducted so far, covering many worldwide markets, have not found statistically significant differences between the performance of SRI and conventional funds.[24] In this way, the inclusion of ethical restrictions into a funds' investment policy does not seem to generate inferior performance. Nevertheless, recent studies have documented that the costs of imposing SRI constraints can be substantial and lead to significantly lower returns (e.g.: Geczy *et al.*, 2005). In line with this argument, some of the latest empirical studies on this area found evidence of significant underperformance of SRI funds in some Asia/Pacific and European fund markets (e.g.: Jones *et al.*, 2008; Renneboog *et al.*, 2008b; Cortez *et al.*, 2009, *forthcoming*).[25] Therefore, the question of whether it is possible to satisfy social concerns without sacrificing financial performance or, as Hamilton *et al.* (1993, p. 64) put it, "*doing well while doing good*", remains a debatable issue and justifies further research, especially in the European SRI fund markets.

In addition, since most studies are focused on funds that invest in their domestic markets, the performance of internationally-oriented SRI funds is a far less explored research topic, but undoubtedly a very interesting one. In fact, one the main arguments that is used in favour of SRI underperformance is related to their restricted investment universe. In this context, as Cortez *et al.* (*forthcoming*) point out, international diversification may help SRI funds to achieve additional diversification benefits that can be reflected on their performance.[26] However, with the exception of Cortez *et al.* (2009, *forthcoming*), previous multi-country studies that investigate the performance of international SRI funds include them as a part of a broader sample that also incorporates domestic funds (e.g.: Schröder, 2004; Bauer *et al.*, 2005) or have samples that are almost evenly distributed between domestic and international funds (Kreander *et al.*, 2002, 2005; Renneboog *et al.*, 2008b). In addition, these studies present some pertinent limitations, mainly related to their sample periods, the sample

[24] See, for example, Gregory *et al.* (1997) and Gregory and Whittaker (2007) for the UK market, Hamilton *et al.* (1993) and Statman (2000) for the US market, Bauer *et al.* (2007) for the Canadian market, Bauer *et al.* (2006) for the Australian market, Scholtens (2005) for the Dutch market and Liedekerke, *et al.* (2007) for the Belgian market.

[25] These include Australia (Jones *et al.*, 2008), Japan (Renneboog *et al.*, 2008b), Austria (Cortez *et al.*, *forthcoming*), France (Renneboog *et al.*, 2008b; Cortez *et al.*, 2009), Ireland (Renneboog *et al.*, 2008b) and Sweden (Renneboog *et al.*, 2008b).

[26] In line with this argument, Kreander *et al.* (2005) found that all international funds in their sample performed better than their matched-pairs under all performance measures used, whereas results for the domestic funds were mixed.

composition, the diversity of European markets considered and the performance evaluation methods and measures used.

In fact, the studies of Kreander *et al.* (2002, 2005) suffer from the well-known limitations of traditional performance evaluation measures, besides considering relatively short sample periods. In turn, both Schröder (2004) and Bauer *et al.* (2005) focused only on two European markets (Germany and Switzerland and Germany and the UK, respectively). Since all of these four studies have rather out-dated sample periods, ending around 2000, they do not allow an assessment of the evolution of the SRI fund industry in the last decade.

On the other hand, Cortez *et al.* (2009) use a conditional model that allows for time-varying risk and performance, but does not control for size, book-to-market or momentum effects. Moreover, the sample used in Cortez *et al.* (*forthcoming*) is only composed of global SRI funds and does not explore the performance of SRI funds investing at a European level, which represent a very significant proportion of the internationally-oriented SRI funds in Europe. Additionally, Bauer *et al.* (2005) and Renneboog *et al.* (2008b) allowed for time-varying betas in their conditional models but disregarded the possibility that performance itself could be time-varying. In fact, and according to Ferson, Sarkissian and Simin (2008), if the conditional model is estimated without the time-varying alpha term, conditional betas may be biased.[27] Furthermore, the studies of Kreander *et al.* (2002, 2005), Schröder (2004), Bauer *et al.* (2005), Renneboog *et al.* (2008b) and Cortez *et al.* (2009) did not control for home biases in portfolio composition, a well-known issue in studies involving internationally-oriented funds.

Moreover, Schröder (2004) and Cortez *et al.* (2009, *forthcoming*) evaluate the performance of SRI funds in relation to market indices, but do not make any comparisons between SRI and conventional funds. In fact, besides methodological sophistication, a critical issue when assessing the performance of SRI funds relative to conventional funds is the construction of an appropriate control group of conventional mutual funds. However, from all of the above mentioned studies, only Bauer *et al.* (2005) and Kreander *et al.* (2005) compare the performance of SRI funds with that of characteristics-matched conventional funds.

In sum, we are not aware of a single multi-country study, focused on international SRI funds, which uses conditional multi-factor performance evaluation models and, simultaneously, investigates the performance of SRI funds compared to a characteristics-

[27] As Ferson *et al.* (2008) point out, "*if one is interested in obtaining good estimates of conditional betas, then in the presence of data mining and persistent lagged instruments, the time-varying alpha term should be included in the regression*" (Ferson *et al.*, 2008, p. 344).

matched sample of conventional funds. This is the one of the main motivations of this chapter.

Another important incentive for our investigation, which results from previous empirical findings, is the fact that the investment styles of SRI and conventional funds have been shown not only to be significantly different, but also to vary geographically. In fact, most empirical studies show that SRI funds are significantly more exposed to small caps than conventional funds (e.g.: Luther *et al.*, 1992; Luther and Matatko, 1994; Gregory *et al.*, 1997; Bauer *et al.*, 2006; Gregory and Whittaker, 2007), whereas significant large cap biases from SRI funds are scarce and almost restricted to the US market (e.g.: Schröder, 2004; Bauer *et al.*, 2005; Renneboog *et al.*, 2008b).[28] Moreover, while some studies show that SRI funds are more growth-oriented (e.g.: Bauer *et al.*, 2005; Gregory and Whittaker, 2007; Cortez *et al.*, *forthcoming*),[29] others report higher exposures from SRI funds to value stocks (e.g.: Scholtens, 2005; Bauer *et al.*, 2006; Renneboog *et al.*, 2008b).

Besides, we also analyse if performance and investment styles vary across different market states, i.e., recession and expansion periods. The issue of whether SRI funds offer some protection to investors in times of crisis is a pertinent one. Areal, Cortez and Silva (2011) highlight this debate: SRI funds might invest in firms with higher reputation, which are less sensitive to price declines that occur during recessions. Surprisingly, with exception of Areal *et al.* (2011), who focus on the US market, this issue has not yet been explored.

In addition, the decomposition of funds' overall performance into selectivity and market timing abilities is still a largely unexplored research topic in the SRI context, but undoubtedly a very interesting one. In fact, in theory, there are arguments to support that SRI fund managers should have either higher or lower selectivity abilities than conventional fund managers. On the one hand, since a SRI fund manager has a restricted investment universe, he/she should have a superior knowledge of firms in which he can invest and, consequently, present better selectivity abilities. Although the process of screening generates additional costs,[30] which could result in lower risk-adjusted returns for SRI funds compared to conventional funds, screening activities can also generate valuable information that otherwise would not be available, this way helping fund managers in their search for undervalued

[28] In fact, the only study we are aware of that has reported significantly higher exposures to large caps from SRI funds, in comparison with conventional funds, outside the US market, is Renneboog *et al.* (2008b), which have found similar evidence for Canadian, Japanese and Luxembourg funds.

[29] A reason that may explain this bias towards growth stocks may be the fact that traditional value stocks, belonging to the chemical or energy sectors, are usually stocks that present higher environmental risks and, as a result, are more likely to be excluded from SRI funds. Consistent with this explanation, Statman (2006) concluded that SRI indices have superior exposures to the information technology and telecommunications sectors, while conventional indices have superior exposures to energy and industrial stocks. Benson *et al.* (2006) have also reported higher exposures of US SRI funds to telecommunication stocks than to utilities.

[30] However, it should be mentioned that SRI screens can also reduce the costs that arise from environmental disasters or social crises.

securities. These arguments are in line with empirical evidence that shows that social and environmental performance tends to be positively related to financial performance (e.g.: Orlitzky *et al.*, 2003; Margolis *et al.*, 2009). On the other hand, one of the consequences of having a restricted investment universe is that undervalued securities ought to have less importance in absolute terms. In other words, an SRI fund manager cannot select undervalued stocks that do not fit into his/her social investment criteria.

In terms of market timing, we can also find theoretical arguments in favour of better or worse timing abilities of SRI fund managers relative to their conventional peers. The above mentioned superior knowledge of firms in the investment universe should allow SRI fund managers to be better skilled at timing cash allocation than conventional fund managers. However, given that SRI funds have generally lower cost structures and investors can convert their positions into cash frequently, this may possibly lead to cash overhang and a lack of market timing abilities (Girard *et al.*, 2007). Besides, if SRI funds have a more long-term perspective than their conventional peers, they may exhibit poorer market timing. Furthermore, SRI funds buy and sell securities for non-financial reasons and this may also limit their potential in terms of timing abilities.

Although recent studies have introduced non-parametric methods (e.g.: Jiang, 2003) and tests based on portfolio holdings data (e.g.: Jiang, Yao and Yu, 2007), the most widely used market-timing models in the financial literature are still the returns-based tests of Treynor and Mazuy (1966) and Henriksson and Merton (1981), who have been refined over the years to accommodate multi-factor (e.g.: Bollen and Busse, 2001) and conditional (e.g.: Ferson and Schadt, 1996) versions. Yet, the very few SRI fund studies that use these refinements are focused on the UK (e.g.: Gregory and Whittaker, 2007; Ferruz, Muñoz and Vargas, 2010) and the US markets (e.g.: Ferruz, Muñoz and Vicente, 2010). The only exceptions are the studies of Schröder (2004) and Renneboog *et al.* (2008b). However, none of these studies is focused on international funds and both are restricted to conditional multi-factor versions of the Treynor and Mazuy (1966) model, which include only 2 factors (market and size) in the case of Schröder (2004).

Therefore, in order to overcome many of the shortcomings of previous research, we investigate the performance and investment styles of a sample of 55 European SRI equity funds with regional / global investment universes, during the period of January 2000 to December 2008. We contribute to the SRI mutual fund literature by conducting a multi-country investigation, involving eight European markets, focused on internationally-oriented SRI funds. The performance of these funds is measured relative to characteristics-matched portfolios of conventional funds. In our research, performance is measured (and, subsequently, compared) using several performance evaluation models, including conditional multi-factor specifications that allow for both time-varying alphas and betas. Besides, we also control for home bias effects and spurious regression biases. In addition, we also investigate fund performance and investment styles across different market states, an issue that remains unexplored in the European SRI market, as well as the selectivity and market timing abilities of international SRI fund managers.

This chapter is organized as follows: Section 2 presents the (overall) performance and the market timing models used. Section 3 describes the data. Section 4 presents and discusses our empirical findings. Finally, section 5 summarises our main results and presents some concluding remarks.

4.2 Fund Performance Evaluation Models

4.2.1 Overall Performance

4.2.1.1 Unconditional Models

The basic unconditional single-factor model used is Jensen's (1968) alpha. This measure, based on the Capital Asset Pricing Model (CAPM), is the intercept (α_p) of the following regression:

$$r_{p,t} = \alpha_p + \beta_p \, r_{m,t} + \varepsilon_{p,t} \qquad [4.1]$$

where $r_{p,t}$ represents the excess return of portfolio *p* over period *t*, $r_{m,t}$ represents the market's excess return during the same period, β_p is the systematic risk of the portfolio and $\varepsilon_{p,t}$ is an error term with the following properties: $\mathrm{E}(\varepsilon_{p,t}) = 0$, $Var(\varepsilon_{p,t}) = \sigma^2_{\varepsilon_{p,t}}$, $Cov(\varepsilon_{p,t}, r_{m,t}) = Cov(\varepsilon_{p,t}, \varepsilon_{j,t}) = 0$. A statistically significant positive (negative) alpha indicates superior (inferior) performance of the fund manager in relation to the market proxy.

Although it can be useful to perform comparisons with previous studies or to evaluate the sensitivity of SRI funds to conventional and SRI benchmarks, it is well known that the single-factor model is not able to fully explain a fund's investment strategies. In fact, since managers can pursue a wide variety of investment styles, single-factor models might produce biased estimates of performance.

Fama and French's (1993, 1996) studies on the cross-sectional variation of stock returns have provided strong evidence on the importance of two additional risk factors in explaining returns: size and book-to-market. This evidence led to the development of the Fama and French 3-factor model for evaluating performance, which is based on the following regression:

$$r_{p,t} = \alpha_p + \beta_p \, r_{m,t} + \beta_{1p} \mathrm{SMB}_t + \beta_{2p} \, \mathrm{HML}_t + \varepsilon_{p,t} \qquad [4.2]$$

where SMB_t is the difference in the returns of a portfolio of small capitalization stocks and a portfolio of large capitalization stocks over period *t* and HML_t is the difference in the returns of a portfolio of high book-to-market stocks and a portfolio of low book-to-market stocks over period *t*.

Although it is recognised that it improves average CAPM pricing errors, the Fama and French 3-factor model cannot fully explain the cross-sectional variation in the returns of momentum-sorted portfolios. Therefore, Carhart (1997) extended this model by adding up a fourth factor that captures the momentum effect documented by Jegadeesh and Titman (1993). The resulting Carhart 4-factor model is based on the following regression:

$$r_{p,t} = \alpha_p + \beta_p \, r_{m,t} + \beta_{1p} \mathrm{SMB}_t + \beta_{2p} \, \mathrm{HML}_t + \beta_{3p} \, \mathrm{MOM}_t + \varepsilon_{p,t} \qquad [4.3]$$

where MOM_t is the difference in the returns of a portfolio of past winners and a portfolio of past losers over period *t*. Although this model is consistent with a market equilibrium model with four risk factors, it can also be interpreted as a performance attribution model, where the coefficients and premiums on the factor-mimicking portfolios show the fraction of mean returns that can be attributed to each of four widely-used investment strategies.

Since we focus on internationally-oriented funds, it is important to consider possible home biases in their holdings.[31] In order to account for this possibility, we include an additional local factor to the Carhart (1997) 4-factor model, estimated as the return difference between a local market index $(r_{lm,t})$ and the Global / European market index used as benchmark $(r_{m,t})$:

$$r_{p,t} = \alpha_p + \beta_p \, r_{m,t} + \beta_{1p}\mathrm{SMB}_t + \beta_{2p}\,\mathrm{HML}_t + \beta_{3p}\,\mathrm{MOM}_t + \beta_{4p}\left(r_{lm,t} - r_{m,t}\right) + \varepsilon_{p,t} \;. \qquad [4.4]$$

4.2.1.2 Conditional Models

Unconditional models of performance evaluation assume that expected returns and risk are invariant over time, regardless of market conditions. In reality, since both expected returns and risk are time-varying, unconditional models can produce biased estimates of performance, especially when portfolio managers exhibit market timing skills or employ dynamic investment strategies resulting in time-varying risk (e.g.: Jensen, 1972; Dybvig and Ross, 1985; Grinblatt and Titman, 1989). To overcome this shortcoming, Ferson and Schadt (1996) proposed a conditional approach to performance evaluation by allowing betas to vary in time as linear functions of a vector of predetermined information variables, Z_{t-1}, which represents the public information available at time *t-1* relevant for predicting returns at time *t*. The conditional beta function can be represented as:

$$\beta_p\,(Z_{t-1}) = \beta_{0p} + \beta_p' \, z_{t-1} \qquad [4.5]$$

where z_{t-1} is a vector of the deviations of Z_{t-1} from the (unconditional) average values, β_p' is a vector that measures the relationship between the conditional betas and the information variables and β_{0p} is an average beta, which represents the (unconditional) mean of the conditional betas. In the context of a conditional single-factor performance evaluation model, substituting equation [4.5] into equation [4.1] leads to the following regression:

[31] In fact, there are several studies in the finance literature that document home biases for international mutual funds, both conventional (e.g.: Chan, Covrig and Ng, 2005; Otten and Bams, 2007) and SRI (e.g.: Bauer *et al.*, 2006; Gregory and Whittaker, 2007; Cortez *et al.*, *forthcoming*).

$$r_{p,t} = \alpha_p + \beta_{0p}\, r_{m,t} + \beta_p'\left(z_{t-1}\, r_{m,t}\right) + \varepsilon_{p,t} \qquad [4.6]$$

where $\mathrm{E}\left(\varepsilon_{p,t} | Z_{t-1}\right) = \mathrm{E}\left(\varepsilon_{p,t}\, r_{m,t} | Z_{t-1}\right) = 0$. If the manager uses only publicly available information, represented by Z_{t-1}, the conditional alpha will equal zero, indicating neutral performance, which is consistent with the semi-strong form of market efficiency of Fama (1970).

Christopherson, Ferson and Glassman (1998) extended the (partial conditional) model presented in regression [4.6] by also allowing alphas to vary over time as linear functions of vector Z_{t-1}. The conditional alpha function is given by:

$$\alpha_p\,(Z_{t-1}) = \alpha_{0p} + A_p'\, z_{t-1} \qquad [4.7]$$

where α_{0p} is an average alpha and the vector A_p' measures the relation of the conditional alpha with the information variables. Combining equations [4.6] and [4.7] originates a (full) conditional single-factor model with time-varying alphas and betas:

$$r_{p,t} = \alpha_{0p} + A_p'\, z_{t-1} + \beta_{0p}\, r_{m,t} + \beta_p'\left(z_{t-1}\, r_{m,t}\right) + \varepsilon_{p,t}\,. \qquad [4.8]$$

Regressions [4.6] and [4.8] can be easily extended to a multi-factor framework. In the case of the partial conditional model, with *L* information variables and *K* factors, this results in a total of (*L* + 1) × *K* + 1 regressors: a constant, the *K* factors and the cross-products of the *L* information variables with the *K* factors. In the case of the full conditional model, we also have to include the *L* information variables, resulting in a total of (*L* + 1) × (*K* + 1) regressors.

Our conditional multi-factor model is a full conditional version of the 5-factor model presented previously, which combines equations [4.4] and [4.8]:

$$\begin{aligned} r_{p,t} = {} & \alpha_{0p} + A_p'\, z_{t-1} + \beta_{0p}\, r_{m,t} + \beta_p'\left(z_{t-1}\, r_{m,t}\right) + \beta_{1p}\mathrm{SMB}_t + \beta_{1p}'\left(z_{t-1}\,\mathrm{SMB}_t\right) + \beta_{2p}\mathrm{HML}_t + \beta_{2p}'\left(z_{t-1}\,\mathrm{HML}_t\right) + \\ & + \beta_{3p}\mathrm{MOM}_t + \beta_{3p}'\left(z_{t-1}\,\mathrm{MOM}_t\right) + \beta_{4p}\left(r_{lm,t} - r_{m,t}\right) + \beta_{4p}'\left[z_{t-1}\cdot\left(r_{lm,t} - r_{m,t}\right)\right] + \varepsilon_{p,t}\,. \end{aligned} \qquad [4.9]$$

4.2.2 Selectivity and Market Timing

4.2.2.1 Conditional Multi-Factor Version of the Treynor-Mazuy (TM) Model

Treynor and Mazuy (1966) were the first to propose a CAPM-based model for assessing a manager's ability to time the market. Their model was based on the following regression:

$$r_{p,t} = \alpha_p + \beta_p \, r_{m,t} + \gamma_p \, r_{m,t}^{\;2} + \varepsilon_{p,t} \qquad [4.10]$$

where α_p indicates selectivity ability, γ_p represents market timing ability and $\varepsilon_{p,t}$ is an error term with the following properties: $E(\varepsilon_{p,t}) = E(\varepsilon_{p,t}, r_{m,t}) = E(\varepsilon_{p,t}, r_{m,t}^{\;2}) = 0$. In this regression, the quadratic term accounts for possible non-linearity between fund returns and market returns.

In fact, the TM model relies on the existence of a convex relation between the fund's returns and the market return to identify timing ability.[32] However, Ferson and Schadt (1996) argue that such a convex relation can also be a consequence of ignoring the time variation in risk and risk premiums across different states of the economy. In order to account for this possible source of nonlinearity, Ferson and Schadt (1996) proposed a conditional version of the original TM model, which is based on the following regression:

$$r_{p,t} = \alpha_p + \beta_{0p} \, r_{m,t} + \beta_p'\left(z_{t-1} \, r_{m,t}\right) + \gamma_p \, r_{m,t}^{\;2} + \varepsilon_{p,t} \qquad [4.11]$$

where z_{t-1} is a vector of the deviations of Z_{t-1} from the (unconditional) average values, β_p' is a vector that measures the relationship between the conditional betas and the information variables, β_{0p} is an average beta, which represents the (unconditional) mean of the conditional betas, and α_p and γ_p measure conditional selectivity and conditional timing abilities, respectively. By capturing any adjustments for public information effects, vector β_p' allows us to distinguish nonlinearities that only reflect publicly available information from timing ability based on superior information.

[32] This convex relation implies that the increase in the fund's return generated by an increase in the market return will be higher than the decrease in the fund's return generated by a similar decrease in the market's return.

The financial literature on market timing (e.g.: Becker, Ferson, Myers and Schill, 1999) also shows that the timing coefficient depends not only on the precision of the manager's market timing signal but also on his/her level of risk aversion. Since both of these factors can be time-varying, Ferson and Qian (2004) argue that the timing coefficient itself can also vary over time as a function of the predetermined information variables and, consequently, substitute the fixed timing coefficient in regression [4.11] with the following expression:

$$\gamma_p\,(Z_{t-1}) = \gamma_{0p} + \gamma'_{0p}\, z_{t-1}. \qquad [4.12]$$

Combining [4.12] with regression [4.11] gives a single-factor conditional market timing model with time-varying timing coefficients:

$$r_{p,t} = \alpha_p + \beta_{0p}\, r_{m,t} + \beta'_p\left(z_{t-1}\, r_{m,t}\right) + \gamma_{0p}\, r_{m,t}{}^2 + \gamma'_{0p}\left(z_{t-1}\, r_{m,t}{}^2\right) + \varepsilon_{p,t} \qquad [4.13]$$

where vector γ'_{0p} captures the variability (if it exists) in the manager's timing ability over different states of the economy.

To extend this model to a multi-factor framework, we added the additional Fama and French's (1993, 1996) size and book-to-market factors, Carhart's (1997) momentum factor and our additional local factor, as well as their cross-products with each of the information variables. The result is the following regression:

$$\begin{aligned} r_{p,t} &= \alpha_p + \beta_{0p}\, r_{m,t} + \beta'_{0p}\left(z_{t-1}\, r_{m,t}\right) + \beta_{1p}\mathrm{SMB}_t + \beta'_{1p}\left(z_{t-1}\,\mathrm{SMB}_t\right) + \beta_{2p}\mathrm{HML}_t + \beta'_{2p}\left(z_{t-1}\,\mathrm{HML}_t\right) + \beta_{3p}\mathrm{MOM}_t + \\ &+ \beta'_{3p}\left(z_{t-1}\,\mathrm{MOM}_t\right) + \beta_{4p}\left(r_{lm,t} - r_{m,t}\right) + \beta'_{4p}\left[z_{t-1}\cdot\left(r_{lm,t} - r_{m,t}\right)\right] + \gamma_{0p}\, r_{m,t}{}^2 + \gamma'_{0p}\left(z_{t-1}\, r_{m,t}{}^2\right) + \varepsilon_{p,t} \qquad [4.14] \end{aligned}$$

where SMB_t represents the return difference between a portfolio of small caps and a portfolio of large caps, HML_t is the return difference between a portfolio of high book-to-market stocks and a portfolio of low book-to-market stocks, MOM_t is the return difference between a portfolio of past winners and a portfolio of past losers and $(r_{lm,t} - r_{m,t})$ represents the return difference between a local market index and the Global / European index used as benchmark. In general, a model with a total of *L* information variables and *K* factors will have (*L* + 1) × (*K* + 1) + 1 regressors: a constant, the *K* factors, the cross-products of the *L* information variables with the K factors, the quadratic term and the cross-products of the quadratic term with each of the L information variables.

4.2.2.2 Conditional Multi-Factor Version of the Henriksson-Merton (HM) Model

Henriksson and Merton (1981) claim that a portfolio manager may time the market by changing his/her portfolio exposures between risky assets and risk-free securities if he/she predicts that market returns will be higher or lower than the risk-free rate. A successful market timer will increase the proportion of risky assets in the portfolio before a market rise and decrease it before a market decline. The original (unconditional) HM model is based on the following expression:

$$r_{p,t} = \alpha_p + \beta_p \, r_{m,t} + \gamma_p \max\left(0, -r_{m,t}\right) + \varepsilon_{p,t} \quad [4.15]$$

where $\max\left(0,-r_{m,t}\right)$ represents the payoff of a put option on the benchmark portfolio with a strike price that equals the risk-free rate and $\mathrm{E}\left(\varepsilon_{p,t}\right) = E\left(\varepsilon_{p,t}, r_{m,t}\right) = E\left[\varepsilon_{p,t}, \max\left(0,-r_{m,t}\right)\right] = 0$.

Ferson and Schadt (1996) have also proposed a conditional version of the HM model, in which a fund manager's timing ability is related to his/her forecast of the non-expected market returns and expected returns are measured with respect to a set of public information variables. If the manager's forecast of the deviation from the expected excess return, conditional on the public information variables, $r_{m,t} - E\left(r_{m,t} \middle| z_{t-1}\right)$, is positive, then he/she chooses a portfolio conditional beta of $\beta_{up}(Z_{t-1}) = b_{up} + \beta'_{up} \, z_{t-1}$. If the forecast is negative, the portfolio conditional beta will be $\beta_{dp}(Z_{t-1}) = b_{dp} + \beta'_{dp} \, z_{t-1}$. Therefore, the equation for the conditional version of the model is given by:

$$r_{p,t} = \alpha_p + b_{dp} \, r_{m,t} + \beta'_{dp}\left(z_{t-1} \, r_{m,t}\right) + \gamma_p \left(D_t \, r_{m,t}\right) + \Delta'_p \left(z_{t-1} \, D_t \, r_{m,t}\right) + \varepsilon_{p,t} \quad [4.16]$$

where $\gamma_p = b_{up} - b_{dp}$, $\Delta'_p = \beta_{up} - \beta_{dp}$ and D_t equals one if the difference between the market excess return and the conditional mean of that excess return (i.e., the unexpected component) is positive, and zero otherwise. The conditional mean, $E\left(r_{m,t} \middle| z_{t-1}\right)$, is estimated regressing the market excess return on the lagged information variables. The null hypothesis of no market timing ability implies that coefficients γ_p and Δ'_p are zero. The alternative hypothesis of positive timing ability is that $\gamma_p + \Delta'_p z_{t-1} > 0$, which means that the conditional beta is higher when the market is above its conditional mean than when it is below the conditional mean.

As with the TM model, we have also extended the conditional version of the HM model to a multi-factor framework by adding the size, book-to-market, momentum and local factors to equation [4.16], as well as their cross-products with each of the predetermined information variables, resulting in the following regression:

$$r_{p,t} = \alpha_p + b_{dp}\, r_{m,t} + \beta'_{dp}(z_{t-1}\, r_{m,t}) + \beta_{1p}\mathrm{SMB}_t + \beta'_{1p}(z_{t-1}\,\mathrm{SMB}_t) + \beta_{2p}\mathrm{HML}_t + \beta'_{2p}(z_{t-1}\,\mathrm{HML}_t) + \beta_{3p}\mathrm{MOM}_t + $$
$$+ \beta'_{3p}(z_{t-1}\,\mathrm{MOM}_t) + \beta_{4p}(r_{lm,t} - r_{m,t}) + \beta'_{4p}[z_{t-1}\cdot(r_{lm,t} - r_{m,t})] + \gamma_p\,(D_t\, r_{m,t}) + \Delta'_p\,(z_{t-1}\, D_t\, r_{m,t}) + \varepsilon_{p,t}\,. \quad [4.17]$$

4.3 Data

4.3.1 Sample

Our data source to identify existing European SRI funds with regional / global investment universes was the "SRI funds service" provided by Vigeo, the leading CSR Ratings Agency in Europe, and Morningstar Europe.[33] In this database, all funds are classified according to Morningstar categories, thus providing a more homogeneous classification scheme when dealing with funds from different countries. Another important advantage of using Morningstar categories is that these account for different investment styles, ranging from large caps to small caps and from value to growth stocks.[34] In order to allow an evaluation of the European SRI fund industry over the last decade, our sample period goes from January 2000 to December 2008.

[33] The free version of the "SRI funds service" can be accessed in the URL http://customer.morningstareurope.com/it/avanzi/fundselect/index_free.aspx, accessed in January 2009.

[34] According to the Morningstar criteria (Morningstar, 2009), equity funds have to invest at least 75% of their total assets in equities and, in the case of the European-oriented funds, at least 75% of these in European/Eurozone equities. Large caps are defined as equities that are in the top 70% of the market, small caps are in the bottom 10% and mid-caps in the next 20%. Growth funds are focused in equities characterized by fast growth (high growth rates for earnings, sales, book value and cash flow) and high valuations (high price ratios and low dividend yields), while value funds invest mainly in stocks with low valuations (low price ratios and high dividend yields) and slow growth (low growth rates for earnings, sales, book value, and cash flow); the blend style is a more neutral category that is assigned to funds where neither growth nor value characteristics predominate.

By the end of the sample period, the "SRI funds service" reported the existence of 91 SRI Global equity funds and 88 SRI European equity funds, divided in 11 Morningstar categories: "Global Large Cap Blend Equity" (63 funds), "Global Large Cap Growth Equity" (12 funds), "Global Large Cap Value Equity" (6 funds), "Global Equity Small/Mid Cap" (10 funds), "Europe Large Cap Blend Equity" (28 funds), "Europe Large Cap Growth Equity" (2 funds), "Europe Large Cap Value Equity" (13 funds), "Europe Mid Cap Equity" (4 funds), "Europe Small Cap Equity" (1 fund), "Eurozone Large Cap Equity" (38 funds) and "Eurozone Mid Cap Equity" (2 funds).[35]

Since our main objective is to investigate the differences in performance and investment styles between internationally-oriented SRI equity funds and characteristics-matched conventional funds in the main European markets, we focused our analysis on funds domiciled in the Euro-Area countries and in the UK. For this reason, we started by excluding funds domiciled in Sweden (8 Global and 4 European funds), Norway (2 Global funds), Switzerland (3 Global funds) and Denmark (3 Global and 1 European fund). Besides, given that Luxembourg is essentially a distribution centre for European funds (Khorana *et al.*, 2005), we also excluded all funds domiciled in this country (31 Global and 14 European funds).

Since we aim to evaluate the performance of actively managed and diversified equity portfolios, directly available to individual investors (i.e., retail funds), we also had to exclude any funds of funds, trackers/index funds or institutional funds that could be incorrectly included in our sample. In this way, after verifying each fund's investment policy, through information available at the "SRI funds service" or, whenever necessary, from the individual funds' prospectuses,[36] we removed 5 funds of funds (1 Global and 4 European funds), 6 index funds (2 Global and 4 European funds) and 7 institutional funds (3 Global funds and 4 European funds).[37] To ensure further resemblance between our samples of SRI and conventional funds, we established the initial investment of every fund to be lower or equal to €5.000 (or £5.000 in the case of the UK funds). For this reason, another SRI Global equity fund was not included.

[35] It should be noted that the "SRI funds service" also includes several international SRI sector funds, especially in the "Sector Equity Ecology" and "Sector Equity Alternative Energy" categories. These funds invest in a single environment-related sector, so they do not invest in socially responsible companies *per se* but in companies that belong to socially responsible industries. As a consequence, the term "social" is often replaced by the term "sustainable".

[36] The funds' prospectuses were obtained from the management companies' websites or from the websites of the respective National Fund Management Associations or National Securities Market Commissions. It is worth to mention that some of these prospectuses had to be translated into a familiar language, especially in the case of the Austrian, Dutch and German funds.

[37] An additional argument for excluding institutional funds is that it would not be possible to create characteristics-matched portfolios of conventional (institutional) funds.

To avoid duplications, whenever we had different classes of the same fund, we selected only the oldest.[38] Besides, whenever we had an accumulation and an income part of the same fund, only one was included in our sample. As a result, another 3 Global and 1 European fund were removed.

Finally, since we selected funds with records available on Datastream and with at least 24 monthly observations across the sample period, other 7 funds (1 Global and 6 European) were also not included. For the remaining funds, we used the "SRI funds service" to collect their inception dates and International Securities Identification Numbers (ISIN).

To select our reference group, we have identified all conventional funds available to investors in each country and investment category, using the regional Morningstar international websites. Then, for each fund, we collected the inception date, legal domicile country and ISIN. In the creation of our matched-sample we have taken into account the same criteria used in the SRI fund sample. Specifically, we have only considered retail funds, only one class of the same fund, only funds with records available on Datastream and with at least 24 monthly observations over the sample period. Additionally, to ensure that our matched-sample did not include any funds of funds or index funds, we have also verified each fund's investment policy through information available at Morningstar international websites or, whenever necessary, from the individual funds' prospectus.[39]

The advantage of using a matched-pairs approach[40] is that differences between SRI and conventional funds cannot be attributed to any of the matching requirements. In our case, the matching procedure is based on the following criteria: fund age, domicile country, investment category and style. The first three characteristics were also used in previous SRI fund studies[41] but, as far as we know, ours is the first to use investment styles as matching criteria. An additional matching requirement, which is implicit in our sample, is related to the initial investment amounts. We did not match on size, not only because that would have involved a trade-off with the other criteria, but also because we were not able to obtain the funds' Total Net Assets for all of the eight countries involved. In addition, some studies have shown that size does not seem to have a significant influence on SRI fund performance (e.g.:

38 A similar procedure was used in the SRI fund studies of Bello (2005) and Cortez *et al.* (*forthcoming*).

39 This procedure, although having been time consuming, provided the additional advantage of detecting some funds classified as "international" that had an investment policy directed towards their domestic market. By excluding these funds, we avoid any "false" home biases in our subsequent analysis.

40 The first empirical studies that used the matched-pairs analysis compared each SRI fund with one conventional fund, thus creating a pair of funds with similar characteristics. However, since funds were not entirely equal in terms of some specific fund characteristics, such as age or size, subsequent studies started to compare each SRI fund with a characteristics-matched portfolio of two or three conventional funds. Given that our objective is to compare each SRI fund with its corresponding matched-portfolio of conventional funds, we still use the term matched-pairs in our investigation.

41 For example, fund age was also used by Mallin *et al.* (1995), Gregory *et al.* (1997), Bauer *et al.* (2005), Kreander *et al.* (2005) and Gregory and Whittaker (2007). The domicile country was also used by Kreander *et al.* (2005), while the investment category / area of investment was used by Gregory *et al.* (1997), Kreander *et al.* (2005) and Gregory and Whittaker (2007).

Gregory *et al.*, 1997; Kreander *et al.*, 2005; Girard *et al.*, 2007; Renneboog *et al.*, 2008b), unlike age (e.g.: Gregory *et al.*, 1997; Girard *et al.*, 2007; Renneboog *et al.*, 2008b).

In this way, for each SRI fund we selected a portfolio of conventional funds from the same country, belonging to the same Morningstar category, with inception dates that had to be within 12 months of that of the SRI fund with which they were matched. For the European equity funds we were able to create portfolios of 3 conventional funds for each SRI; for the Global equity funds, given the relatively small number of funds that exist in some of the investment categories, especially in markets like the Austrian, the Belgian and the Dutch, we could only fulfil all the matching requirements with characteristics-matched portfolios of 2 conventional funds for each SRI fund. However, a significant proportion of the SRI fund studies that performed matched-pairs analysis used only one conventional fund for each SRI (e.g.: Mallin *et al.*, 1995; Gregory *et al.*, 1997; Kreander *et al.*, 2005). Statman (2000) used two conventional funds for each SRI, but only one matching criteria (size), while Bauer *et al.* (2005) used three conventional funds matched on age and size. The only investigation we are aware of that used more than 3 conventional funds for each SRI was the recent UK-based study of Gregory and Whittaker (2007), who used portfolios of five conventional funds matched on age and investment category. In spite of our efforts, we could not create matched-portfolios of conventional funds for 15 Global and 13 European SRI funds and had to remove them from our sample as well.

Therefore, our final sample, described in detail in Appendix 4.1, consists of 55 internationally-oriented SRI equity funds (18 Global and 37 European funds) and 147 characteristics-matched conventional funds (36 Global and 111 European funds) domiciled in 8 European countries: Austria, Belgium, France, Germany, Italy, the Netherlands, Spain and the UK.[42] Table 4.1 provides a decomposition of our sample of international SRI funds per country, investment universe and style.

[42] It is worth to mention that, by June 2009, just six months after the end of our sample period, these markets accounted for 82.2% of the European SRI fund industry in terms of assets under management (Vigeo, 2009).

Table 4.1 – Number of SRI Equity Funds in the Sample per Country, Investment Universe and Style

	Austria	Belgium	France	Germany	Italy	Netherlands	Spain	UK	Total
Global Large Cap Blend	1	1	2	2	2	1	-	4	13
Global Large Cap Growth	-	-	-	-	-	-	-	2	2
Global Large Cap Value	-	-	-	1	-	-	-	1	2
Global Small/Mid Cap	-	-	-	-	-	-	-	1	1
Number of SRI Global Equity Funds	**1**	**1**	**2**	**3**	**2**	**1**	**-**	**8**	**18**
Europe Large Cap Blend	-	1	8	1	-	-	-	-	10
Europe Large Cap Value	-	-	2	-	-	-	1	-	3
Eurozone Large Cap	-	1	23	-	-	-	-	-	24
Number of SRI European Equity Funds	**-**	**2**	**33**	**1**	**-**	**-**	**1**	**-**	**37**
Total SRI Funds	**1**	**3**	**35**	**4**	**2**	**1**	**1**	**8**	**55**

In the table above we can see that the majority (72%) of our sample of Global SRI funds are classified as “Large Cap Blend”, while most of the European SRI funds (65%) are classified as “Eurozone Large Cap” funds. The French market is clearly the most representative in our sample, with a relative weight of 64%, followed by the UK, with almost 15%. These figures are not surprising, since these two markets have been the leading European SRI fund markets over the last decade, both in terms of number of funds and assets under management.

Although our sample of SRI funds is not free of survivorship bias, since we were not able to identify non-surviving funds, conventional funds in our matched-sample are also surviving funds, all active by 31 December 2008. In this way, since both types of funds are affected by this source of bias, we believe that it won’t distort our matched-pair analysis. Additionally, even though attrition rates can differ between SRI and conventional funds,[43] if we combine this survivorship requirement with the matching procedure performed, which takes into account inception dates, this means that our matched-portfolios have the same life span of the SRI funds with which they were matched. This fact is especially relevant because differences in time spans can create biases when estimated performance is time-varying, as pointed out by Bollen (2007), since funds can experience different macroeconomic time-series effects.

[43] For example, Gregory and Whittaker (2007) have reported a rate of demise for SRI funds in their sample of only 12.5%, while for their matched-portfolio of conventional funds it reached 29.9%.

4.3.2 Fund Returns, Benchmark Indices and Factors

Monthly data required to compute the funds' returns (specifically, the end of month total return index) was collected from Datastream.[44] All returns, net of operating expenses but gross of any sales charge, were continuously compounded, with reinvestment of dividends, and denoted in local currency (Euros for the EMU countries and UK Pounds for the UK funds). To compute excess returns, the risk-free rate was proxied by the 1-month Euribor (Euro Interbank Offered Rate) in the case of funds from the EMU countries and the 1-month Libor (London Interbank Offered Rate) for the UK funds. Although our choice of local currencies and local risk-free rates reduces the comparability between funds from the EMU countries and the UK funds,[45] making no currency conversions at this level allows us to avoid the risk of having our results conditioned by fluctuations in exchange rates.

Our subsequent empirical tests were performed not only at the individual fund level, but also at the aggregate level, considering equally-weighted portfolios of funds. These portfolios were constructed for each category (SRI and conventional), country and investment universe (European and Global). Table 4.2 presents some summary statistics for the excess returns of these portfolios. We can see that monthly excess returns are, on average, negative for all portfolios of SRI and conventional funds over the sample period. Like the majority of fund return data sets, returns are not normally distributed, according to the Jarque-Bera test statistic, for practically all portfolios.

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[44] The only exceptions were the UK fund "*Jupiter Green Investment Trust*" and the Belgian fund "*Dexia Sustainable World Classic*", both accumulation funds, whose returns were computed based on Net Asset Values (NAV) obtained from the respective management companies.
[45] For this reason, whenever we present aggregate results for our samples of funds and these involve different currencies, we split them in two categories: funds from the EMU countries and UK funds.

Table 4.2 – Summary Statistics on the Excess Returns of the Global and European Equity Fund Portfolios

This table presents summary statistics for the monthly excess returns of the equally-weighted portfolios of socially responsible (SRI) and conventional (CONV) funds, per country, computed for the period of January 2000 to December 2008. The risk-free rate was proxied by the 1-month Euribor for funds from the Euro Area countries and the 1-month Libor for the UK funds. *p-val* (JB) is the probability that the Jarque-Bera statistic exceeds (in absolute value) the observed value under the null hypothesis of a normal distribution. Panel A refers to Global equity funds and Panel B to European equity funds.

Panel A: Global Equity Funds

	Austria		**Belgium**		**France**		**Germany**		**Italy**		**Netherlands**		**United Kingdom**	
	SRI	CONV	SRI	CONV	SRI	CONV	SRI	CONV	SRI	CONV	SRI	CONV	SRI	CONV
Mean	-0.0146	-0.0179	-0.0093	-0.0132	-0.0046	-0.0078	-0.0111	-0.0101	-0.0102	-0.0081	-0.0080	-0.0115	-0.0054	-0.0060
Median	0.0024	0.0005	-0.0009	-0.0053	0.0041	0.0003	0.0003	-0.0014	-0.0045	-0.0016	0.0035	0.0001	0.0024	0.0030
Maximum	0.0367	0.0510	0.0728	0.0962	0.0490	0.0639	0.0819	0.0691	0.0605	0.0560	0.0669	0.0904	0.0941	0.0831
Minimum	-0.1283	-0.1514	-0.1459	-0.1492	-0.1362	-0.1518	-0.1370	-0.1473	-0.1151	-0.1114	-0.1798	-0.1421	-0.1542	-0.1666
Std. Deviation	0.0461	0.0486	0.0480	0.0500	0.0422	0.0467	0.0506	0.0478	0.0390	0.0374	0.0452	0.0505	0.0482	0.0493
Skewness	-0.9688	-1.2282	-0.6903	-0.7780	-1.2751	-1.0837	-0.7790	-0.7212	-0.8793	-0.7699	-1.3307	-0.6063	-0.8722	-0.8423
Kurtosis	2.8717	3.7528	3.1323	3.2043	4.4585	3.8885	3.1024	2.8958	3.3892	3.0036	5.5432	2.7528	3.6695	3.4626
Jarque-Bera (JB)	5.3423	9.3502	7.9344	10.1581	16.9014	10.7451	9.9552	8.5394	12.3017	8.9903	55.3323	6.2544	15.5660	13.6058
***p-val* (JB)**	0.0692	0.0093	0.0189	0.0062	0.0002	0.0046	0.0069	0.0140	0.0021	0.0112	0.0000	0.0438	0.0004	0.0011
Number of Funds	1	2	1	2	2	4	3	6	2	4	1	2	8	16

Panel B: European Equity Funds

	Belgium		**France**		**Germany**		**Spain**	
	SRI	CONV	SRI	CONV	SRI	CONV	SRI	CONV
Mean	-0.0089	-0.0085	-0.0082	-0.0069	-0.0064	-0.0156	-0.0090	-0.0109
Median	0.0012	0.0033	0.0015	0.0026	0.0028	-0.0035	0.0007	0.0056
Maximum	0.0993	0.0992	0.1079	0.1037	0.1206	0.1441	0.0546	0.0708
Minimum	-0.1998	-0.1698	-0.1715	-0.1625	-0.1599	-0.2344	-0.1228	-0.1611
Std. Deviation	0.0518	0.0526	0.0520	0.0502	0.0497	0.0656	0.0433	0.0509
Skewness	-1.1732	-1.0639	-0.9343	-0.9829	-0.7535	-0.8942	-1.0560	-1.3479
Kurtosis	4.7062	4.1167	4.1776	4.1910	3.8172	4.2917	3.5274	4.4850
Jarque-Bera (JB)	36.8247	25.2633	21.7486	23.5525	13.1034	21.6985	7.8975	15.7884
***p-val* (JB)**	0.0000	0.0000	0.0000	0.0000	0.0014	0.0000	0.0193	0.0004
Number of Funds	2	6	33	99	1	3	1	3

In terms of Global equity funds, the mean excess returns of SRI funds are higher than those of the characteristics-matched portfolios in 5 of the 7 countries involved, with the only exceptions being the Italian and the German funds. In the case of European equity funds, the results are mixed: mean excess returns are higher for the conventional funds in the case of the Belgian and French funds, while SRI funds present higher mean excess returns in Germany and Spain.[46] However, for a 5% significance level, we cannot reject the hypothesis of equal means (or medians) between the series of SRI and conventional fund returns for every country and fund category, as confirmed by (unreported) mean-equality (*t*-tests) and median-equality (Mann-Whitney) tests. Furthermore, SRI funds seem to have, in most cases, a lower overall volatility than the matched-portfolios, although differences are only statistically significant for the German European equity funds, as confirmed by several (unreported) variance-equality tests.[47]

As benchmark portfolios we used several total return indices. As conventional benchmarks we used the MSCI AC World TR index for Global equity funds and the MSCI AC Europe TR index for European equity funds. As SRI benchmarks we used the FTSE4GOOD Global TR and the FTSE4GOOD Europe TR indices for Global and European equity funds, respectively. Like fund returns, market returns were also continuously compounded. Data on the benchmark indices was also collected from Datastream (in Euros and UK pounds). As we can see in Table 4.3, monthly excess returns are, on average, negative for all Global and European benchmarks, with the SRI benchmarks presenting lower values than their conventional counterparts as well as higher standard deviations. Nevertheless, at the usual significance levels, we cannot reject the hypothesis of equal means, medians or variances between SRI and conventional benchmarks, as confirmed by additional (unreported) statistical tests. Besides, for a 5% significance level, the hypothesis of normality is rejected for almost all benchmarks (the only exception is the FTSE4GOOD Global € index).

[46] It is worth to mention that, when comparing funds from different countries, taxation features can play an important role. For example, as pointed out by Silva (2004), while most European countries do not tax the results of investment funds directly, Italian fund units are quoted net of taxation. Hence, unit holders do not need to include any gains in their income tax returns, because the tax has already been paid on a full settlement basis by the fund. However, since we focus on comparing the performance of SRI funds with that of characteristics-matched portfolios of conventional funds from the same country, differences in taxation will not affect our results.

[47] Specifically, we used four variance-equality tests and all yielded the same results: *F*-tests, Bartlett tests, Levene tests and Brown-Forsythe (modified Levene) tests.

Table 4.3 – Summary Statistics for the Global and European Benchmarks

This table presents summary statistics for the monthly excess returns of Global (Panel A) and European (Panel B) benchmarks for the period of January 2000 to December 2008. The risk-free rate was proxied by the 1-month Euribor for indices denominated in Euros and the 1-month Libor for indices denominated in UK pounds. Both socially responsible and conventional benchmarks were used. As conventional benchmarks we used the MSCI AC World TR and the MSCI AC Europe TR indices. As SRI benchmarks we used the FTSE4GOOD Global TR and the FTSE4GOOD Europe TR indices. *p-val* (JB) is the probability that the Jarque-Bera statistic exceeds (in absolute value) the observed value under the null hypothesis of a normal distribution.

Panel A: Global Benchmarks				
	MSCI AC World €	**FTSE4GOOD Global €**	**MSCI AC World £**	**FTSE4GOOD Global £**
Mean	-0.0075	-0.0087	-0.0044	-0.0056
Median	0.0004	0.0010	0.0034	0.0020
Maximum	0.0689	0.0899	0.0995	0.1009
Minimum	-0.1266	-0.1341	-0.1358	-0.1433
Std. Deviation	0.0473	0.0496	0.0472	0.0490
Skewness	-0.6518	-0.5643	-0.7105	-0.5952
Kurtosis	2.8263	2.7984	3.3816	3.3287
Jarque-Bera (JB)	7.7118	5.8594	9.6524	6.8002
***p-val* (JB)**	0.0212	0.0534	0.0080	0.0334

Panel B: European Benchmarks		
	MSCI AC Europe €	**FTSE4GOOD Europe €**
Mean	-0.0061	-0.0069
Median	0.0071	0.0047
Maximum	0.1040	0.1080
Minimum	-0.1502	-0.1660
Std. Deviation	0.0491	0.0497
Skewness	-0.8908	-0.7622
Kurtosis	3.7348	3.7452
Jarque-Bera (JB)	16.5590	12.8347
***p-val* (JB)**	0.0003	0.0016

For the multi-factor models, we included additional risk factors to account for size, book-to-market and momentum effects, as well as home biases.

Small minus big (SMB) represents the difference in returns between a portfolio of small caps and a portfolio of large caps. For the small cap portfolios we used the total returns of the MSCI AC World Small Cap and the MSCI AC Europe Small Cap indices for Global and European equity funds, respectively; for the large cap portfolios we used the total returns of the MSCI AC World Large Cap and the MSCI AC Europe Large Cap indices.

High minus low (HML) represents the difference in returns between a portfolio of high book-to-market stocks (value stocks) and a portfolio of low book-to-market stocks (growth stocks). For the returns of the portfolios of value and growth stocks we used total returns of the MSCI AC World Value and the MSCI AC World Growth indices for Global equity funds, and the MSCI AC Europe Value and MSCI AC Europe Growth indices for European equity funds. The data for the construction of these factors was collected from Datastream.

Momentum (MOM) represents the difference in returns between a portfolio of past winners and a portfolio of past losers. For Global equity funds we used a US momentum factor, collected from Kenneth French's website,[48] as proxy for the world factor and converted it into the required currency (Euros or UK pounds) by using the proper exchange rates, as in Cortez *et al.* (*forthcoming*). In fact, several studies in the finance literature, such as Gregory and Whittaker (2007), Chua, Lai and Wu (2008) and Cortez *et al.* (*forthcoming*), also use US factors as proxies for world factors. Moreover, in an investigation of international momentum effects, Rouwenhorst (1998) found that international momentum returns are correlated to those of the US.

For European equity funds, we created a European momentum factor using the same methodology as Banegas, Gillen, Timmermann and Wermers (2009). For the construction of this factor we used the 18 Dow Jones Stoxx 600 Supersector indices.[49] The momentum factor was computed as the return difference between the top 6 and the bottom 6 sectors. Top and bottom sectors were selected taking into account their performance over the previous 12 months, with portfolios being rebalanced on a monthly basis.[50]

To examine whether our samples of funds were over-weighted in local stocks, we also considered an additional local factor, estimated as the return difference between a local market index and a world or a European market index. As local market indices we used the MSCI country indices (i.e., MSCI Austria TR, MSCI Belgium TR, MSCI France TR, MSCI Germany TR, MSCI Italy TR, MSCI Netherlands TR, MSCI Spain TR and MSCI UK TR), while the world and the European market indices used were the MSCI AC World TR and the MSCI AC Europe TR, respectively.

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[48] Available at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

[49] Currently, there are 19 Dow Jones Supersector indices (Automobiles and Parts, Banks, Basic Resources, Chemicals, Construction and Materials, Financial Services, Food and Beverage, Health Care, Industrial Goods and Services, Insurance, Media, Oil and Gas, Personal and Household Goods, Real Estate, Retail, Technology, Telecommunications, Travel and Leisure, Utilities), but the Real Estate index is only available from 2001.

[50] As a further robustness check, and given that our sample of European equity funds is mostly composed by funds classified as "Eurozone Large Cap", we have also computed an alternative momentum factor based on the 18 Dow Jones EuroStoxx Supersector indices.

Tables 4.4 and 4.5 present some summary statistics for the additional size, book-to-market and momentum factors, as well as the correlation matrixes among the main factors used in our models (i.e., market excess returns, size, book-to-market and momentum), over our sample period. The results show that the hypothesis of normality is rejected for most additional factors, with the only exceptions being the size factors for Global equity funds and the momentum factor for European equity funds. Given the relatively low correlations between the variables, ranging from -0.4316 to 0.2772, multicollinearity will not significantly affect our multi-factor model results.[51]

Table 4.4 – Summary Statistics for the Additional Risk Factors

This table presents summary statistics for the main additional risk factors (denominated in Euros for the Euro Area countries and UK pounds for the UK funds) during the period of January 2000 to December 2008. For Global equity Funds, SMB_{GE} is the difference in the monthly returns of the MSCI AC World Small Cap TR and the MSCI AC World Large Cap TR indices, HML_{GE} is the difference in the monthly returns of the MSCI AC World Value TR and the MSCI AC World Growth TR indices and MOM_{GE} is the difference between the monthly returns of a portfolio of past winners and a portfolio of past losers, collected from Kenneth French's website and converted into Euros or UK pounds by using the proper exchange rates. For European equity Funds, SMB_{EE} is the difference in the monthly returns of the MSCI AC Europe Small Cap TR and the MSCI AC Europe Large Cap TR indices, HML_{EE} is the difference in the monthly returns of the MSCI AC Europe Value TR and the MSCI AC Europe Growth TR indices and MOM_{EE} is the difference between the monthly returns of the top and bottom six sectors from the 18 Dow Jones Stoxx 600 Supersector indices.

	Global Equity Funds – Euro Area			**Global Equity Funds – UK**			**European Equity Funds**		
	SMB_{GE}	**HML_{GE}**	**MOM_{GE}**	**SMB_{GE}**	**HML_{GE}**	**MOM_{GE}**	**SMB_{EE}**	**HML_{EE}**	**MOM_{EE}**
Mean	0.0040	0.0047	0.0060	0.0040	0.0047	0.0040	0.0012	0.0038	0.0043
Median	0.0056	0.0014	0.0052	0.0056	0.0014	0.0036	0.0050	0.0035	0.0032
Maximum	0.0681	0.0851	0.1910	0.0681	0.0851	0.1165	0.0448	0.0744	0.1047
Minimum	-0.0558	-0.0706	-0.2695	-0.0558	-0.0706	-0.1715	-0.0954	-0.0752	-0.1276
Std. Deviation	0.0215	0.0237	0.0598	0.0215	0.0237	0.0385	0.0258	0.0210	0.0416
Skewness	-0.3442	0.5115	-0.6418	-0.3442	0.5114	-0.6632	-0.9821	-0.2723	-0.1031
Kurtosis	3.7042	4.9482	7.5734	3.7046	4.9485	7.1276	4.3206	5.1764	3.3593
Jarque-Bera (JB)	4.3231	21.5877	100.5990	4.3261	21.5907	83.7998	24.9761	22.4402	0.7649
***p-val* (JB)**	0.1151	0.0000	0.0000	0.1150	0.0000	0.0000	0.0000	0.0000	0.6822

[51] To simplify these tables, we chose not to report summary statistics for the local factors, since these are different for each country and each investment category. Nevertheless, it is important to mention that multicollinearity should not be an additional concern for our 5-factor specifications, since correlations between the local factor and the remaining factors never surpass 0.5191.

Table 4.5 – Correlation Matrixes among the Factors

This table presents the correlation matrixes among the main factors used, namely market excess returns (MKT), size (SMB), book-to-market (HML) and momentum (MOM), for the period of January 2000 to December 2008. These factors were denominated in Euros for the Euro Area countries and UK pounds for the UK funds. Market returns were based on the MSCI AC World TR index for the Global equity funds and the MSCI AC Europe TR index for the European equity funds. The risk-free rate was proxied by the 1-month Euribor for funds from the Euro Area countries and the 1-month Libor for the UK funds. Panels A and B refer to Global equity (GE) funds and Panel C to European equity (EE) funds.

Panel A: Global Equity Funds - Euro Area				
	MKT_{GE}	**SMB_{GE}**	**HML_{GE}**	**MOM_{GE}**
MKT_{GE}	1.0000			
SMB_{GE}	0.0522	1.0000		
HML_{GE}	-0.1461	-0.1021	1.0000	
MOM_{GE}	-0.3927	0.2123	-0.1991	1.0000
Panel B: Global Equity Funds - UK				
	MKT_{GE}	**SMB_{GE}**	**HML_{GE}**	**MOM_{GE}**
MKT_{GE}	1.0000			
SMB_{GE}	0.1378	1.0000		
HML_{GE}	-0.1765	-0.1020	1.0000	
MOM_{GE}	-0.4316	0.1864	-0.2002	1.0000
Panel C: European Equity Funds				
	MKT_{EE}	**SMB_{EE}**	**HML_{EE}**	**MOM_{EE}**
MKT_{EE}	1.0000			
SMB_{EE}	0.1651	1.0000		
HML_{EE}	0.2772	0.0925	1.0000	
MOM_{EE}	-0.4101	0.1704	-0.3865	1.0000

4.3.3 Information Variables

Conditional models usually make use of a set of 1-month lagged instruments that several studies in the finance literature have shown suitable to predict stock returns (e.g.: Fama and French, 1989; Pesaran and Timmermann, 1995; Avramov and Chordia, 2006). We started by selecting the level of the short-term interest rate, a measure of the slope of the term structure of interest rates, a default spread and the dividend yield of a market index.[52] Since we are evaluating funds with European and Global investment universes, both European and Global information variables were considered, with the US market being our proxy for the world market.

[52] In fact, many previous studies in the mutual fund performance literature, focusing on both SRI and conventional funds, also use the same information variables. For example, the level of the short-term interest rate, the slope of the term structure of interest rates and the dividend yield variables were also used by Ferson and Schadt (1996), Christopherson *et al.* (1998), Sawicki and Ong (2000), Cortez and Silva (2002), Otten and Bams (2002, 2004, 2007), Bauer *et al.* (2006), Bauer *et al.* (2007), Renneboog *et al.* (2008b), Banegas *et al.* (2009), Bessler, Drobetz and Zimmermann (2009), Cortez *et al.* (2009), Ferruz, Muñoz and Vargas (2010) and Ferruz, Muñoz and Vicente (2010). Besides, the default / quality spread variable was also used in the studies of Ferson and Schadt (1996), Christopherson *et al.* (1998), Otten and Bams (2002, 2004, 2007), Bauer *et al.* (2006), Bauer *et al.* (2007), Renneboog *et al.* (2008b), Banegas *et al.* (2009), Cortez *et al.* (2009) and Ferruz, Muñoz and Vicente (2010).

The dividend yield variable corresponds to the dividend payments in the prior 12 months divided by the current price of the MSCI AC World or the MSCI AC Europe indices, obtained from MSCI.

The indicator of short-term interest rates is represented by the annualized 3-month Euribor rate or the annualized 3-month US Treasury Bill yield, both collected from Datastream.

The Global slope of the term structure variable is measured by the annualized spread between 10-year US Government bond yields and 3-month US Treasury bill yields. The European variable is the annualized yield spread between a 10-year Euro area Government bond yield[53] and the 3-month Euribor rate. This data was also collected from Datastream.

The Global default spread variable corresponds to the difference between Moody's US BAA-rated and AAA-rated corporate bond yields, gathered from Datastream. For the European indicator, we use a default spread on European bonds, computed as the difference between the monthly average yields on corporate bonds and the monthly average yields on public debt securities, as suggested by Banegas *et al.* (2009). Data for this variable was collected from the Bundesbank website.

In order to allow an easier interpretation of the estimated coefficients and minimize eventual scale problems, the information variables will be demeaned, as proposed by Ferson and Schadt (1996).

Additionally, to avoid any spurious regression biases, we started by testing the stationarity of our information variables using the Augmented Dickey-Fuller (1979) test.[54] As we can see in Table 4.6, for a MacKinnon critical value of 5%, we could not reject the null hypothesis of a unit root for all of our information variables, which were all integrated of order (1), since we could reject the null hypothesis of a unit root for all first-difference series.[55] In addition, many of these variables presented first-order autocorrelation coefficients higher than 0.90, which is evidence of high degrees of persistence.

[53] As an alternative, we have also used a German Government Bond Yield with a residual maturity of 9-10 years and the results were very similar.
[54] It should be mentioned that the importance of checking if the series are stationarity is related to the fact that standard inference procedures cannot be applied to regressions that contain integrated regressors.
[55] We have also checked if our groups of non-stationary time series were cointegrated, but (unreported) results of the Johansen test showed they were not.

Table 4.6 – ADF Test Statistics for the Information Variables

This table presents the Augmented Dickey-Fuller (ADF) test statistics for the time series of the four information variables used, over the period of January 2000 to December 2008. Since these series were all mean zero variables, the regressions were performed with no trend and no intercept[56] (the number of lagged difference terms was automatically selected by means of a Schwarz Information Criterion). Panel A presents the results for Global information variables and Panel B for European information variables.

Panel A: Global Information Variables	
Default Spread	2.5283
Dividend Yield	1.0422
Short-Term Rate	-1.4148
Term Structure	-1.2092
Panel B: European Information Variables	
Default Spread	0.0652
Dividend Yield	2.0435
Short-Term Rate	-1.4368
Term Structure	-1.7011

Note: In bold we indicate the cases in which we reject, for a 5% MacKinnon critical value, the null hypothesis of a unit root in favour of the alternative hypothesis of a stationary time series.

Therefore, given the persistence exhibited by the information variables and the non-stationarity issues, the series were stochastically detrended by subtracting a trailing moving average of their own past values, as suggested by Ferson, Sarkissian and Simin (2003a). Following Campbell (1991), they suggest the use of a 12-month lag for monthly data, but they also recognise that different numbers of lags could be used in the detrending process, meaning that the choice of using a 12-month lag may not be appropriate for all data sets.

In fact, in our case, with a 12-month detrending we obtained lower first-order autocorrelation coefficients for all series, but some of them were not lower or equal to 0.90, the level in which spurious regressions become a problem, according to Ferson, Sarkissian and Simin (2003b).[57] Additionally, our non-stationarity problems persisted, since we still could not reject the null hypothesis of a unit root in most cases (at the 5% level), especially for the Global information variables. These results are relevant because they show that the 12-month detrending procedure usually suggested in the finance literature may not be enough to deal with the non-stationarity and the high persistence of the information variables and, consequently, to avoid spurious regressions. Therefore, previous studies that do not test for the stationarity of the information variables also after performing 12-month detrendings may yield biased results, due to the use of integrated or persistent regressors.

[56] According to Hamilton (1994), we should choose a specification that is a plausible description of the data under both the null and alternative hypotheses. Therefore, if a series seems to be fluctuating around a zero mean, we should include neither a constant nor a trend in the ADF test regression.
[57] As Ferson *et al*. (2003b) point out, "*... spurious regression bias does not arise to any serious degree provided ρ** (the first order autocorrelation coefficient) *is 0.90 or less*" (Ferson *et al*., 2003b, p. 1401).

To overcome this problem, we analysed the sensitivity of each of our information variables to the use of different lags in the stochastic detrending procedure. The results of our analysis are presented in Table 4.7.

Table 4.7 – ADF Test Statistics for the Stochastically Detrended Information Variables using Different Monthly Lags

This table presents the Augmented Dickey-Fuller (ADF) test statistics for the time series of the four stochastically detrended information variables, over the period of January 2000 to December 2008, using different monthly lags in the detrending procedure. Since these series were all mean zero variables, the regressions were performed with no trend and no intercept (the number of lagged difference terms was automatically selected by means of a Schwarz Information Criterion). Panel A presents the results for Global information variables and Panel B for European information variables.

Panel A: Global Information Variables											
Number of lags:	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**
Default Spread	0.6359	0.5180	0.3450	0.1309	-0.0904	-0.2430	-0.5673	-0.9463	-1.5194	**-2.3640**	**-3.9252**
Dividend Yield	0.4665	0.2978	0.0529	-0.1163	-0.3113	-0.5018	**-2.0460**	**-2.6303**	**-3.1766**	**-3.9606**	**-2.7114**
Short-Term Rate	-1.1920	-1.3012	-1.4583	-1.5722	-1.6938	-1.8915	**-2.0554**	**-2.3402**	**-2.8445**	**-3.4115**	**-4.5958**
Term Structure	**-2.0144**	**-2.1458**	**-2.3096**	**-2.4577**	**-2.6600**	**-2.9799**	**-3.2523**	**-3.6263**	**-4.2053**	**-4.9891**	**-6.4757**
Panel B: European Information Variables											
Number of lags:	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**
Default Spread	**-2.3865**	**-2.5393**	**-2.6512**	**-2.8049**	**-3.0009**	**-3.2962**	**-3.6345**	**-3.9273**	**-4.4418**	**-4.8147**	**-5.4715**
Dividend Yield	0.1921	-0.0456	-0.3098	-0.4869	-0.6837	-0.9312	-1.2913	-1.9146	**-3.3486**	**-4.0932**	**-5.2925**
Short-Term Rate	-1.7201	-1.8131	-1.9090	**-1.9966**	**-2.1099**	**-2.2274**	**-2.3661**	**-2.5197**	**-2.7785**	**-3.1225**	**-2.3023**
Term Structure	**-2.7642**	**-2.8315**	**-2.9165**	**-2.9758**	**-3.0990**	**-3.2811**	**-3.5691**	**-3.9924**	**-4.6608**	**-5.6339**	**-4.2463**

Note: In bold we indicate the cases in which we reject, for a 5% MacKinnon critical value, the null hypothesis of a unit root in favour of the alternative hypothesis of a stationary time series.

As we can see in the table above, using a smaller number of lags in the detrendings allows us to solve our non-stationarity problems, but different time series require the use of different lags to achieve so. Also, consistent with the findings of Leite and Cortez (2009), we find that the shorter the detrending period, the lower the first-order autocorrelation coefficients of the series and, also, the lower the correlations between the variables. So, one could argue that we should use the shorter detrending period possible, i.e., the 2-month alternative. However, Leite and Cortez (2009) show that this may compromise the significance of the information variables, in the sense that we may lose valuable long-term relationships between the variables if we use too short detrending periods.[58]

Therefore, to reduce the persistence of the regressors, resulting in autocorrelations that fall under the level in which spurious regressions become a problem, and solve the non-

[58] Although an accurate econometric treatment of the information variables is critical in a conditional framework, in order to avoid spurious regression biases, most empirical studies conducted so far have not taken these issues into consideration, thus meaning that their results may be compromised.

stationarity problems, we used the same stochastic detrending procedure advocated by Campbell (1991) and Ferson *et al.* (2003a), but with a number of lags that varied according to the persistence and non-stationarity of each regressor. This meant that each of our information variables was stochastically detrended with the maximum number of lags that allowed us to obtain a stationary time series and, simultaneously, a first-order autocorrelation coefficient below 0.90.[59] By doing this, we are solving the persistence and the non-stationarity problems and, simultaneously, trying not to lose any long-term relationships that really exist between the variables.

Tables 4.8 and 4.9 present some descriptive statistics and autocorrelations for the Global and the European information variables, respectively, as well as their correlation matrix.

Table 4.8 – Summary Statistics for the Global Information Variables

This table presents summary statistics for the Global lagged information variables for the period of January 2000 to December 2008: default spread (DS), dividend yield (DY), short-term interest rate (STR) and the slope of the term structure (TS). The instruments were all stochastically detrended by subtracting a trailing moving average of their own past values. Table **A** presents several statistics for these variables (annual, demeaned and expressed in percentage) as well as their first-order autocorrelation coefficients (AC1). Table **B** presents the correlation matrix among the instruments.

Table A – Descriptive Statistics and Autocorrelations

	DS	DY	STR	TS
Mean	0.0000	0.0000	0.0000	0.0000
Median	-0.0366	-0.0387	0.1092	-0.1712
Maximum	1.4301	0.8967	0.8642	1.9029
Minimum	-0.2332	-0.2515	-1.7141	-1.3359
Std. Deviation	0.2152	0.1800	0.6384	0.8894
Skewness	4.4558	2.4834	-0.8405	0.4032
Kurtosis	27.9430	12.4318	2.8189	2.0365
AC1	0.2200	0.4970	0.8520	0.8990

Table B – Correlation Matrix

	DS	DY	STR	TS
DS	1.0000			
DY	0.6716	1.0000		
STR	-0.3414	-0.4617	1.0000	
TS	0.2758	0.2905	-0.8023	1.0000

[59] Therefore, for the Global information variables, we used a 3-month detrending for the default spread variable, a 6-month detrending for the dividend yield and the short-term interest rate variables, and a 12-month detrending for the term structure variable. In the case of the European variables, we used a 4-month detrending for the dividend yield, a 9-month detrending for the short-term rate, a 10-month detrending for the term structure (due to the fact that the first-order autocorrelation coefficient was over 0.90 with both the 11-month and 12-month detrendings) and a 12-month detrending for the default spread variable.

Table 4.9 – Summary Statistics for the European Information Variables

This table presents summary statistics for the European lagged information variables for the period of January 2000 to December 2008: default spread (DS), dividend yield (DY), short-term interest rate (STR) and the slope of the term structure (TS). The instruments were all stochastically detrended by subtracting a trailing moving average of their own past values. Table **A** presents several statistics for these variables (annual, demeaned and expressed in percentage) as well as their first-order autocorrelation coefficients (AC1). Table **B** presents the correlation matrix among the instruments.

Table A – Descriptive Statistics and Autocorrelations

	DS	DY	STR	TS
Mean	0.0000	0.0000	0.0000	0.0000
Median	-0.0439	-0.0392	-0.0507	-0.0458
Maximum	1.9878	1.0328	0.9208	1.0072
Minimum	-1.2697	-0.3817	-1.0831	-0.9678
Std. Deviation	0.5384	0.2463	0.4582	0.4436
Skewness	0.3883	1.6947	-0.2505	0.1408
Kurtosis	5.2306	7.3277	2.6578	2.5333
AC1	0.6970	0.5290	0.8890	0.8990

Table B – Correlation Matrix

	DS	DY	STR	TS
DS	1.0000			
DY	0.5762	1.0000		
STR	-0.0142	-0.1122	1.0000	
TS	-0.2689	-0.0171	-0.6869	1.0000

In the tables above we can see that correlations between the instruments range from -0.8023 to 0.6716 for the Global variables and from -0.6869 to 0.5762 for the European variables, so we may encounter some multicollinearity problems, particularly between the short-term rate and the slope of the term structure variables.[60] However, before using these instruments on our conditional performance evaluation models, we previously checked their predictive power of stock returns.

The (unreported) analysis of predictability, using both simple and multiple regressions, for Global and European stock market indices (specifically, the MSCI AC World TR index and the MSCI AC Europe TR index), as well as portfolios of funds, showed that Global information variables are not only useful predictors of Global stock returns, but also that they do a much better job in explaining European stock returns than European information variables. Consequently, although we are investigating European-based funds, with European and Global investment universes, we will use Global information variables for both fund categories, as in Cortez *et al.* (2009). An additional argument to justify the use of Global information variables is the increasing degree of integration of international financial markets.

Moreover, stock return predictability tests have also shown that, with respect to Global information variables, the slope of the term structure, the default spread and the dividend yield variables are all highly significant in most cases. On the other hand, the short-term

[60] As mentioned by Gujarati (1995), "*...if the pair-wise or zero-order correlation coefficient between two regressors is high, say, in excess of 0.8, then multicollinearity is a serious problem*" (Gujarati, 1995, p. 335).

interest rate is, usually, only weakly significant and the variable that presents the smallest explanatory power of stock returns. Consequently, since the short-term rate variable is highly correlated with the term structure variable, which is clearly the most important of all information variables, we chose not to use it on our conditional models.

Therefore, given these results, we will use the same set of three Global information variables when evaluating Global and European funds with conditional performance evaluation models: a default spread, the dividend yield and the slope of the term structure.[61] Since correlations between these variables range from -0.4617 to 0.6716, multicollinearity should not significantly affect the results of our conditional models.

4.4 Empirical Results

4.4.1 Fund Performance

As mentioned previously, our fund samples are not similarly distributed by country and are concentrated on the two leading European markets, France and the UK, which account for 78% of our SRI fund sample. Consequently, in each section, instead of the more usual portfolio-level analysis, which we also use for some additional robustness tests, we focus on an analysis at the individual fund level, in which the individual SRI funds are compared with their corresponding matched-portfolios of conventional funds. In addition, we employ several model specifications, in order to assess the sensitivity of our results to different performance evaluation models.

4.4.1.1 Unconditional Single-Factor Model: Evaluating Benchmark Sensitivity

The first performance evaluation model we make use of is an unconditional 1-factor model. Although it has several well-known limitations, this model may be useful in the following ways: (1) to test the sensitivity of our results to the benchmarks used; (2) to

[61] Considering some risk of data mining, we have also analysed the predictive power of two other macroeconomic variables in explaining stock returns: the level of inflation (measured by the annual percentage change in the European Union or the US Consumer Price Index) and a measure of industrial production growth (based on the 12-month percentage change in the European Union or the US Industrial Production index, excluding construction). Data on the additional macroeconomic variables was obtained from the European Central Bank and Datastream. However, we found that these variables did not improve our results, since their predictive power was very weak. In addition, we have also investigated the existence of the so-called January effect. To do that, we used a January dummy variable, which took a value of 1 if the next month was the month of January and 0 otherwise. Nevertheless, our results showed no evidence of any seasonality in returns.

evaluate if the returns of SRI funds are better explained by conventional or by socially responsible indices; (3) to assess the existence of European biases in Global equity funds, as reported by Ferruz, Muñoz and Vargas (2010) for UK SRI pension funds.[62]

The results of applying the unconditional 1-factor model of equation [4.1] to each SRI fund in our sample and the corresponding matched-portfolios are summarised in Table 4.10 (full results are available in Appendix 4.2).

Table 4.10 – Summary of Individual Fund Performance and Risk Estimates using the Unconditional 1-Factor Model

This table presents the number of positive (*N*+) or negative (*N*–) coefficients for the performance (alphas) estimates of SRI funds and the characteristics-matched portfolios of conventional funds, as well as those which are statistically significant at the 5% level, reported in brackets, using the unconditional 1-factor model of equation [4.1]. In addition, we also report the percentage of significantly positive (% Sig. *N*+) or significantly negative (% Sig. *N*–) alphas. In the last two columns of the table we report the average alphas (expressed in percentage) and the average betas for each fund category. The benchmarks used are the MSCI AC World TR index for Global equity funds and the MSCI AC Europe TR index for European equity funds. Panel A presents the results for Global equity funds from the EMU countries, Panel B for UK Global equity funds and Panel C for European equity funds.

Panel A: Global Equity Funds – EMU				
	α_p		Average α_p	Average β_p
SRI Funds	***N+*** ***N-***	2 [0] 8 [3]	-0.0977	0.9161
	% Sig. N+ ***% Sig. N-***	0% 30%		
Matched-portfolios	***N+*** ***N-***	1 [0] 9 [5]	-0.1792	0.9474
	% Sig. N+ ***% Sig. N-***	0% 50%		
Panel B: Global Equity Funds – UK				
	α_p		Average α_p	Average β_p
SRI Funds	***N+*** ***N-***	2 [0] 6 [3]	-0.1492	1.0117
	% Sig. N+ ***% Sig. N-***	0% 38%		
Matched-portfolios	***N+*** ***N-***	4 [0] 4 [2]	-0.1373	1.0378
	% Sig. N+ ***% Sig. N-***	0% 25%		
Panel C: European Equity Funds				
	α_p		Average α_p	Average β_p
SRI Funds	***N+*** ***N-***	5 [0] 32 [10]	-0.1499	1.0100
	% Sig. N+ ***% Sig. N-***	0% 27%		
Matched-portfolios	***N+*** ***N-***	13 [0] 24 [5]	-0.0673	0.9922
	% Sig. N+ ***% Sig. N-***	0% 14%		

[62] Besides, since our matched-portfolios control for some investment styles, the results of our 1-factor model may be more reliable than in previous studies, although several limitations persist.

Our results show that most of our SRI and conventional funds present neutral performance. At the 5% level, there is not a single SRI fund that significantly outperforms its benchmark, while 6 Global (3 from EMU countries and 3 UK funds) and 10 European funds significantly underperform the market. Similar results are found for the matched-portfolios, where 7 Global (5 from EMU countries and 2 from the UK) and 5 European portfolios present significantly negative alphas at the 5% level. All the remaining portfolios present performance that is not significantly different from zero.[63]

Overall, the percentage of funds with significantly negative performance (at the 5% level) is slightly higher for the SRI funds (29%) than for the matched-portfolios (22%), indicating a slender underperformance of the socially-screened portfolios. However, results vary considerably between the three fund categories. The performance estimates of our matched-portfolios of UK Global equity funds are very similar to those of the SRI funds, whereas Global equity funds from EMU countries perform better than their conventional peers, with significantly negative performance being registered for 30% of the SRI funds and 50% of their matched-portfolios. On the other hand, for European funds, the percentage of SRI funds with significantly negative alphas is two times higher than that of the conventional funds, which is evidence of a considerable underperformance of socially-screened portfolios.

To test if the alphas of SRI funds are significantly different than the alphas of conventional funds we use both parametric (*t*-tests) and non-parametric tests (Mann-Whitney *U*-tests).[64] The results of these tests, reported in Appendix 4.3, show that differences in performance between SRI and conventional funds are only significant for European equity funds, both with the parametric (although only at the 10% level) and the non-parametric (at the 5% level) tests.

Another interesting result is that, taken together, SRI funds in our sample do not seem to have lower market exposures than their peers. Overall, evidence is mixed, with 29 SRI funds having lower betas than conventional funds, while the remaining 26 have higher market exposures. However, it is important to mention the contrast between the three fund categories we investigate. While most of the Global funds (both from the UK and the EMU countries) have lower betas than their matched-portfolios, in line with many previous studies (e.g.:

[63] In Appendix 4.2, we can also see that the adjusted R^2's are relatively high for all portfolios, reaching average values of 88.53% for the SRI funds and 88.51% for the conventional funds. In most cases, though, they are lower for the SRI funds than for their matched-portfolios, especially in the Global equity fund sub-samples.

[64] The parametric *t*-test is used to compare the means of both series (SRI and conventional), while the Mann-Whitney test (which is statistically equivalent to the Wilcoxon rank sum test) is a median equality test. For this reason, the Mann-Whitney test not only overcomes the underlying assumption of normality used in parametric tests, but can also be considered more robust to the presence of outliers. Hence, it is less likely to spuriously indicate significance than the *t*-test, a fact that may be important when dealing with small sample sizes.

Mallin *et al.*, 1995; Gregory *et al.*, 1997; Kreander *et al.*, 2005), for the majority of the European funds it's exactly the opposite, with 57% of the SRI funds presenting higher betas than their matched-portfolios. Nevertheless, the differences in the risk exposures of SRI and conventional funds are not significant for all three categories, according to both parametric and non-parametric tests performed (see Appendix 4.3).

In terms of benchmark sensitivity, a pertinent issue in SRI fund studies is whether SRI benchmarks are as powerful as conventional benchmarks in explaining SRI fund returns. To analyse this matter, we ran regression [4.1] for our SRI funds using SRI benchmarks as well, specifically the FTSE4GOOD Global TR index for Global equity funds and the FTSE4GOOD Europe TR index for European equity funds.[65] The results of these regressions are presented in Table 4.11.

Table 4.11 – SRI Fund Performance and Risk Estimates: SRI vs. Conventional Benchmarks

This table presents estimates of performance (alphas expressed in percentage) and risk for each individual SRI fund, using the unconditional 1-factor model of equation [4.1], with both SRI and conventional benchmarks. As conventional benchmarks, we use the MSCI AC World TR and the MSCI AC Europe TR indices. As SRI benchmarks, we use the FTSE4GOOD Global TR index for the Global equity funds and the FTSE4GOOD Europe TR index for the European equity funds. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for Global equity funds and Panel B for European equity funds.

Panel A: Global Equity Funds										
	MSCI AC World					FTSE4GOOD Global				
Code	α_p		β_p		R^2 adj.	α_p		β_p		R^2 adj.
ATG1	0.0542		0.9484	***	88.17%	0.0602		0.9100	***	80.45%
BEG1	-0.0824		0.9871	***	95.60%	-0.0030		0.9442	***	94.53%
DEG1	-0.2194		1.0639	***	85.73%	-0.1336		0.9989	***	81.16%
DEG2	-0.2148	**	0.9962	***	94.28%	-0.1242		0.9700	***	94.04%
DEG3	-0.1268		0.9849	***	89.98%	-0.0025		0.9948	***	88.17%
FRG1	-0.0578		0.9425	***	83.89%	0.0344		0.9294	***	78.23%
FRG2	0.4098		0.8438	***	84.45%	0.4576		0.8177	***	78.31%
ITG1	-0.3604	***	0.8866	***	94.20%	-0.2851	***	0.8587	***	93.05%
ITG2	-0.3381	***	0.6548	***	96.15%	-0.2775	***	0.6372	***	93.98%
NLG1	-0.0408		0.8522	***	80.96%	0.0268		0.7991	***	76.43%
UKG1	-0.3019	**	0.9848	***	91.41%	-0.2110		0.9422	***	87.10%
UKG2	0.2903	*	0.9385	***	89.37%	0.3699	**	0.8803	***	84.49%
UKG3	-0.4099	***	0.9814	***	89.67%	-0.3076	*	0.9468	***	85.24%
UKG4	-0.1020		1.1093	***	93.05%	-0.0324		1.1123	***	88.49%
UKG5	0.0175		1.0272	***	89.80%	0.1061		0.9659	***	85.34%
UKG6	-0.2852	**	0.9754	***	86.24%	-0.2040		0.9121	***	81.03%
UKG7	-0.0734		1.0016	***	84.91%	0.0116		0.9309	***	78.65%
UKG8	-0.3293		1.0752	***	73.00%	-0.2032		1.0470	***	64.39%

[65] We could have also used alternative SRI benchmarks, but we could not find appropriate indices to cover our entire sample period. In fact, the only alternative SRI indices with a global or European focus we could find were the ECPI Ethical Global and the ECPI Ethical Euro indices, provided by E. Capital Partners, but these had records available only from 2001.

Table 4.11 – SRI Fund Performance and Risk Estimates: SRI vs. Conventional Benchmarks (continued)

Panel B: European Equity Funds										
	MSCI AC Europe					FTSE4GOOD Europe				
Code	α_p		β_p		R^2 *adj.*	α_p		β_p		R^2 *adj.*
BEE1	-0.2421	**	0.9475	***	87.85%	-0.1822		0.9260	***	85.83%
BEE2	-0.2079	*	1.0650	***	87.90%	-0.1267		1.0405	***	85.54%
DEE1	-0.0389		0.9913	***	96.01%	0.0329		0.9819	***	96.19%
FRE1	-0.2780	***	0.9571	***	96.53%	-0.2009	**	0.9476	***	96.82%
FRE2	-0.2517	***	1.0150	***	97.82%	-0.1549		1.0600	***	96.64%
FRE3	-0.1562		0.9379	***	90.72%	-0.1002		0.9299	***	90.56%
FRE4	-0.1601		1.0044	***	89.83%	-0.0840		0.9883	***	88.98%
FRE5	-0.3052	***	0.9739	***	96.49%	-0.2532	***	1.0115	***	97.47%
FRE6	-0.3424	***	1.0255	***	95.28%	-0.2495	**	1.0207	***	96.12%
FRE7	-0.2163	*	0.8954	***	94.46%	-0.1574	*	0.9403	***	96.01%
FRE8	-0.1776	***	1.0164	***	98.43%	-0.1046	**	1.0058	***	98.42%
FRE9	-0.2510	***	0.9713	***	96.60%	-0.1991	**	1.0079	***	97.41%
FRE10	-0.4390	**	0.9393	***	83.17%	-0.3550	*	0.9245	***	82.16%
FRE11	0.2293		0.8774	***	90.48%	0.2924	*	0.9222	***	90.51%
FRE12	-0.0224		0.9212	***	79.23%	0.0377		0.9433	***	76.61%
FRE13	-0.0436		0.9228	***	70.64%	0.0124		0.9173	***	70.87%
FRE14	0.0194		1.0537	***	89.74%	0.0768		1.0401	***	88.87%
FRE15	-0.0380		1.0410	***	79.10%	0.0461		1.0219	***	77.59%
FRE16	0.0248		0.9081	***	90.07%	0.1065		0.8963	***	89.46%
FRE17	-0.2723	*	1.0494	***	90.95%	-0.2054		1.0262	***	88.78%
FRE18	-0.3010	**	1.0402	***	87.79%	-0.2624	*	1.0087	***	85.13%
FRE19	-0.3086	*	1.1281	***	82.02%	-0.2262		1.1033	***	80.23%
FRE20	-0.0892		1.1005	***	91.57%	-0.0048		1.0841	***	90.92%
FRE21	-0.1990	*	1.1576	***	94.61%	-0.0966		1.1468	***	94.87%
FRE22	-0.1460		0.9185	***	88.01%	-0.0871		0.8988	***	86.04%
FRE23	0.0313		1.1421	***	91.89%	0.1101		1.1255	***	91.11%
FRE24	-0.0885		1.1310	***	91.67%	-0.0139		1.1097	***	90.10%
FRE25	-0.3017		1.1514	***	77.05%	-0.2142		1.1465	***	78.02%
FRE26	-0.4870	***	0.8884	***	81.57%	-0.4326	**	0.8655	***	79.03%
FRE27	-0.0502		1.1109	***	94.05%	0.0262		1.0945	***	93.22%
FRE28	0.0402		0.9477	***	75.31%	0.1006		0.9269	***	73.53%
FRE29	-0.0739		1.0895	***	89.24%	0.0031		1.1345	***	87.66%
FRE30	-0.1550		1.0935	***	92.03%	-0.0816		1.0748	***	90.77%
FRE31	-0.0678		1.1309	***	89.62%	-0.0011		1.0982	***	86.24%
FRE32	-0.1046		1.0724	***	89.35%	-0.0336		1.1151	***	89.15%
FRE33	-0.0075		0.9226	***	72.76%	0.0413		0.9437	***	71.24%
ESE1	-0.0672		0.8315	***	91.59%	0.0230		0.8863	***	93.72%

Our results show that conventional benchmarks have a higher explaining power of SRI fund returns than SRI benchmarks, since we find higher adjusted R^2's for all Global equity funds and for 26 of the 37 European equity funds (on average, the adjusted R^2's are 4.32% higher for the Global funds and 0.77% higher for the European funds). These results mean that conventional indices are more useful in explaining SRI mutual fund returns than SRI indices, in line with the findings of Bauer *et al.* (2005), Bauer *et al.* (2007) and Cortez *et al.* (2009, *forthcoming*).

Another interesting result is that the performance of our individual SRI funds is always higher with SRI benchmarks than with conventional benchmarks, although only one SRI fund is able to outperform its SRI index significantly, at the 5% level. However, only eight funds (2 Global and 6 European) remain with a negative and statistically significant alpha at the 5% level. On the other hand, SRI benchmarks lead to lower betas than conventional benchmarks for approximately 78% of our fund sample (more precisely, for 43 of the 55 SRI funds), meaning that SRI funds are more exposed to standard market indices than to SRI indices.

To further evaluate the sensitivity of our results to the benchmarks chosen, we perform two additional robustness tests. Since (unreported) results at the individual fund level are very similar to a portfolio-level analysis, we chose to present the results for the latter, to allow an easier interpretation.

In the first test, we ran regression [4.1] for the portfolios of SRI and conventional funds using alternative conventional benchmarks, specifically the FTSE AW All-World TR Index for Global equity funds and the FTSE AW Europe TR Index for European equity funds, instead of the MSCI indices. The results of these regressions, presented in Appendix 4.4, are very similar between the two alternative benchmarks and do not change our inferences.[66] Therefore, since we also use MSCI indices to compute our additional size and book-to-market factors, as well as to evaluate the existence of possible home biases, we chose to use the MSCI indices.

In our second test, we evaluated the possibility of Global equity funds being mainly invested in European securities, as reported by Ferruz, Muñoz and Vargas (2010) for UK pension funds. To do that, we estimated regression [4.1] for the Global equity fund portfolios using the MSCI AC Europe TR index as benchmark. Our results, presented in Appendix 4.5, show that the use of global benchmarks is, as expected, more appropriate, since it leads to higher adjusted R^2's than with European benchmarks (3.88%, on average).

[66] The main difference in the results of our models is that the adjusted R^2's are, in general, slightly lower for Global equity funds and slightly higher for European equity funds with the FTSE AW indices, in comparison with the MSCI AC indices. However, the differences are very small, reaching average values of 0.09% and 0.56% for Global and European equity funds, respectively.

4.4.1.2 Unconditional 4-Factor Model: Evaluating Differences in Investment Styles

Given the limitations of the 1-factor model, we also use the Carhart (1997) 4-factor model to evaluate the differences in performance and, additionally, in investment styles between SRI and conventional funds.

Our decision to create matched-portfolios of conventional funds based on investment styles and, simultaneously, use multi-factor models that control for some of those styles is justified for the following reasons: (1) we may encounter some misclassification issues in Morningstar categories; (2) investment styles may change during the studied period and the Morningstar classifications we use refer to the end of our sample period; (3) even if funds have the same broad investment style, they can be significantly more/less exposed to the factors; (4) besides size and book-to-market effects, which are those that are reflected in Morningstar style classifications, our 4-factor model also controls for momentum effects.

Table 4.12 summarises the results of applying the unconditional 4-factor model of equation [4.3] to each of our 55 SRI funds and their characteristics-matched portfolios (full results on individual regressions are available in Appendix 4.6).

First, our results confirm the importance of controlling for size, book-to-market and momentum effects, besides market risk. As we can see in Appendix 4.6, at the usual significance levels, we can reject the null hypothesis of the Wald test that the coefficients of the additional factors are jointly equal to zero for the majority of the SRI funds and their matched-portfolios. This evidence is further reinforced when comparing these results with those of the unconditional 1-factor model. In fact, there is an increase in the adjusted R^2's for 45 SRI funds and 48 matched-portfolios (which represent 82% and 87% of our samples, respectively), with differences that reach up to 8.58%. This evidence shows the superiority of multi-factor models in explaining fund returns.

Table 4.12 – Summary of Individual Fund Performance and Risk Estimates using the Unconditional 4-Factor Model

This table presents the number of positive (*N*+) or negative (*N*–) coefficients for the performance (alphas) and risk (betas of the size, book-to-market and momentum factors) estimates of SRI funds and the characteristics-matched portfolios of conventional funds, as well as those which are statistically significant at the 5% level, reported in brackets, using the unconditional 4-factor model of equation [4.3]. In addition, we also report the percentage of significantly positive (% Sig. *N*+) or significantly negative (% Sig. *N*–) coefficients for each parameter. In the last two columns of the table we report the average alphas (expressed in percentage) and the average betas of the market factor for each fund category. The benchmarks used are the MSCI AC World TR index for Global equity funds and the MSCI AC Europe TR index for European equity funds. Panel A presents the results for Global equity funds from the EMU countries, Panel B for UK Global equity funds and Panel C for European equity funds.

		α_p	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	Average α_p	Average β_p (MKT)
Panel A: Global Equity Funds – EMU							
SRI Funds	***N+***	1 [0]	8 [2]	2 [0]	7 [3]	-0.1377	0.9000
	N-	9 [2]	2 [0]	8 [2]	3 [2]		
	% Sig. N+	0%	20%	0%	30%		
	% Sig. N-	20%	0%	20%	20%		
Matched-portfolios	***N+***	1 [0]	4 [1]	3 [1]	6 [1]	-0.1671	0.9389
	N-	9 [3]	6 [2]	7 [1]	4 [0]		
	% Sig. N+	0%	10%	10%	10%		
	% Sig. N-	30%	20%	10%	0%		
Panel B: Global Equity Funds – UK							
		α_p	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	Average α_p	Average β_p (MKT)
SRI Funds	***N+***	2 [0]	7 [6]	2 [0]	7 [2]	-0.1884	0.9765
	N-	6 [4]	1 [0]	6 [3]	1 [0]		
	% Sig. N+	0%	75%	0%	25%		
	% Sig. N-	50%	0%	38%	0%		
Matched-portfolios	***N+***	2 [0]	6 [2]	3 [1]	8 [4]	-0.2460	1.0539
	N-	6 [2]	2 [0]	5 [2]	0 [0]		
	% Sig. N+	0%	25%	13%	50%		
	% Sig. N-	25%	0%	25%	0%		
Panel C: European Equity Funds							
		α_p	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	Average α_p	Average β_p (MKT)
SRI Funds	***N+***	8 [0]	17 [4]	25 [7]	7 [0]	-0.1393	0.9817
	N-	29 [11]	20 [3]	12 [2]	30 [9]		
	% Sig. N+	0%	11%	19%	0%		
	% Sig. N-	30%	8%	5%	24%		
Matched-portfolios	***N+***	11 [0]	26 [15]	24 [3]	9 [2]	-0.0828	0.9542
	N-	26 [4]	11 [0]	13 [2]	28 [7]		
	% Sig. N+	0%	41%	8%	5%		
	% Sig. N-	11%	0%	5%	19%		

Second, in terms of performance, Table 4.12 shows that 17 SRI funds (2 EMU Global, 4 UK Global and 11 European) and 10 matched-portfolios (3 EMU Global, 2 UK Global and 4 European), which altogether represent 31% and 18% of our samples, respectively, present significantly negative alphas at the 5% level, with all the remaining portfolios presenting neutral performance. The performance estimates are similar for EMU Global funds, as well as the distribution of individual alphas between SRI and conventional funds. For UK Global funds, we find significantly negative alphas for 50% of the SRI funds and only 25% of their matched-portfolios, although average performance is better for the former than for the latter. European SRI funds continue to perform worse than their peers, with 30% of the SRI funds significantly underperforming their benchmarks, while just 11% of the conventional fund portfolios present significantly negative alphas. In addition, the average alpha is also lower for the SRI funds than for their matched-portfolios. However, when we analyse the differences in performance between SRI and conventional funds, we find no statistically significant differences in all three fund categories using both parametric and non-parametric tests, as we can confirm in Appendix 4.7.[67] Therefore, previous evidence of significant underperformance from European SRI funds is removed when using the 4-factor model.

Third, we find mixed evidence in terms of market exposures, with 32 SRI funds (16 Global and 16 European) having lower betas than their peers and 23 SRI funds (2 Global and 21 European) presenting higher betas. Like with the 1-factor model, it is clear that Global SRI funds are less exposed to the market than their peers, but European SRI funds are slightly less risk-averse than their peers. When we analyse the significance of the differences in market exposures, we find that differences in betas are statistically significant only for UK Global funds. For this category, both parametric and non-parametric tests show that SRI funds are significantly (at the 5% level) less exposed to the market than their matched-portfolios.

Fourth, although most previous studies report significant small-cap biases for SRI funds, overall the size factor is significantly positive (at the 5% level) for only 12 SRI funds, i.e., 22% of our sample. However, most of these significant small-cap biases are associated to UK Global funds. Indeed, 75% of these SRI funds are significantly more exposed to small caps, although only one is classified as a "Small/Mid Cap" fund. Therefore, previous findings of significant small-cap biases for the SRI funds seem to be restricted to the UK market. Furthermore, our results also show that 18 of our conventional fund portfolios are also significantly more exposed to small caps. This type of evidence suggests there may be some misclassification issues in the Morningstar classification scheme, as all but one of our funds are classified as "Large Cap" funds.

Another interesting finding is that conclusions regarding the size factor exposures vary considerably between our three fund categories. We do not find many differences between SRI and conventional funds for EMU Global funds, but UK Global SRI funds seem clearly

[67] It should be mentioned that in Appendix 4.7 we also evaluate the significance of the differences between SRI and conventional funds in terms of their risk exposures and not only in relation to fund performance.

more exposed to small caps than their conventional peers. On the other hand, for European SRI funds we observe the opposite. In fact, in this last category, 41% of the matched-portfolios are significantly more exposed to small caps, while only 11% of the SRI funds present similar exposures. Furthermore, there is no European matched-portfolio with a significantly negative exposure to the size factor, whereas 8% of European SRI funds show significant tilts towards large caps. When we evaluate the significance of the differences in the size factor exposures, we find no significant differences for EMU Global funds. However, according to both parametric and non-parametric tests, UK Global SRI funds are significantly more exposed to small caps than their conventional peers (although only at the 10% level), whereas European SRI funds exhibit significantly (at the 5% level) lower exposures to small caps than their matched-portfolios, as we can confirm in Appendix 4.7.

Fifth, since 42% of our fund sample is composed by funds classified as "Large Cap Blend", it is with no surprise that only 14 SRI funds (2 EMU Global, 3 UK Global and 9 European) and 10 matched-portfolios (2 EMU Global, 3 UK Global and 5 European) exhibit significant exposures (at the 5% level) to the HML factor. Indeed, 75% of the SRI funds and 82% of their matched-portfolios do not exhibit significant value or growth tendencies. If we compare our three fund categories, we can see that Global SRI funds, both EMU and UK-based, seem slightly more growth-oriented than their matched-portfolios, while European SRI funds seem slightly more value-oriented than conventional funds. However, none of the differences between SRI and conventional funds in terms of the HML factor exposures is statistically significant. Although our results suggest the existence of some misclassification issues in the Morningstar style classifications, since we find several funds classified as "Large Cap Blend" that express clear tilts towards growth or value stocks, it is a fact that most of the Morningstar style classifications are in accordance with our results.[68] Anyway, even if these misclassifications exist, they are not reflected on performance estimates, since our multi-factor model controls for these investment styles.

Finally, 71% of the SRI funds and 75% of their matched-portfolios do not show significant exposures to the momentum factor. Significant positive exposures, at the 5% level, are found for only 5 SRI funds (3 EMU Global and 2 UK Global) and 7 matched-portfolios (1 EMU Global, 4 UK Global and 2 European), whereas significantly negative exposures characterize 11 SRI funds (2 EMU Global and 9 European) and 7 (European) conventional

[68] Moreover, any eventual discrepancies between our results and the Morningstar classifications may also be a result of the fact that investment styles can change during the sample period and the Morningstar classifications refer to the end of our sample period.

fund portfolios.[69] Overall, Global funds seem more exposed to momentum strategies, whereas European funds seem more exposed to contrarian strategies. When comparing between fund categories, although European SRI funds seem slightly more exposed to contrarian strategies than conventional funds (24% of the SRI funds and 19% of the matched-portfolios have significantly negative exposures to the momentum factor), none of the differences between SRI and conventional funds was statistically significant, according to both parametric and non-parametric tests.

4.4.1.3 Unconditional 5-Factor Model: Measuring Home Biases

Since we are investigating international funds, another important issue to address is the possible existence of home biases in portfolio composition. In fact, fund managers may prefer investing in local stocks due to information advantages, in the sense that it is more costly to operate far away from the information (e.g.: Engström, 2003). The home bias has been documented in the literature of conventional mutual funds (e.g.: Chan *et al.*, 2005; Otten and Bams, 2007). Moreover, recent studies that include international SRI funds have recognised the existence of significant home biases in their holdings (e.g.: Bauer *et al.*, 2006; Gregory and Whittaker, 2007; Cortez *et al.*, *forthcoming*). To deal with this possibility and to assess the extent to which our samples of funds are over-weighted in local stocks, we have also considered an additional local factor in our 4-factor performance evaluation model, resulting in the 5-factor model of equation [4.4].

The results of our individual fund regressions, available in Appendix 4.9, show significant home biases, at the 5% level, for 67% of our individual SRI funds (more precisely, for 37 SRI funds). However, when we look at the matched-portfolios we see that 60% of conventional funds also present significant exposures to their local markets. These findings further confirm the existence of significant home biases in internationally-oriented mutual funds. Nevertheless, SRI funds seem only marginally more invested in local stocks than their conventional peers.

If we compare our fund categories, we observe that the existence of significant home biases is more evident for European funds than for Global funds, both EMU and UK-based. In

[69] We have also used an alternative European momentum factor on our unconditional 4-factor model, based on the 18 Dow Jones Euro Stoxx Supersector indices. Our results, available in Appendix 4.8, show that the individual significance of the momentum factor is lower with this last specification than when the factor is based on the Dow Jones Stoxx 600 Supersector indices and, therefore, confirm that our initial choice is more appropriate. We chose to present the results of this additional robustness test at the portfolio-level as (unreported) results at the individual fund level were similar.

fact, for European funds, 78% of the SRI funds and 70% of the matched-portfolios present significant exposures (at the 5% level) to local stocks, while the same indicators reach 38% and 25%, respectively, for UK Global funds and 50% for both SRI and conventional EMU Global funds. However, when we evaluate the significance of the differences in the local factor exposures, we find no statistically significant differences between SRI and conventional funds for all three fund categories, using both parametric and non-parametric tests (see Appendix 4.10).

When comparing the 4-factor with the 5-factor model specification, it is clear that we should chose the latter: 51 SRI funds and 48 matched-portfolios (93% and 87% of our samples, respectively) present higher adjusted R^2's with the 5-factor model, with increases of 0.89% and 1.79%, on average, for Global and European funds, respectively.[70]

In terms of performance, the 5-factor model leads to slightly higher alphas for most Global funds (69%, to be more precise) and lower alphas for the vast majority (92%) of European funds. As a consequence, 35% of the SRI funds and 24% of the matched-portfolios present significantly negative alphas at the 5% level, with all other performance estimates being not statistically significant. Overall, in comparison with the 4-factor model, there are more funds (SRI and conventional) with significantly negative performance, but the differences between both fund groups remain statistically insignificant for all three categories. In general, all our previous observations in terms of the other factor exposures (market, size, book-to-market and momentum) remain valid with the 5-factor specification.

Therefore, our findings recognise the existence of significant home biases in international SRI funds, in line with previous studies (e.g.: Bauer *et al.*, 2006; Gregory and Whittaker, 2007; Cortez *et al.*, *forthcoming*). However, in contrast to Bauer *et al.* (2006), we cannot argue that SRI funds are significantly more exposed to local stocks than their conventional peers, since differences in the exposures to the local factor are not statistically significant. Nevertheless, we do find significant exposures to the local factor for the majority of our fund samples and our results confirm the superior explanatory power of the 5-factor model, in comparison with the 4-factor specification, when evaluating the performance of internationally-oriented mutual funds.

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70 In addition, Gregory and Whittaker (2007) have also suggested that we should control for possible home biases not only in the market factor but also in the size, book-to-market and momentum factors. Although we did not have local momentum factors and we could only compute local size factors for the period of 2001 to 2008, given the availability of the local MSCI Small Cap indices, we have also estimated a multi-factor model that allowed for home biases in the market, size and book-to-market factors, as a further robustness test. This 7-factor model, estimated for the period of January 2001 to December 2008, was constructed by adding local size and book-to-market factors to regression [4.4], with the local size factor being measured as the return difference between the local MSCI Small Cap and Large Cap indices and the local book-to-market factor corresponding to the difference in the returns of the local MSCI Value and MSCI Growth indices. The results obtained with this last specification, presented in Appendix 4.11, showed little evidence of significant differences between SRI and conventional funds in terms of their exposures to the local size or book-to-market factors (similarly to our previous robustness checks, results are presented at the portfolio-level to allow an easier interpretation).

4.4.1.4 Conditional Multi-Factor Model

Given that performance and risk estimates may be time-varying, conditional models are clearly more appropriate to measure fund performance. As discussed previously, conditional models are recognised as theoretically more robust for evaluating mutual fund performance. Also, our previous analysis of stock return predictability suggested that some public information variables are useful in predicting stock returns. As a consequence, we should incorporate them on our performance evaluation models. Additionally, given that our previous results showed clear evidence of significant home biases affecting both SRI and conventional funds, our conditional multi-factor model, which incorporates both time-varying alphas and betas, also includes the local factor.

Our results, available in detail in Appendix 4.12, show that the incorporation of the lagged public information variables has a positive impact in the explanatory power of the models, consistent with most empirical studies that use conditional measures, both to assess the performance of conventional funds (e.g.: Ferson and Schadt, 1996; Otten and Bams, 2004) and SRI funds (e.g.: Bauer *et al.*, 2006; Cortez *et al.*, 2009, *forthcoming*). In fact, 93% of our individual SRI funds (16 Global and 34 European funds) exhibit higher adjusted R^2's in relation to the unconditional 5-factor model, with increases of 1.51% and 1.50%, on average, for the Global and European fund categories, respectively.[71] Additionally, the results of the Wald tests show that the percentage of individual SRI funds presenting time-varying betas is of 94%, while approximately 22% exhibit time-varying alphas (at the 5% level). Only one SRI fund rejects the joint time-variation of alphas and betas. Since we find similar figures for our matched-portfolios, this evidence further corroborates the use of a conditional performance evaluation model.

Table 4.13 summarises the results of our individual fund regressions based on the conditional 5-factor model of equation [4.9].

[71] It is worth to mention that our conditional multi-factor model was not estimated for one of the UK Global equity funds (Code UKG8), since it only had 24 monthly observations for the returns.

Table 4.13 – Summary of Individual Fund Performance and Risk Estimates using the Conditional 5-Factor Model

This table presents the number of positive (N+) or negative (N–) coefficients for the performance (average conditional alphas) and risk (average conditional betas of the size, book-to-market, momentum and local factors) estimates of the SRI funds and the characteristics-matched portfolios of conventional funds, as well as those which are statistically significant at the 5% level, reported in brackets, using the conditional 5-factor model of equation [4.9]. In addition, we also report the percentage of significantly positive (% Sig. N+) or significantly negative (% Sig. N–) coefficients for each parameter. In the last two columns of the table we report the average conditional alphas (expressed in percentage) and the average conditional betas of the market factor for each fund category. The benchmarks used are the MSCI AC World TR index for Global equity funds and the MSCI AC Europe TR index for European equity funds. Panel A presents the results for Global equity funds from the EMU countries, Panel B for UK Global equity funds and Panel C for European equity funds.

		α_{0p}	$\beta_{0,1p}$ (SMB)	$\beta_{0,2p}$ (HML)	$\beta_{0,3p}$ (MOM)	$\beta_{0,4p}$ (HBIAS)	Average α_{0p}	Average β_{0p} (MKT)
Panel A: Global Equity Funds – EMU								
SRI Funds	***N+***	1 [0]	5 [0]	4 [1]	6 [1]	8 [6]	-0.2379	0.8668
	N-	9 [6]	5 [2]	6 [1]	4 [0]	2 [1]		
	% Sig. N+	0%	0%	10%	10%	60%		
	% Sig. N-	60%	20%	10%	0%	10%		
Matched-portfolios	***N+***	0 [0]	3 [2]	5 [0]	6 [0]	9 [4]	-0.2997	0.9281
	N-	10 [3]	7 [1]	5 [1]	4 [0]	1 [0]		
	% Sig. N+	0%	20%	0%	0%	40%		
	% Sig. N-	30%	10%	10%	0%	0%		
Panel B: Global Equity Funds – UK								
		α_{0p}	$\beta_{0,1p}$ (SMB)	$\beta_{0,2p}$ (HML)	$\beta_{0,3p}$ (MOM)	$\beta_{0,4p}$ (HBIAS)	Average α_{0p}	Average β_{0p} (MKT)
SRI Funds	***N+***	3 [0]	6 [4]	2 [1]	6 [1]	6 [3]	-0.2113	0.9913
	N-	4 [4]	1 [0]	5 [2]	1 [0]	1 [0]		
	% Sig. N+	0%	57%	14%	14%	43%		
	% Sig. N-	57%	0%	29%	0%	0%		
Matched-portfolios	***N+***	1 [0]	7 [1]	2 [1]	4 [2]	7 [4]	-0.1958	1.0894
	N-	6 [2]	0 [0]	5 [3]	4 [0]	0 [0]		
	% Sig. N+	0%	14%	14%	29%	57%		
	% Sig. N-	29%	0%	43%	0%	0%		
Panel C: European Equity Funds								
		α_{0p}	$\beta_{0,1p}$ (SMB)	$\beta_{0,2p}$ (HML)	$\beta_{0,3p}$ (MOM)	$\beta_{0,4p}$ (HBIAS)	Average α_{0p}	Average β_{0p} (MKT)
SRI Funds	***N+***	5 [0]	18 [1]	24 [2]	18 [2]	34 [25]	-0.1622	0.9759
	N-	32 [9]	19 [3]	13 [1]	19 [0]	3 [0]		
	% Sig. N+	0%	3%	5%	5%	68%		
	% Sig. N-	24%	8%	3%	0%	0%		
Matched-portfolios	***N+***	10 [0]	33 [12]	27 [5]	18 [3]	35 [24]	-0.0950	0.9407
	N-	27 [7]	4 [0]	10 [1]	19 [5]	2 [0]		
	% Sig. N+	0%	32%	14%	8%	65%		
	% Sig. N-	19%	0%	3%	14%	0%		

In terms of performance estimates, we can observe that 19 SRI funds (6 EMU Global, 4 UK Global and 9 European) and 12 matched-portfolios (3 EMU Global, 2 UK Global and 7 European), which, altogether, represent 35% and 22% of our samples, respectively, exhibit significantly negative alphas. These results are very similar to those obtained with the unconditional model. In fact, the majority of the SRI funds and their conventional peers continue to present neutral performance.

Nevertheless, the conditional model produces important differences in the performance of our Global and European fund sub-samples. In comparison with the unconditional 5-factor model, alphas are lower for most Global funds (on average, differences reach 0.09% for EMU Global funds and 0.08% for UK Global funds) and higher for the majority of European funds (0.04%, on average). Although the percentage of funds with significantly negative alphas (at the 5% level) is now higher for SRI funds than for their matched-portfolios in all three fund categories, we do not find any significant difference in the alphas of SRI and conventional funds, as we can confirm in Appendix 4.13.

In addition, most of our previous inferences regarding factor exposures remain valid with the conditional specification, although there are some facts worth mentioning.

First, most Global funds continue to present lower market exposures than their peers, but differences on (average) market betas are even higher under the conditional model. On the other hand, most European funds continue to show higher betas than their matched-portfolios and differences remain identical. Significant differences in the market exposures of SRI and conventional funds are only found for UK Global funds, with SRI funds presenting significantly (although only at the 10% level) lower market betas than their peers, according to both parametric and non-parametric tests.

Second, the significant differences in the size factor exposures of UK Global funds are removed with the conditional model. Nevertheless, the percentage of SRI funds with significant exposures to small caps remains considerably higher for the SRI funds (57%) than for their matched-portfolios (14%). On the other hand, European SRI funds continue to be significantly less exposed to small caps than their matched-portfolios, with differences being significant at the 1% level under both parametric and non-parametric tests (see Appendix 4.13).

Finally, none of the differences between SRI and conventional funds regarding their exposures to the book-to-market, momentum and local factors is statistically significant with the conditional model.

4.4.2 Performance and Investment Styles across Different Market States

Some critics of SRI (e.g.: Entine, 2003) argue that conclusions regarding the relatively good performance of SRI funds may have been overstated, mainly due to the fact that most empirical studies cover the long bull market period of the 1990s. The issue of comparing fund performance across different market regimes has been addressed by recent research on the performance of conventional funds.[72] With respect to SRI funds, the issue is even more pertinent. There are arguments in favour of SRI funds performing better than conventional funds in times of crisis. Indeed, the higher reputation of socially responsible companies might protect these stocks from general price declines in times of crisis. Accordingly, in these periods, portfolios of socially responsible stocks should yield better performance relative to unscreened portfolios. Surprisingly, SRI fund studies do not distinguish their performance in recession and expansion periods.[73] Therefore, in this section, we investigate if the performance and investment styles of SRI and conventional funds vary considerably across different market states.

To identify market states across our sample period we use the business cycles criteria provided by the National Bureau of Economic Research (NBER).[74] In fact, several studies in the finance literature also use NBER business cycles to define market regimes (e.g.: Moskowitz, 2000; Sun, Wang and Zheng, 2009; Areal *et al.*, 2011; Kosowski, 2011). Additionally, the increasing degree of integration of international financial markets and the fact that many of our funds invest globally are also arguments that can be used to support this choice. From January 2000 to December 2008, two recession periods are identified by the NBER: April 2001 to November 2001 and January 2008 to December 2008. The remaining periods are considered expansion periods.

To analyse the performance and risk estimates of SRI and conventional funds over expansion and recession periods we include a dummy variable in our unconditional 5-factor model, in order to obtain the coefficients for each market regime. Consequently, our new specification is given by the following regression:

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[72] Wang (2010), Glode (2011) and Kosowski (2011) have found evidence that mutual funds tend to perform better in recession periods than in expansion periods.

[73] The only exception we are aware of is Areal *et al.* (2011), who focused on US SRI funds. In fact, although Huimin, Kong and Eduardo (2010) have analysed the performance of SRI indices over different market states, this investigation did not include actively managed funds.

[74] Available at http://www.nber.org/cycles.html.

$$r_{p,t} = \alpha_p + \alpha_{rec,p}\,\mathrm{D_t} + \beta_p\, r_{m,t} + \beta_{rec,p}\, r_{m,t}\,\mathrm{D_t} + \beta_{1p}\mathrm{SMB_t} + \beta_{1rec,p}\mathrm{SMB_t}\,\mathrm{D_t} + \beta_{2p}\,\mathrm{HML_t} + \beta_{2rec,p}\,\mathrm{HML_t}\,\mathrm{D_t} +$$

$$+ \beta_{3p}\,\mathrm{MOM_t} + \beta_{3rec,p}\,\mathrm{MOM_t}\,\mathrm{D_t} + \beta_{4p}\left(r_{lm,t} - r_{m,t}\right) + \beta_{4rec,p}\left(r_{lm,t} - r_{m,t}\right)\mathrm{D_t} + \varepsilon_{p,t} \qquad [4.18]$$

where $\mathrm{D_t}$ is a dummy variable that takes a value of zero in periods of expansion and a value of one in periods of recession.[75] Hence, the coefficient $\alpha_{rec,p}$ corresponds to the difference in performance between expansion and recession periods (i.e., alphas for expansion periods are equal to α_p, while alphas for recession periods are equal to $\alpha_p + \alpha_{rec,p}$). The interpretation of the remaining parameters is similar.

The results of our individual fund regressions are summarised in Table 4.14 (full results are available in Appendix 4.14). Overall, we find little evidence of a significant relationship between market states and fund performance. In fact, only 7 SRI funds (1 EMU Global, 1 UK Global and 5 European) and 3 matched-portfolios (1 UK Global and 2 European), which, altogether, represent only 13% and 5% of our samples, respectively, present alphas that are significantly different during expansion and recession periods.

On average, both SRI and conventional funds perform better in expansion periods than during recessions. In expansion periods, both categories of Global SRI funds perform better, on average, than conventional funds, whereas European SRI funds perform worse than their matched-portfolios. During recessions, the performance of SRI funds in all fund categories decreases considerably more than the performance of conventional funds. As a result, all categories of SRI funds present lower average alphas than their conventional peers. These results are clearly in contrast with the argument that SRI funds provide better performance than conventional funds in times of crisis.

[75] The approach of using dummy variables to identify market regimes is, by itself, a method of considering the time-variability of performance and risk estimates, which is what the conditional models of Ferson and Schadt (1996) and Christopherson *et al.* (1998) do. However, since the conditional models of Ferson and Schadt (1996) and Christopherson *et al.* (1998) evaluate portfolio managers taking into account the public information available to investors at the time the returns were generated (Farnsworth, 1997), they rely on a set of lagged public information variables. On the other hand, information about business cycles is not available at the time the returns are generated, since they are only announced several months later (for example, the December 2007 peak was only announced by the NBER a year later, in December 2008). For this reason, these two alternative approaches of considering the time-variability of performance and risk estimates may be viewed as mutually exclusive.

Table 4.14 – Summary of Individual Fund Performance and Risk Estimates during Recession and Expansion Periods

This table presents the number of positive (*N*+) or negative (*N*–) coefficients for the performance (alphas) and risk (betas of the size, book-to-market, momentum and local factors) estimates of the SRI funds and the characteristics-matched portfolios of conventional funds, as well as those which are statistically significant at the 5% level, reported in brackets, across recession and expansion periods, based on the NBER business cycles. A dummy variable with a value of one in recessions and zero in expansions is included in our unconditional 5-factor model, as specified in equation [4.18]. In addition, we also report the percentage of significantly positive (% Sig. *N*+) or significantly negative (% Sig. *N*–) coefficients for each parameter. In the last two columns of the table we report the average alphas (expressed in percentage) during expansion (α_{EXP}) and recession (α_{REC}) periods for each fund category. The benchmarks used are the MSCI AC World TR index for Global equity funds and the MSCI AC Europe TR index for European equity funds. Panel A presents the results for Global equity funds from the EMU countries, Panel B for UK Global equity funds and Panel C for European equity funds.

		α_p	$\alpha_{rec,p}$	β_p (MKT)	$\beta_{rec,p}$ (MKT)	β_{1p} (SMB)	$\beta_{1rec,p}$ (SMB)	β_{2p} (HML)	$\beta_{2rec,p}$ (HML)	β_{3p} (MOM)	$\beta_{3rec,p}$ (MOM)	β_{4p} (HBIAS)	$\beta_{4rec,p}$ (HBIAS)	Average α_{EXP}	Average α_{REC}
Panel A: Global Equity Funds – EMU															
SRI Funds	***N+***	3 [0]	1 [0]	10 [10]	7 [1]	5 [1]	9 [1]	6 [1]	2 [1]	6 [1]	5 [2]	9 [6]	5 [2]	-0.1139	-0.3354
	N-	7 [3]	9 [1]	0 [0]	3 [0]	5 [1]	1 [0]	4 [0]	8 [2]	4 [0]	5 [0]	1 [0]	5 [1]		
	% Sig. N+	0%	0%	100%	10%	10%	10%	10%	10%	10%	20%	60%	20%		
	% Sig. N-	30%	10%	0%	0%	10%	0%	0%	20%	0%	0%	0%	10%		
Matched-portfolios	***N+***	1 [0]	5 [0]	10 [10]	7 [0]	3 [2]	6 [3]	6 [1]	5 [0]	7 [1]	7 [3]	7 [3]	3 [0]	-0.2000	-0.2971
	N-	9 [4]	5 [0]	0 [0]	3 [1]	7 [2]	4 [0]	4 [1]	5 [4]	3 [1]	3 [0]	3 [0]	7 [1]		
	% Sig. N+	0%	0%	100%	0%	20%	30%	10%	0%	10%	30%	30%	0%		
	% Sig. N-	40%	0%	0%	10%	20%	0%	10%	40%	10%	0%	0%	10%		
Panel B: Global Equity Funds – UK															
		α_p	$\alpha_{rec,p}$	β_p (MKT)	$\beta_{rec,p}$ (MKT)	β_{1p} (SMB)	$\beta_{1rec,p}$ (SMB)	β_{2p} (HML)	$\beta_{2rec,p}$ (HML)	β_{3p} (MOM)	$\beta_{3rec,p}$ (MOM)	β_{4p} (HBIAS)	$\beta_{4rec,p}$ (HBIAS)	Average α_{EXP}	Average α_{REC}
SRI Funds	***N+***	4 [0]	3 [0]	8 [7]	6 [3]	7 [6]	4 [1]	2 [0]	5 [0]	7 [1]	7 [1]	5 [1]	6 [2]	-0.0348	-0.3966
	N-	4 [2]	5 [1]	0 [0]	2 [0]	1 [0]	4 [1]	6 [3]	3 [1]	1 [0]	1 [0]	3 [0]	2 [0]		
	% Sig. N+	0%	0%	88%	38%	75%	13%	0%	0%	13%	13%	13%	25%		
	% Sig. N-	25%	13%	0%	0%	0%	13%	38%	13%	0%	0%	0%	0%		
Matched-portfolios	***N+***	1 [0]	4 [1]	8 [8]	6 [3]	7 [1]	4 [1]	3 [2]	1 [0]	7 [5]	4 [0]	4 [0]	8 [4]	-0.2145	-0.2314
	N-	7 [2]	4 [0]	0 [0]	2 [1]	1 [0]	4 [1]	5 [2]	7 [3]	1 [0]	4 [1]	4 [0]	0 [0]		
	% Sig. N+	0%	13%	100%	38%	13%	13%	25%	0%	63%	0%	0%	50%		
	% Sig. N-	25%	0%	0%	13%	0%	13%	25%	38%	0%	13%	0%	0%		

Table 4.14 – Summary of Individual Fund Performance and Risk Estimates during Recession and Expansion Periods (continued)

Panel C: European Equity Funds															
		α_{p}	$\alpha_{rec,p}$	β_{p} (MKT)	$\beta_{rec,p}$ (MKT)	$\beta_{1\text{p}}$ (SMB)	$\beta_{1rec,p}$ (SMB)	$\beta_{2\text{p}}$ (HML)	$\beta_{2rec,p}$ (HML)	$\beta_{3\text{p}}$ (MOM)	$\beta_{3rec,p}$ (MOM)	β_{4p} (HBIAS)	$\beta_{4rec,p}$ (HBIAS)	Average α_{EXP}	Average α_{REC}
SRI Funds	***N+***	3 [0]	19 [3]	37 [37]	9 [1]	22 [0]	32 [4]	28 [4]	16 [2]	25 [5]	4 [0]	35 [24]	28 [6]	-0.2482	-0.2802
	N-	34 [16]	18 [2]	0 [0]	28 [9]	15 [2]	5 [1]	9 [1]	21 [1]	12 [0]	33 [10]	2 [1]	9 [3]		
	% Sig. N+	0%	8%	100%	3%	0%	11%	11%	5%	14%	0%	65%	16%		
	% Sig. N-	43%	5%	0%	24%	5%	3%	3%	3%	0%	27%	3%	8%		
Matched-portfolios	***N+***	6 [0]	19 [1]	37 [36]	14 [2]	28 [14]	28 [6]	22 [5]	19 [3]	27 [4]	9 [0]	36 [24]	28 [3]	-0.1579	-0.1686
	N-	31 [10]	18 [1]	0 [0]	23 [4]	9 [1]	9 [4]	15 [2]	18 [0]	10 [0]	28 [7]	1 [0]	9 [1]		
	% Sig. N+	0%	3%	97%	5%	38%	16%	14%	8%	11%	0%	65%	8%		
	% Sig. N-	27%	3%	0%	11%	3%	11%	5%	0%	0%	19%	0%	3%		

To analyse the statistical significance of the differences in performance between SRI and conventional funds, across recession and expansion periods, we used both parametric and non-parametric tests. The results of these tests, available in Appendices 4.15 and 4.16, show that differences in performance between SRI and conventional funds are never significant during recessions and are only significant during expansions for the European funds. In fact, during periods of expansion, European SRI funds underperform conventional funds significantly (although only at the 10% level), according to both parametric and non-parametric tests. In line with this result, the percentage of individual funds with significantly negative alphas (at the 5% level) during expansions is substantially higher for European SRI funds than for their matched-portfolios (43% versus 27%, respectively).

In terms of investment styles, we find evidence suggesting some shifts in funds' risk exposures across market states. However, these vary considerably between our three fund categories.

For EMU Global funds, the results of individual fund regressions are similar for SRI and conventional funds in most cases. Nevertheless, it is worth to mention that 30% of the matched-portfolios are more exposed to small caps during recession periods than during expansion periods, whereas for SRI funds this indicator reaches only 10%. Additionally, almost half (40%) of the matched-portfolios exhibit significantly higher exposure to growth stocks during recessions than during expansions. However, we find no significant changes between SRI and conventional funds in any of their factor exposures during both expansion (Appendix 4.15) and recession (Appendix 4.16) periods.

For UK Global funds, it seems like conventional funds become more growth-oriented and more tilted towards local stocks than SRI funds during recessions. In fact, 13% of SRI funds and 38% of conventional funds present significantly lower exposure to the HML factor during recessions than during expansions. Moreover, 25% of SRI funds and 50% of conventional funds exhibit significantly higher exposure to local stocks in recessions than in expansion periods. After evaluating the significance of the differences in factor exposures during recessions, we find that the only significant difference is related to the HML factor, with conventional funds exhibiting a significantly higher exposure to growth stocks than SRI funds, at the 5% level, according to both parametric and non-parametric tests. On the other hand, during expansions, the only significant difference between SRI and conventional funds is related to their market exposure, with SRI funds presenting significantly lower market betas than their matched-portfolios.

For European funds, individual fund regressions suggest that both SRI and conventional funds present lower market exposures and lower exposures to the momentum factor during recessions than during expansions. In fact, during recessions, market betas decrease for most SRI and conventional funds, with 24% of SRI funds and 11% of the matched-portfolios presenting significantly lower betas at the 5% level. Additionally, the vast majority of SRI and conventional funds exhibit lower exposures to the momentum factor during recessions than during expansions. As a result, 27% of SRI funds and 19% of conventional funds present significantly lower exposure to the momentum factor in recessions. After evaluating the significance of the differences in factor exposures during recession periods, we find that the only significant difference between SRI and conventional funds is related to the momentum factor exposure: during recessions, SRI funds are more exposed to contrarian strategies than their conventional peers. During expansion periods, differences in factor exposures are significant for the market and size factors: SRI funds are significantly more exposed to the market (although only with the parametric test and at the 10% level) and significantly less exposed to small caps than conventional funds.

4.4.3 Selectivity and Market Timing Abilities

Although we have not found significant differences in performance between SRI and conventional funds across the sample period, it is a fact that the models we used in the previous section measure overall performance and do not distinguish between selectivity and timing abilities of fund managers. In fact, even though overall performance is similar between SRI and conventional funds, it is interesting to check whether selectivity and timing abilities are also similar among them or if one type of ability offsets the other. Therefore, in this section, we aim to explore if the selectivity and timing abilities of SRI fund managers differ significantly from those of conventional fund managers. To do so, we use the conditional multi-factor versions of the Treynor-Mazuy (TM) and the Henriksson-Merton (HM) models described in Section 4.2.2.

First, consistent with our previous assessment of stock return predictability, the results of the Wald tests, available in detail in Appendices 4.17 and 4.18, confirm the existence of time-varying betas for all SRI funds and all but one or two matched-portfolios, according to the HM and TM models, respectively. This evidence strongly supports the use of conditional market timing models. In addition, at the usual significance levels, 35% of the SRI funds and

39% of their matched-portfolios present time-varying timing coefficients in the TM model and all SRI funds and all but one of the matched-portfolios cannot reject the joint time variation in all coefficients (i.e., betas and gammas). Again, this evidence corroborates the model specification we use.

Table 4.15 summarises the results of applying the conditional multi-factor versions of the TM (equation [4.14]) and the HM (equation [4.17]) market timing models to our samples of funds.

Table 4.15 – Summary of the Selectivity and Timing Estimates of SRI Funds and Conventional Funds

This table presents the number of positive (*N*+) or negative (*N*–) coefficients for the SRI funds and the characteristics-matched portfolios of conventional funds in terms of selectivity (alphas) and timing abilities (gammas and average conditional gammas), as well as those which are statistically significant at the 5% level, reported in brackets, using two model specifications: the conditional multi-factor version of the Treynor-Mazuy Model of equation [4.14] and the conditional multi-factor version of the Henriksson-Merton Model of equation [4.17]. In addition, we also report the percentage of significantly positive (% Sig. *N*+) or significantly negative (% Sig. *N*–) coefficients for each parameter. The benchmarks used are the MSCI AC World TR index for Global equity funds and the MSCI AC Europe TR index for European equity funds. Panels A and B present the results for Global equity funds from the EMU countries, Panels C and D for UK Global equity funds and Panels E and F for European equity funds.

Panel A: Global Equity Funds – EMU – Conditional Multi-Factor Treynor-Mazuy Model

	SRI Funds		Matched-portfolios	
	α_p	γ_{0p}	α_p	γ_{0p}
N+	2 [0]	2 [0]	2 [0]	2 [0]
N-	8 [1]	8 [2]	8 [1]	8 [4]
% Sig. N+	0%	0%	0%	0%
% Sig. N-	10%	20%	10%	40%

Panel B: Global Equity Funds – EMU – Conditional Multi-Factor Henriksson-Merton Model

	SRI Funds		Matched-portfolios	
	α_p	γ_p	α_p	γ_p
N+	3 [0]	2 [0]	3 [0]	1 [0]
N-	7 [1]	8 [1]	7 [1]	9 [1]
% Sig. N+	0%	0%	0%	0%
% Sig. N-	10%	10%	10%	10%

Panel C: Global Equity Funds – UK – Conditional Multi-Factor Treynor-Mazuy Model

	SRI Funds		Matched-portfolios	
	α_p	γ_{0p}	α_p	γ_{0p}
N+	3 [0]	1 [0]	1 [0]	3 [0]
N-	4 [2]	6 [0]	6 [1]	4 [0]
% Sig. N+	0%	0%	0%	0%
% Sig. N-	29%	0%	14%	0%

Panel D: Global Equity Funds – UK – Conditional Multi-Factor Henriksson-Merton Model

	SRI Funds		Matched-portfolios	
	α_p	γ_p	α_p	γ_p
N+	3 [0]	0 [0]	2 [0]	3 [0]
N-	4 [0]	7 [1]	5 [0]	4 [1]
% Sig. N+	0%	0%	0%	0%
% Sig. N-	0%	14%	0%	14%

Panel E: European Equity Funds – Conditional Multi-Factor Treynor-Mazuy Model

	SRI Funds		Matched-portfolios	
	α_p	γ_{0p}	α_p	γ_{0p}
N+	4 [0]	18 [4]	12 [0]	14 [0]
N-	33 [7]	19 [2]	25 [4]	23 [3]
% Sig. N+	0%	11%	0%	0%
% Sig. N-	19%	5%	11%	8%

Panel F: European Equity Funds – Conditional Multi-Factor Henriksson-Merton Model

	SRI Funds		Matched-portfolios	
	α_p	γ_p	α_p	γ_p
N+	8 [0]	20 [2]	14 [0]	14 [1]
N-	29 [1]	17 [0]	23 [2]	23 [4]
% Sig. N+	0%	5%	0%	3%
% Sig. N-	3%	0%	5%	11%

In terms of selectivity, our results show that the majority of our SRI funds and their corresponding matched-portfolios exhibit neutral selectivity abilities. With the TM model, at least 71% of the SRI funds and 86% of their matched-portfolios exhibit selectivity estimates that are not statistically different from zero (at the 5% level). Using the HM model, neutral selectivity abilities are found for at least 90% of the SRI funds and their matched-portfolios. So, consistent with most of the literature on mutual fund performance, it seems that fund managers in our samples, both SRI and conventional, are not able to successfully identify undervalued stocks.

According to both model specifications, there is not a single fund or matched-portfolio with significantly positive selectivity abilities (at the 5% level). In terms of significantly negative alphas, according to the TM model, they are found for 10 SRI funds (1 EMU Global, 2 UK Global and 7 European) and 6 matched-portfolios (1 EMU Global, 1 UK Global and 4 European), which, altogether, represent 19% and 11% of our samples, respectively. According to the HM model, evidence of significantly negative alphas is considerably smaller, affecting only 2 SRI funds (1 EMU Global and 1 European) and 3 matched-portfolios (1 EMU Global and 2 European), i.e., 4% and 6% of our total samples, respectively.

If we analyse the results within our three fund categories, we can see that the selectivity estimates of EMU Global funds are very similar between SRI and conventional funds. On the other hand, in the UK Global and in the European fund categories, the percentage of funds with significantly negative selectivity estimates according to the TM model is higher for the SRI funds than for their matched-portfolios (more precisely, 29% vs. 14% for UK Global funds and 19% vs. 11% for European funds). However, with the HM model, these results do not hold, since the same indicators are very similar for SRI and conventional funds, although the number of European SRI funds with negative selectivity abilities is still higher than the number of matched-portfolios with negative alphas.

To check if the differences in the selectivity estimates of SRI and conventional funds are statistically significant we used both parametric and non-parametric tests. Our results, presented in Appendix 4.19, show no significant differences for both Global fund sub-samples. However, European SRI funds perform significantly worse than their peers in terms of selectivity abilities, according to both parametric and non-parametric tests, based on the TM and on the HM model.

As to the contribution of timing to overall performance, it is clear that most SRI fund managers in our sample do not have the ability to time the market, consistent with the findings of Kreander *et al.* (2005) and Girard *et al.* (2007). However, these results are similar to those documented for conventional funds.

According to the TM model, significantly positive timing abilities are only found for 4 SRI funds, while the HM model shows similar abilities for only 2 SRI funds and 1 matched-portfolio. However, although scarce, it is worth to mention that these successful timing abilities are only found in the European fund sub-sample. On the other hand, in spite of using conditional multi-factor models,[76] we still find evidence of significant negative or "perverse" timing abilities, although only for a small part of our fund sample. In fact, according to the TM model, 4 SRI funds (2 EMU Global and 2 European) and 7 matched-portfolios (4 EMU Global and 3 European) present evidence of "perverse" timing abilities. With the HM model, similar results are found for 2 SRI funds (1 EMU Global and 1 UK Global) and 6 matched-portfolios (1 EMU Global, 1 UK Global and 4 European). Overall, 7% of the SRI funds and 13% of their matched-portfolios, according to the TM model, and 4% of the SRI funds and 11% of the matched-portfolios, according to the HM model, exhibit significantly negative gammas or average conditional gammas. Nevertheless, although restricted to a small fraction of our sample, these negative timing coefficients may be related to some kind of model misspecification or just be a consequence of the use of options or other related trading strategies, as pointed out by Ferson and Schadt (1996), among others. Anyway, we do not find significant positive selectivity estimates to somewhat compensate these negative timing coefficients.

When we evaluate the significance of the differences in the timing coefficients between SRI and conventional funds, we find only one case in which they are statistically significant. In fact, European SRI funds exhibit significantly (at the 5% level) better timing abilities than their conventional peers, although this inference is only valid in the context of the TM model and with the parametric *t*-test. In all other cases, differences in the timing abilities of SRI and conventional funds are not statistically significant, as we can confirm in Appendix 4.19.

If we compare our two market timing models, we can see that even though we find that the TM model provides a greater number of significant coefficients (both alphas and gammas) than the HM model, especially for SRI funds, results are, in general, similar between the two model specifications, consistent with previous studies on conventional mutual funds (e.g.: Ferson and Schadt, 1996; Bollen and Busse, 2001). However, the HM model seems to be slightly better specified than the TM model, leading to less evidence of significantly negative timing coefficients.

[76] In fact, in comparison with unconditional models, conditional models seem to greatly reduce the number of significant negative timing coefficients, as shown by Ferson and Schadt (1996) and Sawicki and Ong (2000), among others.

In sum, it seems that, in comparison to conventional funds, international SRI funds perform slightly better in terms of market timing abilities and slightly worse in terms of selectivity abilities. In fact, according to the TM model, 65% of the selectivity estimates are lower for the SRI funds than for their corresponding matched-portfolios, while 57% of the timing estimates are higher for the former than for the latter. The results of the HM model further corroborate these findings, although to a lesser extent: in comparison to their respective matched-portfolios, 61% of the selectivity estimates of SRI funds are lower, whereas 52% of their timing estimates are higher. However, in general, we find little evidence of significant differences in the selectivity and timing abilities of international socially responsible and conventional fund managers.

4.5 Conclusions

In this chapter we used several model specifications to examine the performance, investment styles and timing abilities of internationally-oriented SRI mutual funds, in comparison with characteristics-matched portfolios of conventional funds. Our analysis was decomposed into three fund categories, based on investment scope and domicile country: Global equity funds from the EMU countries, Global equity funds from the UK and European equity funds.

Overall, our results show that, in practically all situations, differences in performance between international SRI funds and their matched-portfolios are not statistically significant, according to both parametric and non-parametric tests.[77] Consistent with most previous empirical studies, neither SRI nor conventional fund managers are able to outperform the market, with most funds exhibiting neutral performance. When comparing results between model specifications, our findings clearly confirm the superiority of conditional multi-factor models. The vast majority of both SRI and conventional funds present time-varying betas. After analysing the ability of a set of standard information variables in predicting stock returns, we find that Global information variables are more suited to explain European stock returns than European variables, possibly as a consequence of the increasing degree of integration of financial markets.

[77] The only exception was found when using the unconditional 1-factor model, with European SRI funds significantly underperforming their peers.

In terms of risk exposures, we find that, on average, Global SRI funds (both EMU and UK-based) present lower market betas than conventional funds, whereas European SRI funds are slightly less risk-averse than their conventional peers. However, differences in market exposures are only statistically significant for UK Global SRI funds, which present significantly lower market betas relative to their matched-portfolios in all of our (unconditional and conditional) multi-factor models. Conclusions regarding the exposures to the size factor vary considerably between our three fund categories. While no significant differences are found for EMU Global funds, UK Global SRI funds present significantly higher exposures to small caps than their conventional peers (at the 10% level) with unconditional multi-factor models. This evidence, though, is removed when the conditional specification is used. In contrast, European SRI funds exhibit significantly lower exposures to small caps than their conventional peers in all models and according to both parametric and non-parametric tests. Additionally, none of the differences between SRI and conventional funds in terms of their book-to-market, momentum and local factor exposures is statistically significant, even though both SRI and conventional funds exhibit significant home biases, in line with previous studies including international SRI funds (e.g.: Bauer *et al.*, 2006; Gregory and Whittaker, 2007; Cortez *et al.*, *forthcoming*).

A possible explanation for the absence of any significant performance differentials between SRI and conventional funds, as well as for the similar factor exposures observed, may be related to the use of "best-in-class" screens, the most common approach in continental Europe. This strategy may result in SRI funds having portfolio compositions that do not differ significantly from non-SRI funds.

In terms of benchmark sensitivity, and in line with the findings of Bauer *et al.* (2005), Bauer *et al.* (2007) and Cortez *et al.* (2009, *forthcoming*), our results show that conventional benchmarks are more useful in explaining SRI fund returns than SRI benchmarks. In comparison with conventional benchmarks, SRI benchmarks not only lead to lower adjusted R^2's but also to lower market betas for the vast majority of our SRI funds. In addition, SRI fund performance is always higher with SRI benchmarks than with conventional benchmarks, although increases are not large enough to produce more than a couple of significant outperformers.

After analysing performance and investment styles across different market states, we find no evidence to support that SRI funds offer some additional protection to investors in times of crisis, in contrast to the results of Areal *et al.* (2011). In fact, differences in performance between SRI and conventional funds are never significant during recessions and are only significant during periods of expansion for European funds. In this last case, SRI funds underperform their matched-portfolios significantly, although only at the 10% level, according to both parametric and non-parametric tests. Additionally, we find some significant shifts in funds' risk exposures across different market states, but these vary considerably between the three categories of funds.

Furthermore, our results also call attention to the issue of decomposing overall performance into selectivity and market timing abilities. Turning to selectivity first, the majority of the SRI funds and their corresponding matched-portfolios exhibit neutral selectivity abilities and are not able to successfully identify undervalued stocks. Differences in selectivity estimates of SRI and conventional funds are not statistically significant for both Global fund categories, whereas European SRI funds show significantly worse selectivity abilities than their conventional peers, according to both parametric and non-parametric tests based on the TM and on the HM models. In terms of market timing, we do not find evidence of abilities to successfully time the market for both SRI and conventional funds. These findings are consistent with those of Kreander *et al.* (2005) and Girard *et al.* (2007). In addition, differences in the timing abilities of SRI and conventional funds are also not statistically significant in practically all cases.

In sum, the results of our research show no statistically significant differences in the performance of internationally-oriented SRI funds and their conventional peers. Our findings are, therefore, consistent with most studies conducted with SRI funds investing in their local markets. Therefore, although these results are important for investors who wish to incorporate environmental, social and governance criteria in their international investment decisions, it seems that SRI funds are not able to exploit the potential benefits that arise from international diversification.

APPENDICES

Appendix 4.1 – Mutual Funds in the Sample

This appendix describes our sample of SRI funds and the characteristics-matched sample of conventional funds. For each fund we present the following characteristics: fund name, Morningstar category, legal domicile country (AT = Austria; BE = Belgium; DE = Germany; ES = Spain; FR = France; IT = Italy; NL = Netherlands; UK = United Kingdom), fund type (SRI / Ethical or conventional), start date and International Securities Identification Number (ISIN). Table A refers to Global equity funds while Table B refers to European equity funds.

Table A – Global Equity Funds

Code	Fund Name	Morningstar Category	Domicile	Fund Type	Start Date	ISIN
ATG1	ESPA Vinis Stock Global T Acc	Global Large-Cap Blend Equity	AT	SRI	02-01-2006	AT0000646799
ATG1	Apollo Diversified Equity T Acc	Global Large-Cap Blend Equity	AT	Conventional	09-02-2006	AT0000A00AZ2
ATG1	Apollo Styrian Global Equity Acc	Global Large-Cap Blend Equity	AT	Conventional	14-12-2006	AT0000A03KC4
BEG1	Dexia Sustainable World Classic C (C)	Global Large-Cap Blend Equity	BE	SRI	20-03-2000	BE0946893766
BEG1	KBC Eq Fd Global Leaders (C)	Global Large-Cap Blend Equity	BE	Conventional	01-09-2000	BE0174807132
BEG1	Privileged Portfolio Equity (C)	Global Large-Cap Blend Equity	BE	Conventional	18-10-2000	BE0175331520
FRG1	BNP Paribas Retraite Horizon P 100 (C)	Global Large-Cap Blend Equity	FR	SRI	21-01-2005	FR0010146530
FRG1	Delubac Exceptions (C)	Global Large-Cap Blend Equity	FR	Conventional	27-08-2004	FR0010108647
FRG1	HMG Globetrotter (C)	Global Large-Cap Blend Equity	FR	Conventional	01-07-2005	FR0010241240
FRG2	Palatine Or Bleu A (C)	Global Large-Cap Blend Equity	FR	SRI	07-07-2006	FR0010341800
FRG2	SGAM Invest Global Concentrated C (C)	Global Large-Cap Blend Equity	FR	Conventional	07-04-2006	FR0010312058
FRG2	Monde Gan (C)	Global Large-Cap Blend Equity	FR	Conventional	23-04-2006	FR0010318121
DEG1	Gerling Select 21 Acc	Global Large-Cap Blend Equity	DE	SRI	21-01-2000	DE0009847343
DEG1	DWS International Aktien Typ O Acc	Global Large-Cap Blend Equity	DE	Conventional	13-01-2000	DE0009848010
DEG1	Postbank Global Player Inc	Global Large-Cap Blend Equity	DE	Conventional	17-03-2000	DE0009797753
DEG2	KCD-Union Nachhaltig Aktien Inc	Global Large-Cap Blend Equity	DE	SRI	01-03-2001	DE0005326532
DEG2	Konzept Global Leader Inc	Global Large-Cap Blend Equity	DE	Conventional	12-01-2001	DE0005326201
DEG2	R+P Universal-Fonds Acc	Global Large-Cap Blend Equity	DE	Conventional	15-01-2001	DE0005316962
DEG3	MEAG Nachhaltigkeit A Inc	Global Large-Cap Value Equity	DE	SRI	01-10-2003	DE0001619997
DEG3	Allianz Strat Wachst Plus A EUR Inc	Global Large-Cap Value Equity	DE	Conventional	02-12-2002	DE0009797274
DEG3	DWS Top Dividende Inc	Global Large-Cap Value Equity	DE	Conventional	28-04-2003	DE0009848119

Appendix 4.1 – Mutual Funds in the Sample (continued)

Code	Fund Name	Morningstar Category	Domicile	Fund Type	Start Date	ISIN
ITG1	Ducato Etico Geo Acc	Global Large-Cap Blend Equity	IT	SRI	04-06-2001	IT0003113724
ITG1	Bancoposta Azionario Internazionale Acc	Global Large-Cap Blend Equity	IT	Conventional	22-05-2001	IT0003110860
ITG1	Bipiemme Valore Acc	Global Large-Cap Blend Equity	IT	Conventional	04-06-2001	IT0003098164
ITG2	Gestielle Etico Azionario	Global Large-Cap Blend Equity	IT	SRI	02-09-2002	IT0003329544
ITG2	Nextam Partners Azionario Internazionale	Global Large-Cap Blend Equity	IT	Conventional	02-04-2002	IT0003245286
ITG2	UBI Pramerica Azioni Globali Acc	Global Large-Cap Blend Equity	IT	Conventional	27-03-2002	IT0003242507
NTG1	Triodos Meerwaarde Aandelenfonds	Global Large-Cap Blend Equity	NL	SRI	12-10-2000	NL0000289742
NTG1	SNS Wereld Aandelenfonds	Global Large-Cap Blend Equity	NL	Conventional	22-11-1999	NL0000291144
NTG1	Achmea Wereld Aandelenfonds	Global Large-Cap Blend Equity	NL	Conventional	15-09-2000	NL0006259996
UKG1	Aviva Investors Sustainable Future Global Growth SC1 Acc	Global Large-Cap Blend Equity	UK	SRI	19-02-2001	GB0030029952
UKG1	Gartmore Global Focus Retail Acc	Global Large-Cap Blend Equity	UK	Conventional	31-01-2001	GB0031860603
UKG1	Investec Global Equity A Acc Net GBP	Global Large-Cap Blend Equity	UK	Conventional	14-07-2000	GB00B01VDJ10
UKG2	Ecclesiastical Amity International A Inc	Global Large-Cap Blend Equity	UK	SRI	10-09-1999	GB0008448663
UKG2	BlackRock Global Equity A Acc	Global Large-Cap Blend Equity	UK	Conventional	31-01-2000	GB0000646421
UKG2	Lord Abbett Global Growth and Income A Acc	Global Large-Cap Blend Equity	UK	Conventional	11-01-2000	GB0009507962
UKG3	SWIP Global SRI A Acc	Global Large-Cap Blend Equity	UK	SRI	23-07-2002	GB0030809247
UKG3	MandG Global Growth X Acc	Global Large-Cap Blend Equity	UK	Conventional	01-10-2002	GB0031956138
UKG3	UBS Global Optimal A Acc	Global Large-Cap Blend Equity	UK	Conventional	01-07-2002	GB0031680910
UKG4	Skandia IM Ethical Acc	Global Large-Cap Blend Equity	UK	SRI	23-09-2005	GB00B0JZPC21
UKG4	Newton Glb Opps Exempt Acc	Global Large-Cap Blend Equity	UK	Conventional	01-07-2005	GB00B0C3H616
UKG4	NFU Mutual Global Growth B	Global Large-Cap Blend Equity	UK	Conventional	03-10-2005	GB00B0GWDY41
UKG5	Aberdeen Ethical World A Acc	Global Large-Cap Value Equity	UK	SRI	01-05-1999	GB0006833718
UKG5	Morgan Stanley Global Value Eq A Acc	Global Large-Cap Value Equity	UK	Conventional	20-07-1998	GB0003840385
UKG5	Old Mutual Global Equity Acc	Global Large-Cap Value Equity	UK	Conventional	16-07-1998	GB00B1XG7H70
UKG6	FandC Stewardship International 1 Acc	Global Large-Cap Growth Equity	UK	SRI	13-10-1987	GB0030833650
UKG6	AEGON Global Equity A Acc	Global Large-Cap Growth Equity	UK	Conventional	05-11-1987	GB0007254229
UKG6	FandC Global Growth 1 Acc	Global Large-Cap Growth Equity	UK	Conventional	09-09-1987	GB0008464207
UKG7	Insight Investment Evergreen A Acc	Global Large-Cap Growth Equity	UK	SRI	13-03-2000	GB0008478108
UKG7	Aviva Investors World Leaders SC1 Acc	Global Large-Cap Growth Equity	UK	Conventional	14-02-2000	GB0030441918
UKG7	First State Global Opportunities A Acc	Global Large-Cap Growth Equity	UK	Conventional	14-07-1999	GB0030978612

Appendix 4.1 – Mutual Funds in the Sample (continued)

Code	Fund Name	Morningstar Category	Domicile	Fund Type	Start Date	ISIN
UKG8	Jupiter Green Inv Trust	Global Equity Small/Mid Cap	UK	SRI	08-06-2006	GB00B120GL77
UKG8	Smith and Williamson Aubrey Global Conviction Acc	Global Equity Small/Mid Cap	UK	Conventional	08-01-2007	GB00B1L8XB18
UKG8	St James´s Place Global Acc	Global Equity Small/Mid Cap	UK	Conventional	08-01-2007	GB00B1KHKN05

Table B – European Equity Funds

Code	Fund Name	Morningstar Category	Domicile	Fund Type	Start Date	ISIN
BEE1	Dexia Sustainable Eq Europe C Acc	Europe Large-Cap Blend Equity	BE	SRI	03-04-2000	BE0173540072
BEE1	Dexia Equities B European Sector Rotation Classic C	Europe Large-Cap Blend Equity	BE	Conventional	15-07-1999	BE0171243380
BEE1	KBC Eq Fd Euro Cyclicals (C)	Europe Large-Cap Blend Equity	BE	Conventional	30-12-1999	BE0172711518
BEE1	Puilaetco Dewaay Europe (C)	Europe Large-Cap Blend Equity	BE	Conventional	20-12-1999	BE0172851942
BEE2	Dexia Sust EMU C Acc	Eurozone Large-Cap Equity	BE	SRI	09-06-2000	BE0174192774
BEE2	Dexia Eqs B EMU Growth C (C)	Eurozone Large-Cap Equity	BE	Conventional	20-07-1999	BE0945528694
BEE2	Dexia Eqs B EMU Value C (C)	Eurozone Large-Cap Equity	BE	Conventional	20-07-1999	BE0945522630
BEE2	KBC Eq Fd Eurozone (C)	Eurozone Large-Cap Equity	BE	Conventional	02-02-2001	BE0175979211
FRE1	SGAM Invest Europe Développement Durable (C)	Europe Large-Cap Value Equity	FR	SRI	15-05-2000	FR0000444275
FRE1	CAAM Actions Europe P (C)	Europe Large-Cap Value Equity	FR	Conventional	13-06-2000	FR0010013763
FRE1	Europe Value (C)	Europe Large-Cap Value Equity	FR	Conventional	15-06-2000	FR0007046578
FRE1	NOAM Europe Value C (C)	Europe Large-Cap Value Equity	FR	Conventional	04-07-2000	FR0010069195
FRE2	SSgA Europe SRI Alpha Equity P (C)	Europe Large-Cap Value Equity	FR	SRI	28-04-2006	FR0010316802
FRE2	Elan Europe Alpha C/D	Europe Large-Cap Value Equity	FR	Conventional	21-07-2006	FR0010352146
FRE2	Garance (C)	Europe Large-Cap Value Equity	FR	Conventional	18-04-2006	FR0010291203
FRE2	Ofi Nemo A (C)	Europe Large-Cap Value Equity	FR	Conventional	30-12-2005	FR0010273391
FRE3	BNP Paribas Etheis (D)	Europe Large-Cap Blend Equity	FR	SRI	15-05-2002	FR0010028969
FRE3	Actimaaf Europe (C)	Europe Large-Cap Blend Equity	FR	Conventional	05-07-2002	FR0000985368
FRE3	Label Europe Actions C/D	Europe Large-Cap Blend Equity	FR	Conventional	24-07-2002	FR0007073713
FRE3	Médicis (C)	Europe Large-Cap Blend Equity	FR	Conventional	16-11-2001	FR0000979171

Appendix 4.1 – Mutual Funds in the Sample (continued)

Code	Fund Name	Morningstar Category	Domicile	Fund Type	Start Date	ISIN
FRE4	CM-CIC Valeurs Ethiques (C)	Europe Large-Cap Blend Equity	FR	SRI	16-06-2000	FR0000444366
FRE4	CAAM Sélect Europe P (D)	Europe Large-Cap Blend Equity	FR	Conventional	26-08-1999	FR0000289902
FRE4	CPR Active Europe P (D)	Europe Large-Cap Blend Equity	FR	Conventional	01-01-2000	FR0010619916
FRE4	LBPAM Actions Europe R (D)	Europe Large-Cap Blend Equity	FR	Conventional	08-03-2000	FR0000441586
FRE5	Atout Valeurs Durables C/D	Europe Large-Cap Blend Equity	FR	SRI	24-02-2003	FR0000991424
FRE5	Aviva Horizon 2011 (C)	Europe Large-Cap Blend Equity	FR	Conventional	04-12-2002	FR0000990012
FRE5	Etoile Multi Gestion Europe (C)	Europe Large-Cap Blend Equity	FR	Conventional	17-04-2003	FR0010540856
FRE5	Ambiose (C)	Europe Large-Cap Blend Equity	FR	Conventional	16-12-2003	FR0010250142
FRE6	CAAM Activaleurs Durables C/D	Europe Large-Cap Blend Equity	FR	SRI	01-09-2000	FR0000446684
FRE6	SG Prive 3 (D)	Europe Large-Cap Blend Equity	FR	Conventional	11-05-2001	FR0007057427
FRE6	Fructi Europe Croissance (C)	Europe Large-Cap Blend Equity	FR	Conventional	07-08-2001	FR0000977530
FRE6	Fructi Europe Cycliques (C)	Europe Large-Cap Blend Equity	FR	Conventional	07-08-2001	FR0000977522
FRE7	Regard Actions Developpement Durable (C)	Europe Large-Cap Blend Equity	FR	SRI	25-06-2003	FR0007083357
FRE7	Cogéfi Europe P (C)	Europe Large-Cap Blend Equity	FR	Conventional	20-12-2002	FR0007079132
FRE7	Pioneer Europe Actions (C)	Europe Large-Cap Blend Equity	FR	Conventional	15-12-2003	FR0010029645
FRE7	Hocheurope (C)	Europe Large-Cap Blend Equity	FR	Conventional	01-08-2003	FR0010000653
FRE8	Europe Gouvernance (C)	Europe Large-Cap Blend Equity	FR	SRI	13-01-1998	FR0000285702
FRE8	Iéna Actions Européennes (C)	Europe Large-Cap Blend Equity	FR	Conventional	22-08-1997	FR0010541003
FRE8	NOAM Europe Opportunités C/D	Europe Large-Cap Blend Equity	FR	Conventional	27-03-1998	FR0010363846
FRE8	Finex Europe C/D	Europe Large-Cap Blend Equity	FR	Conventional	05-06-1998	FR0000428369
FRE9	CAAM Actions Durables C/D	Europe Large-Cap Blend Equity	FR	SRI	24-02-2003	FR0000991432
FRE9	ICG Actions Rendement (C)	Europe Large-Cap Blend Equity	FR	Conventional	04-04-2003	FR0000992893
FRE9	Métropole Sélection (C)	Europe Large-Cap Blend Equity	FR	Conventional	29-11-2002	FR0007078811
FRE9	Rouvier Europe (C)	Europe Large-Cap Blend Equity	FR	Conventional	21-05-2003	FR0007084066
FRE10	Ethique et Partage - CCFD (D)	Europe Large-Cap Blend Equity	FR	SRI	20-12-2000	FR0000970899
FRE10	Fructi Europe Défensive (C)	Europe Large-Cap Blend Equity	FR	Conventional	29-08-2001	FR0000977548
FRE10	JPM Europe (C)	Europe Large-Cap Blend Equity	FR	Conventional	01-06-2001	FR0000975138
FRE10	Fidelity SICAV - Fidelity Europe (C)	Europe Large-Cap Blend Equity	FR	Conventional	07-12-2001	FR0000008674

Appendix 4.1 – Mutual Funds in the Sample (continued)

Code	Fund Name	Morningstar Category	Domicile	Fund Type	Start Date	ISIN
FRE11	Groupama Euro Capital Durable Retraite (C)	Eurozone Large-Cap Equity	FR	SRI	22-06-2004	FR0010086496
FRE11	ABP Actions C/D	Eurozone Large-Cap Equity	FR	Conventional	18-05-2004	FR0010074690
FRE11	Audiens A1 (C)	Eurozone Large-Cap Equity	FR	Conventional	04-06-2004	FR0010072439
FRE11	K Invest Europe (C)	Eurozone Large-Cap Equity	FR	Conventional	02-04-2004	FR0010057364
FRE12	AG2R Actions ISR (C)	Eurozone Large-Cap Equity	FR	SRI	31-05-2002	FR0000984346
FRE12	CD Euro Capital (C)	Eurozone Large-Cap Equity	FR	Conventional	21-06-2002	FR0010250084
FRE12	CIC Actions 60 (D)	Eurozone Large-Cap Equity	FR	Conventional	28-06-2002	FR0000985731
FRE12	Sycomore Twenty A (C)	Eurozone Large-Cap Equity	FR	Conventional	24-06-2002	FR0007073119
FRE13	Etoile Partenaires (C)	Eurozone Large-Cap Equity	FR	SRI	05-09-2001	FR0010502096
FRE13	AR2I (C)	Eurozone Large-Cap Equity	FR	Conventional	05-04-2002	FR0007070883
FRE13	Bâti Valeurs Europe C/D	Eurozone Large-Cap Equity	FR	Conventional	23-05-2002	FR0007071642
FRE13	Cardif Actions Rendement C/D	Eurozone Large-Cap Equity	FR	Conventional	24-06-2002	FR0007074208
FRE14	LBPAM Actions Développement Dur. R (C)	Eurozone Large-Cap Equity	FR	SRI	05-11-2001	FR0000008963
FRE14	Equi-Selection (D)	Eurozone Large-Cap Equity	FR	Conventional	29-10-2002	FR0000989022
FRE14	Indosuez Europe Patrimoine (D)	Eurozone Large-Cap Equity	FR	Conventional	30-09-2002	FR0007076641
FRE14	Union Europe (C)	Eurozone Large-Cap Equity	FR	Conventional	19-07-2002	FR0000986655
FRE15	Macif Croissance Durable Europe (C)	Eurozone Large-Cap Equity	FR	SRI	09-01-2001	FR0000971160
FRE15	AGF Actions Euro Value (C)	Eurozone Large-Cap Equity	FR	Conventional	04-10-2000	FR0000449431
FRE15	KBL Richelieu Europe (C)	Eurozone Large-Cap Equity	FR	Conventional	23-10-2000	FR0000989410
FRE15	Barclays Euro Opportunité Acc	Eurozone Large-Cap Equity	FR	Conventional	20-02-2001	FR0000971996
FRE16	Objectif Ethique Socialement Responsable C/D	Eurozone Large-Cap Equity	FR	SRI	01-06-2001	FR0000003998
FRE16	AGF Aequitas C/D	Eurozone Large-Cap Equity	FR	Conventional	05-06-2001	FR0000975880
FRE16	Finance Europe C/D	Eurozone Large-Cap Equity	FR	Conventional	09-11-2001	FR0007066246
FRE16	Etoile Actions Styles (C)	Eurozone Large-Cap Equity	FR	Conventional	20-09-2001	FR0010194464
FRE17	HSBC Développement Durable A C/D	Eurozone Large-Cap Equity	FR	SRI	29-12-1995	FR0000437113
FRE17	AXA Europe du Sud (C)	Eurozone Large-Cap Equity	FR	Conventional	28-06-1996	FR0000990608
FRE17	CS Actions Euro (C)	Eurozone Large-Cap Equity	FR	Conventional	14-06-1996	FR0000985442
FRE17	MW Actions Europe (C)	Eurozone Large-Cap Equity	FR	Conventional	01-01-1995	FR0007437603

Appendix 4.1 – Mutual Funds in the Sample (continued)

Code	Fund Name	Morningstar Category	Domicile	Fund Type	Start Date	ISIN
FRE18	Epargne Ethique Actions C/D	Eurozone Large-Cap Equity	FR	SRI	20-01-2000	FR0000004970
FRE18	Invesco Euro Equity E (C)	Eurozone Large-Cap Equity	FR	Conventional	07-05-1999	FR0000288557
FRE18	Aviva Investors Actions Euro C/D	Eurozone Large-Cap Equity	FR	Conventional	28-04-2000	FR0007045604
FRE18	Sinopia Euro Equities (C)	Eurozone Large-Cap Equity	FR	Conventional	19-04-1999	FR0000435406
FRE19	Ethis Vitalité (C)	Eurozone Large-Cap Equity	FR	SRI	28-06-2000	FR0007046073
FRE19	Meyerbeer Actions Europe (C)	Eurozone Large-Cap Equity	FR	Conventional	18-06-1999	FR0010460931
FRE19	CPR Active Euroland P C/D	Eurozone Large-Cap Equity	FR	Conventional	22-05-1999	FR0000446098
FRE19	Vendôme Europe (C)	Eurozone Large-Cap Equity	FR	Conventional	27-09-1999	FR0007371703
FRE20	Fédéris ISR Euro C/D	Eurozone Large-Cap Equity	FR	SRI	16-06-2000	FR0007045950
FRE20	AXA Valeurs Euro (C)	Eurozone Large-Cap Equity	FR	Conventional	18-06-1999	FR0000170292
FRE20	CAAM Euroland (C)	Eurozone Large-Cap Equity	FR	Conventional	26-11-1999	FR0007038054
FRE20	CAAM Sélect Euro (D)	Eurozone Large-Cap Equity	FR	Conventional	08-11-1999	FR0010315424
FRE21	Génération Ethique (C)	Eurozone Large-Cap Equity	FR	SRI	23-11-2000	FR0010377549
FRE21	Prévoir Gestion Actions (C)	Eurozone Large-Cap Equity	FR	Conventional	07-01-2000	FR0007035159
FRE21	UFF Multitalents LT A (D)	Eurozone Large-Cap Equity	FR	Conventional	29-11-1999	FR0010180786
FRE21	VP Gestion Dynamique (D)	Eurozone Large-Cap Equity	FR	Conventional	01-10-1999	FR0010019315
FRE22	Insertion-Emplois (D)	Eurozone Large-Cap Equity	FR	SRI	11-05-1994	FR0000970873
FRE22	Acer Actions (C)	Eurozone Large-Cap Equity	FR	Conventional	16-06-1994	FR0007480652
FRE22	Brongniart Rendement (C)	Eurozone Large-Cap Equity	FR	Conventional	10-12-1993	FR0010135434
FRE22	France Actions Expansion (C)	Eurozone Large-Cap Equity	FR	Conventional	04-02-1994	FR0007476387
FRE23	AGF Valeurs Durables R (C)	Eurozone Large-Cap Equity	FR	SRI	15-10-1991	FR0000017329
FRE23	Etoile Euro Opportunités (C)	Eurozone Large-Cap Equity	FR	Conventional	06-09-1991	FR0000987273
FRE23	Oddo Cibles and Leaders A C/D	Eurozone Large-Cap Equity	FR	Conventional	27-12-1991	FR0000980922
FRE23	SSgA EMU Alpha Equity Fund (C)	Eurozone Large-Cap Equity	FR	Conventional	03-10-1991	FR0000026585
FRE24	AGF Euro Actions (C)	Eurozone Large-Cap Equity	FR	SRI	26-06-1998	FR0010004663
FRE24	Centrale Actions Euro (C)	Eurozone Large-Cap Equity	FR	Conventional	29-12-1997	FR0000285587
FRE24	Elan Euro Dynamique C/D	Eurozone Large-Cap Equity	FR	Conventional	06-03-1998	FR0000285850
FRE24	Saint-Honoré Euro Opportunités A C/D	Eurozone Large-Cap Equity	FR	Conventional	18-07-1997	FR0010505537

Appendix 4.1 – Mutual Funds in the Sample (continued)

Code	Fund Name	Morningstar Category	Domicile	Fund Type	Start Date	ISIN
FRE25	MAM Actions Ethique (C)	Eurozone Large-Cap Equity	FR	SRI	02-07-1998	FR0000448987
FRE25	BMM Euro Croissance (C)	Eurozone Large-Cap Equity	FR	Conventional	09-04-1998	FR0007019377
FRE25	Gan Eurostratégie (D)	Eurozone Large-Cap Equity	FR	Conventional	23-04-1998	FR0007020003
FRE25	SLF (F) Equity Europe (C)	Eurozone Large-Cap Equity	FR	Conventional	20-04-1998	FR0010074914
FRE26	Orsay Croissance Responsable (C)	Eurozone Large-Cap Equity	FR	SRI	03-09-1997	FR0000431918
FRE26	MAM Sélection Actions (C)	Eurozone Large-Cap Equity	FR	Conventional	08-08-1997	FR0000978090
FRE26	Ecureuil Profil 90 (D)	Eurozone Large-Cap Equity	FR	Conventional	17-10-1997	FR0010075796
FRE26	Bâti Action Euro C/D	Eurozone Large-Cap Equity	FR	Conventional	30-04-1998	FR0007019898
FRE27	EuroSociétale (C)	Eurozone Large-Cap Equity	FR	SRI	16-04-1999	FR0010458745
FRE27	MV Euro Flex A (C)	Eurozone Large-Cap Equity	FR	Conventional	06-05-1998	FR0000286072
FRE27	Aviva Actions Euro C/D	Eurozone Large-Cap Equity	FR	Conventional	07-05-1998	FR0007022108
FRE27	Baring Grand´Europe (C)	Eurozone Large-Cap Equity	FR	Conventional	10-07-1998	FR0000444192
FRE28	Macif Croissance Durable (C)	Eurozone Large-Cap Equity	FR	SRI	18-06-1999	FR0000435331
FRE28	Groupama Evolution Dynamique (C)	Eurozone Large-Cap Equity	FR	Conventional	20-07-1998	FR0007024716
FRE28	Afer-Eurosfer A C/D	Eurozone Large-Cap Equity	FR	Conventional	30-07-1998	FR0007024393
FRE28	CM-CIC Euro Actions (C)	Eurozone Large-Cap Equity	FR	Conventional	02-10-1998	FR0010359331
FRE29	Ecureuil Bénéfices Responsable (D)	Eurozone Large-Cap Equity	FR	SRI	21-09-1999	FR0010091116
FRE29	Médi Actions (D)	Eurozone Large-Cap Equity	FR	Conventional	22-10-1998	FR0000284648
FRE29	MMA Euro-Actions C/D	Eurozone Large-Cap Equity	FR	Conventional	17-12-1998	FR0000441636
FRE29	Optimum Actions (C)	Eurozone Large-Cap Equity	FR	Conventional	15-01-1999	FR0007019237
FRE30	Natixis Impact Actions Euro R (C)	Eurozone Large-Cap Equity	FR	SRI	20-12-1999	FR0000970840
FRE30	Atout Quanteuroland (D)	Eurozone Large-Cap Equity	FR	Conventional	22-01-1999	FR0000287815
FRE30	Gérer Multi-Factoriel Euro (C)	Eurozone Large-Cap Equity	FR	Conventional	01-02-1999	FR0000990921
FRE30	HSBC Euro Actions (C)	Eurozone Large-Cap Equity	FR	Conventional	12-02-1999	FR0000971319
FRE31	AXA Euro Valeurs Responsables (C)	Eurozone Large-Cap Equity	FR	SRI	25-07-1996	FR0000982761
FRE31	Federal Euro Dynamique P C/D	Eurozone Large-Cap Equity	FR	Conventional	31-10-1996	FR0000994378
FRE31	Indosuez Europe Secteurs (C)	Eurozone Large-Cap Equity	FR	Conventional	08-04-1997	FR0000432387
FRE31	Sinopia Actions Euro G (C)	Eurozone Large-Cap Equity	FR	Conventional	10-03-1997	FR0000421083

Appendix 4.1 – Mutual Funds in the Sample (continued)

Code	Fund Name	Morningstar Category	Domicile	Fund Type	Start Date	ISIN
FRE32	LCL Actions Dev Durable Euro (C)	Eurozone Large-Cap Equity	FR	SRI	23-10-2002	FR0000989006
FRE32	AG2R Actions C (C)	Eurozone Large-Cap Equity	FR	Conventional	17-04-2003	FR0007082466
FRE32	Etoile Actions Rendement (D)	Eurozone Large-Cap Equity	FR	Conventional	16-07-2003	FR0010501676
FRE32	MMGI Euromix Actions (C)	Eurozone Large-Cap Equity	FR	Conventional	11-07-2003	FR0007085063
FRE33	Macif Croissance Durable and Solidaire (C)	Eurozone Large-Cap Equity	FR	SRI	26-04-2002	FR0000983819
FRE33	Best Business Models (C)	Eurozone Large-Cap Equity	FR	Conventional	10-04-2002	FR0000994451
FRE33	Métropole Euro (C)	Eurozone Large-Cap Equity	FR	Conventional	28-11-2002	FR0007078753
FRE33	SGAM Invest Euro Value (C)	Eurozone Large-Cap Equity	FR	Conventional	17-12-2002	FR0007079199
DEE1	Liga Pax Aktien Union Inc	Europe Large-Cap Blend Equity	DE	SRI	05-05-1997	DE0009750216
DEE1	Dac-Fonds UI Inc	Europe Large-Cap Blend Equity	DE	Conventional	21-04-1997	DE0009781724
DEE1	BWI-EuroProfil Inc	Europe Large-Cap Blend Equity	DE	Conventional	21-07-1997	DE0009780221
DEE1	cominvest EuropaVision P Inc	Europe Large-Cap Blend Equity	DE	Conventional	27-01-1997	DE0009769679
ESE1	Santander Dividendo Solidario FI Acc	Europe Large-Cap Value Equity	ES	SRI	03-06-1999	ES0114350038
ESE1	Cahispa Eurovariable FI Acc	Europe Large-Cap Value Equity	ES	Conventional	13-03-2000	ES0124541030
ESE1	Ibercaja Bolsa Europa FI Acc	Europe Large-Cap Value Equity	ES	Conventional	30-12-1998	ES0130705033
ESE1	Medivalor Europeo FI Acc	Europe Large-Cap Value Equity	ES	Conventional	05-11-1998	ES0162022034

Appendix 4.2 – Fund Performance and Risk Estimates using the Unconditional 1-Factor Model

This appendix presents estimates of performance (alphas expressed in percentage) and risk for each SRI fund in our sample, as well as for each characteristics-matched portfolio, using the unconditional 1-factor model of equation [4.1]. The benchmarks used are the MSCI AC World TR index for Global equity funds and the MSCI AC Europe TR index for European equity funds. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for Global equity funds and Panel B for European equity funds.

Code		α_p		β_p		R^2 *adj.*
Panel A: Global Equity Funds						
ATG1	SRI Fund	0.0542		0.9484	***	88.17%
	Matched-portfolio	-0.1689		1.0160	***	91.35%
BEG1	SRI Fund	-0.0824		0.9871	***	95.60%
	Matched-portfolio	-0.4335	***	1.0320	***	96.53%
DEG1	SRI Fund	-0.2194		1.0639	***	85.73%
	Matched-portfolio	-0.2158		1.0693	***	88.72%
DEG2	SRI Fund	-0.2148	**	0.9962	***	94.28%
	Matched-portfolio	-0.1435		0.8148	***	81.19%
DEG3	SRI Fund	-0.1268		0.9849	***	89.98%
	Matched-portfolio	0.1197		0.9827	***	91.35%
FRG1	SRI Fund	-0.0578		0.9425	***	83.89%
	Matched-portfolio	-0.0325		1.0598	***	81.35%
FRG2	SRI Fund	0.4098		0.8438	***	84.45%
	Matched-portfolio	-0.2896	***	0.9122	***	97.00%
ITG1	SRI Fund	-0.3604	***	0.8866	***	94.20%
	Matched-portfolio	-0.1702	**	0.7931	***	96.57%
ITG2	SRI Fund	-0.3381	***	0.6548	***	96.15%
	Matched-portfolio	-0.1962	***	0.7898	***	97.02%
NLG1	SRI Fund	-0.0408		0.8522	***	80.96%
	Matched-portfolio	-0.2612	**	1.0041	***	90.15%
UKG1	SRI Fund	-0.3019	**	0.9848	***	91.41%
	Matched-portfolio	0.1409		1.0424	***	86.08%
UKG2	SRI Fund	0.2903	*	0.9385	***	89.37%
	Matched-portfolio	-0.1947	**	0.9400	***	91.98%
UKG3	SRI Fund	-0.4099	***	0.9814	***	89.67%
	Matched-portfolio	0.0539		1.0445	***	94.44%
UKG4	SRI Fund	-0.1020		1.1093	***	93.05%
	Matched-portfolio	0.0281		1.1068	***	87.49%
UKG5	SRI Fund	0.0175		1.0272	***	89.80%
	Matched-portfolio	0.0526		0.9316	***	91.38%
UKG6	SRI Fund	-0.2852	**	0.9754	***	86.24%
	Matched-portfolio	-0.4288	***	1.0744	***	89.56%
UKG7	SRI Fund	-0.0734		1.0016	***	84.91%
	Matched-portfolio	-0.3967		1.0546	***	76.80%
UKG8	SRI Fund	-0.3293		1.0752	***	73.00%
	Matched-portfolio	-0.3534		1.1079	***	80.75%
Panel B: European Equity Funds						
Code		α_p		β_p		R^2 *adj.*
BEE1	SRI Fund	-0.2421	**	0.9475	***	87.85%
	Matched-portfolio	-0.1081		1.0293	***	95.96%
BEE2	SRI Fund	-0.2079	*	1.0650	***	87.90%
	Matched-portfolio	-0.0949		1.1260	***	95.82%
DEE1	SRI Fund	-0.0389		0.9913	***	96.01%
	Matched-portfolio	-0.8286	***	1.1902	***	79.36%

Appendix 4.2 – Fund Performance and Risk Estimates using the Unconditional 1-Factor Model (continued)

Code		α_p		β_p		R^2 *adj.*
FRE1	SRI Fund	-0.2780	***	0.9571	***	96.53%
	Matched-portfolio	0.1520		0.9307	***	92.78%
FRE2	SRI Fund	-0.2517	***	1.0150	***	97.82%
	Matched-portfolio	-0.0244		0.8112	***	95.41%
FRE3	SRI Fund	-0.1562		0.9379	***	90.72%
	Matched-portfolio	0.0475		1.0328	***	93.21%
FRE4	SRI Fund	-0.1601		1.0044	***	89.83%
	Matched-portfolio	-0.2581	**	1.0092	***	94.70%
FRE5	SRI Fund	-0.3052	***	0.9739	***	96.49%
	Matched-portfolio	-0.1460		1.0044	***	95.04%
FRE6	SRI Fund	-0.3424	***	1.0255	***	95.28%
	Matched-portfolio	-0.2353		1.0922	***	91.58%
FRE7	SRI Fund	-0.2163	*	0.8954	***	94.46%
	Matched-portfolio	-0.2283		0.8738	***	93.69%
FRE8	SRI Fund	-0.1776	***	1.0164	***	98.43%
	Matched-portfolio	-0.3151	***	0.9460	***	88.21%
FRE9	SRI Fund	-0.2510	***	0.9713	***	96.60%
	Matched-portfolio	0.2060		0.9043	***	88.72%
FRE10	SRI Fund	-0.4390	**	0.9393	***	83.17%
	Matched-portfolio	0.0108		1.0176	***	91.84%
FRE11	SRI Fund	0.2293		0.8774	***	90.48%
	Matched-portfolio	0.1730		0.8744	***	78.10%
FRE12	SRI Fund	-0.0224		0.9212	***	79.23%
	Matched-portfolio	0.0166		0.7890	***	90.62%
FRE13	SRI Fund	-0.0436		0.9228	***	70.64%
	Matched-portfolio	0.2094		0.7915	***	86.32%
FRE14	SRI Fund	0.0194		1.0537	***	89.74%
	Matched-portfolio	-0.0410		1.0877	***	92.96%
FRE15	SRI Fund	-0.0380		1.0410	***	79.10%
	Matched-portfolio	0.0653		0.9879	***	93.55%
FRE16	SRI Fund	0.0248		0.9081	***	90.07%
	Matched-portfolio	-0.0924		1.0613	***	90.28%
FRE17	SRI Fund	-0.2723	*	1.0494	***	90.95%
	Matched-portfolio	-0.1009		1.0378	***	86.81%
FRE18	SRI Fund	-0.3010	**	1.0402	***	87.79%
	Matched-portfolio	-0.0584		1.0481	***	90.48%
FRE19	SRI Fund	-0.3086	*	1.1281	***	82.02%
	Matched-portfolio	-0.1522		1.0662	***	93.94%
FRE20	SRI Fund	-0.0892		1.1005	***	91.57%
	Matched-portfolio	-0.0565		1.0372	***	94.11%
FRE21	SRI Fund	-0.1990	*	1.1576	***	94.61%
	Matched-portfolio	-0.7670		0.8227	***	35.08%
FRE22	SRI Fund	-0.1460		0.9185	***	88.01%
	Matched-portfolio	-0.1298		0.8186	***	77.90%
FRE23	SRI Fund	0.0313		1.1421	***	91.89%
	Matched-portfolio	-0.2102	**	1.1451	***	94.08%
FRE24	SRI Fund	-0.0885		1.1310	***	91.67%
	Matched-portfolio	-0.0087		1.0410	***	89.38%
FRE25	SRI Fund	-0.3017		1.1514	***	77.05%
	Matched-portfolio	0.5962		1.1284	***	35.77%
FRE26	SRI Fund	-0.4870	***	0.8884	***	81.57%
	Matched-portfolio	-0.0198		1.0889	***	89.02%

Appendix 4.2 – Fund Performance and Risk Estimates using the Unconditional 1-Factor Model (continued)

Code		α_p		β_p		R^2 *adj.*
FRE27	SRI Fund	-0.0502		1.1109	***	94.05%
	Matched-portfolio	0.0358		1.0061	***	92.29%
FRE28	SRI Fund	0.0402		0.9477	***	75.31%
	Matched-portfolio	-0.0455		1.0715	***	91.42%
FRE29	SRI Fund	-0.0739		1.0895	***	89.24%
	Matched-portfolio	0.1527		0.9510	***	90.07%
FRE30	SRI Fund	-0.1550		1.0935	***	92.03%
	Matched-portfolio	-0.2314		0.7951	***	79.79%
FRE31	SRI Fund	-0.0678		1.1309	***	89.62%
	Matched-portfolio	-0.2310	**	1.0966	***	95.19%
FRE32	SRI Fund	-0.1046		1.0724	***	89.35%
	Matched-portfolio	0.1107		0.9809	***	88.02%
FRE33	SRI Fund	-0.0075		0.9226	***	72.76%
	Matched-portfolio	0.2018		1.0143	***	92.98%
ESE1	SRI Fund	-0.0672		0.8315	***	91.59%
	Matched-portfolio	-0.0859		1.0011	***	96.18%

Appendix 4.3 – Statistical Tests for the Differences in Performance and Risk Estimates between SRI and Conventional Funds using the Unconditional 1-Factor Model

This appendix reports the *t*-statistics and the *U*-statistics for the null hypothesis that the members of each group (SRI and conventional) have equal means/medians in terms of their performance (alphas) and risk estimates (betas). In both cases, we also report the respective *p-values* for a two-sided test. In bold we indicate the cases in which we reject the null hypothesis at the usual significance levels. Panel A presents the results for Global equity funds from the EMU countries, Panel B for UK Global equity funds and Panel C for European equity funds.

Panel A: Global Equity Funds – EMU countries		
	α_p	β_p
t-statistic	0.9672	0.6204
p-val	*0.3463*	*0.5427*
U-statistic	0.7181	0.6425
p-val	*0.4727*	*0.5205*
Panel B: Global Equity Funds – UK		
	α_p	β_p
t-statistic	0.1034	0.8370
p-val	*0.9191*	*0.4167*
W-statistic	0.1575	0.6826
p-val	*0.8748*	*0.4948*
Panel C: European Equity Funds		
	α_p	β_p
t-statistic	**1.7345**	0.7704
p-val	***0.0871***	*0.4436*
W-statistic	**2.2865**	0.5730
p-val	***0.0222***	*0.5667*

Appendix 4.4 – Portfolio Performance and Risk Estimates using the Unconditional 1-Factor Model with Alternative Conventional Benchmarks

This appendix presents estimates of performance (alphas expressed in percentage) and risk for equally-weighted portfolios of SRI Funds and characteristics-matched portfolios of conventional funds, using the unconditional 1-factor model of equation [4.1], with 2 alternative benchmarks: for Global equity funds we use the MSCI AC World TR index and the FTSE AW All-World TR index; for European equity funds, we use the MSCI AC Europe TR index and the FTSE AW Europe TR index. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for Global equity funds and Panel B for European equity funds.

Panel A: Global Equity Funds											
		MSCI AC World					**FTSE AW All-World**				
Country		α_p		β_p		R^2 *adj.*	α_p		β_p		R^2 *adj.*
Austria	SRI Funds	0.0542		0.9484	***	88.17%	0.0156		0.9431	***	87.48%
	Matched-portfolios	-0.1689		1.0160	***	91.35%	-0.2064		1.0128	***	91.11%
Belgium	SRI Funds	-0.0824		0.9871	***	95.60%	-0.1071		0.9856	***	95.72%
	Matched-portfolios	-0.4335	***	1.0320	***	96.53%	-0.4598	***	1.0298	***	96.52%
France	SRI Funds	0.1183		0.8962	***	86.26%	0.0897		0.8953	***	86.40%
	Matched-portfolios	-0.1351		1.0145	***	90.27%	-0.1680		1.0125	***	90.23%
Germany	SRI Funds	-0.2097	*	1.0181	***	92.42%	-0.2310	**	1.0173	***	92.59%
	Matched-portfolios	-0.1573		0.9563	***	91.19%	-0.1784		0.9544	***	91.14%
Italy	SRI Funds	-0.3752	***	0.8156	***	95.54%	-0.3931	***	0.8140	***	95.48%
	Matched-portfolios	-0.1886	***	0.7899	***	97.50%	-0.2061	***	0.7881	***	97.38%
Netherlands	SRI Funds	-0.0408		0.8522	***	80.96%	-0.0605		0.8495	***	80.71%
	Matched-portfolios	-0.2612	**	1.0041	***	90.15%	-0.2823	**	1.0032	***	90.30%
UK	SRI Funds	-0.1121		0.9826	***	92.50%	-0.1553	*	0.9781	***	92.14%
	Matched-portfolios	-0.1602		1.0067	***	92.97%	-0.2036	*	1.0040	***	92.93%
Panel B: European Equity Funds											
		MSCI AC Europe					**FTSE AW Europe**				
Country		α_p		β_p		R^2 *adj.*	α_p		β_p		R^2 *adj.*
Belgium	SRI Funds	-0.1888	*	0.9912	***	87.71%	-0.2395	**	0.9928	***	88.39%
	Matched-portfolios	-0.1016		1.0556	***	96.90%	-0.1548	**	1.0584	***	97.88%
France	SRI Funds	-0.1869	**	1.0309	***	94.82%	-0.2241	***	1.0356	***	95.44%
	Matched-portfolios	-0.0822		0.9923	***	94.46%	-0.1182		0.9967	***	95.06%
Germany	SRI Funds	-0.0389		0.9913	***	96.01%	-0.0740		0.9970	***	96.89%
	Matched-portfolios	-0.8286	***	1.1902	***	79.36%	-0.8737	***	1.1920	***	79.40%
Spain	SRI Funds	-0.0672		0.8315	***	91.59%	-0.0961		0.8341	***	92.04%
	Matched-portfolios	-0.0859		1.0011	***	96.18%	-0.1216		1.0031	***	96.44%

Appendix 4.5 – Portfolio Performance and Risk Estimates for Global Equity Funds using the Unconditional 1-Factor Model with a European Benchmark

This appendix presents estimates of performance (alphas expressed in percentage) and risk for equally-weighted portfolios of Global SRI Funds and characteristics-matched portfolios of conventional funds using the unconditional 1-factor model of equation [4.1]. The benchmark used is the MSCI AC Europe TR Index. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987).

Country		α_p		β_p		R^2 *adj.*
Austria	SRI Funds	-0.1225		0.8502	***	88.64%
	Matched-portfolios	-0.3397	*	0.9225	***	94.31%
Belgium	SRI Funds	-0.3091	*	0.8931	***	86.78%
	Matched-portfolios	-0.6627	***	0.9447	***	89.73%
France	SRI Funds	0.0494		0.8424	***	90.70%
	Matched-portfolios	-0.2280		0.9287	***	89.89%
Germany	SRI Funds	-0.4134	***	0.9526	***	89.60%
	Matched-portfolios	-0.3546	**	0.8866	***	86.79%
Italy	SRI Funds	-0.5684	***	0.7236	***	86.97%
	Matched-portfolios	-0.3724	***	0.7061	***	90.13%
Netherlands	SRI Funds	-0.1995		0.8134	***	81.71%
	Matched-portfolios	-0.4981	***	0.8905	***	78.42%
UK	SRI Funds	-0.2792	***	0.8900	***	88.71%
	Matched-portfolios	-0.3380	**	0.8893	***	84.75%

Appendix 4.6 – Fund Performance and Risk Estimates using the Unconditional 4-Factor Model

This appendix presents estimates of performance (alphas expressed in percentage) and risk for each SRI fund in our sample, as well as for each characteristics-matched portfolio, using the unconditional 4-factor model of equation [4.3]. The benchmarks used are the MSCI AC World TR index for Global equity funds and the MSCI AC Europe TR index for European equity funds.[78] $r_{m,t}$ is the market excess return, SMB_t, HML_t and MOM_t are factor-mimicking portfolios for the size, book-to-market and momentum factors, respectively. *Wald* corresponds to the probability values of the χ-square statistic of the Newey and West (1987) Wald test for the null hypothesis that the coefficients of the size (SMB), book-to-market (HML) and momentum (MOM) factors are jointly equal to zero. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for Global equity funds and Panel B for European equity funds.

Panel A: Global Equity Funds

Code		α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	*Wald*	R^2 *adj.*
ATG1	SRI Fund	-0.0440	0.9414 ***	0.1164	-0.3199 *	0.1989 ***	0.0002	91.42%
	Matched-portfolio	-0.1527	0.9611 ***	0.2410 *	-0.2679	-0.0235	0.0722	92.39%
BEG1	SRI Fund	-0.1445	0.9961 ***	0.0527	0.1144	0.0101	0.0863	95.77%
	Matched-portfolio	-0.3368 ***	1.0387 ***	-0.1971 ***	-0.0260	-0.0006	0.0005	97.09%
DEG1	SRI Fund	-0.3000 *	1.0041 ***	0.2740 ***	-0.1879	-0.0662	0.0122	86.73%
	Matched-portfolio	-0.1094	1.0522 ***	0.0060	-0.3814 ***	0.0069	0.0046	90.24%
DEG2	SRI Fund	-0.1152	0.9679 ***	-0.1296 *	-0.1851 ***	-0.0799 ***	0.0001	95.02%
	Matched-portfolio	-0.1736	0.8440 ***	0.0827	-0.1285	0.0693	0.3324	81.52%
DEG3	SRI Fund	-0.1404	0.9528 ***	0.1674	-0.0600	0.0062	0.2747	90.01%
	Matched-portfolio	0.0978	0.9904 ***	-0.0260	-0.1424	0.1067 ***	0.0070	91.90%
FRG1	SRI Fund	-0.0952	0.9052 ***	0.2523	-0.0645	0.0625	0.5307	83.76%
	Matched-portfolio	-0.1563	0.9515 ***	0.7940 ***	-0.0604	0.2059 *	0.0026	86.85%
FRG2	SRI Fund	0.3339	0.8079 ***	0.1114	-0.2771	0.0055	0.5958	83.94%
	Matched-portfolio	-0.2695 **	0.9408 ***	-0.1867	0.0582	-0.0111	0.0756	97.22%
ITG1	SRI Fund	-0.3264 ***	0.8583 ***	0.0356	-0.2167 ***	-0.0595 ***	0.0003	94.72%
	Matched-portfolio	-0.1580 *	0.7956 ***	-0.0895 *	0.1631 ***	-0.0042	0.0000	97.19%
ITG2	SRI Fund	-0.3476 ***	0.6784 ***	-0.0639	0.0929	0.0598 **	0.1503	96.56%
	Matched-portfolio	-0.1986 **	0.8138 ***	-0.0966 **	0.0995	0.0485 *	0.0891	97.38%
NLG1	SRI Fund	-0.1980	0.8876 ***	0.3417 **	-0.0550	0.0981 **	0.0269	83.90%
	Matched-portfolio	-0.2141	1.0005 ***	-0.0261	-0.1188	0.0028	0.5564	90.06%
UKG1	SRI Fund	-0.4084 ***	1.0136 ***	0.2028 ***	-0.0837	0.1353 **	0.0002	92.52%
	Matched-portfolio	0.0329	1.1385 ***	0.0565	0.0065	0.2927 ***	0.0020	87.58%
UKG2	SRI Fund	0.2313	0.9493 ***	0.1632 *	-0.0693	0.0770 *	0.0003	90.50%
	Matched-portfolio	-0.1856 **	0.9772 ***	-0.0154	-0.0740	0.1217 ***	0.0150	92.94%
UKG3	SRI Fund	-0.3250 **	1.0105 ***	-0.0994 *	-0.3577 **	0.0678	0.0013	91.19%
	Matched-portfolio	0.0335	1.0490 ***	0.0456	0.0091	0.0367	0.7956	94.27%
UKG4	SRI Fund	-0.0840	1.0479 ***	0.4191 ***	0.2324 *	0.0667	0.0040	93.84%
	Matched-portfolio	-0.0991	1.0869 ***	0.1807	-0.3708	0.3808 *	0.0003	91.26%
UKG5	SRI Fund	0.0597	0.9616 ***	0.2540 ***	-0.3131 ***	-0.0624	0.0000	92.56%
	Matched-portfolio	-0.1077	0.9736 ***	0.0921	0.2335 ***	0.0769 *	0.0004	92.73%
UKG6	SRI Fund	-0.3358 ***	0.9738 ***	0.3106 ***	-0.2560 ***	0.1151 **	0.0000	91.37%
	Matched-portfolio	-0.4493 ***	1.0909 ***	0.1453 **	-0.1606	0.1131 **	0.0063	91.31%
UKG7	SRI Fund	-0.2937 **	1.0153 ***	0.4775 ***	0.0641	0.0947 *	0.0000	89.08%
	Matched-portfolio	-0.3231 **	1.0724 ***	0.3603 ***	-0.4544 ***	0.2006 **	0.0000	84.09%
UKG8	SRI Fund	-0.3513	0.8406 ***	1.3341 **	-0.2865	0.3453	0.0001	79.75%
	Matched-portfolio	-0.8697	1.0430 ***	-0.0054	-1.0725 ***	0.2352	0.0000	89.33%

[78] We could also have used the MSCI EMU TR index as benchmark for the Eurozone funds, but the MSCI EMU Small Cap Index, which is required to compute the SMB factor, was only available from 2001.

Appendix 4.6 – Fund Performance and Risk Estimates using the Unconditional 4-Factor Model (continued)

Panel B: European Equity Funds													
Code		α_p		β_p (MKT)		β_{1p} (SMB)		β_{2p} (HML)		β_{3p} (MOM)		*Wald*	R^2 *adj.*
BEE1	SRI Fund	-0.2860	**	0.9024	***	0.1908	**	0.0245		-0.0660		0.1512	88.52%
	Matched-portfolio	-0.1320		1.0465	***	0.0061		0.0219		0.0576	*	0.2188	96.01%
BEE2	SRI Fund	-0.2084		0.9985	***	0.2480	*	-0.0450		-0.1175	**	0.1228	88.86%
	Matched-portfolio	-0.0905		1.1130	***	-0.1150	*	0.1469	**	-0.0077		0.0184	96.11%
DEE1	SRI Fund	-0.0160		0.9716	***	-0.0266		-0.0084		-0.0662	**	0.0184	96.20%
	Matched-portfolio	-0.6667	***	1.1692	***	0.5756	***	-0.5252	***	-0.0963		0.0000	85.35%
FRE1	SRI Fund	-0.2601	***	0.9653	***	-0.1202	***	0.0308		0.0032		0.0377	96.82%
	Matched-portfolio	-0.0375		0.9124	***	0.0737		0.3179	***	0.0928	***	0.0000	94.57%
FRE2	SRI Fund	-0.1899	**	0.9800	***	0.0294		0.1815		-0.0118		0.2259	97.89%
	Matched-portfolio	0.1174		0.7842	***	-0.0125		0.1556		-0.1031	**	0.0013	96.36%
FRE3	SRI Fund	-0.1829		0.8938	***	-0.0658		0.2671		0.0088		0.1387	91.06%
	Matched-portfolio	0.0056		0.9807	***	-0.0118		0.2770		0.0130		0.6475	93.48%
FRE4	SRI Fund	-0.3003	**	0.9531	***	0.0471		0.2988	**	-0.0113		0.0272	90.74%
	Matched-portfolio	-0.2166	*	1.0163	***	0.0544		-0.1189		-0.0126		0.4616	94.76%
FRE5	SRI Fund	-0.3408	***	0.9466	***	-0.0243		0.2185	***	0.0501		0.0581	96.63%
	Matched-portfolio	-0.1292		0.9986	***	-0.0352		0.0596		-0.0469		0.4797	95.03%
FRE6	SRI Fund	-0.3543	***	0.9803	***	-0.0329		0.2029	***	-0.0378		0.0260	95.70%
	Matched-portfolio	-0.2225		1.0085	***	0.1191		0.0910		-0.1458	**	0.0539	92.44%
FRE7	SRI Fund	-0.2005	*	0.9356	***	-0.1716	***	0.0611		-0.0044		0.0019	95.09%
	Matched-portfolio	-0.2459	*	0.8226	***	0.0430		0.2415	*	0.0269		0.1157	93.89%
FRE8	SRI Fund	-0.1909	***	1.0000	***	-0.0405		0.0617	**	-0.0360	**	0.0001	98.63%
	Matched-portfolio	-0.2974	***	0.9877	***	0.2366	***	-0.1834	**	0.1163	***	0.0001	91.76%
FRE9	SRI Fund	-0.2888	***	0.9439	***	-0.0199		0.2147	***	0.0553		0.0403	96.75%
	Matched-portfolio	0.2568		0.8318	***	0.1826	**	-0.0028		-0.2135	***	0.0000	91.70%
FRE10	SRI Fund	-0.4014	*	0.8548	***	0.1923		-0.0739		-0.2106	***	0.0151	84.91%
	Matched-portfolio	-0.0478		0.9832	***	0.1737		0.0336		-0.0166		0.5835	92.19%
FRE11	SRI Fund	0.2673		0.9220	***	-0.1711	*	0.0469		-0.0349		0.1681	90.73%
	Matched-portfolio	-0.0522		0.9056	***	-0.1085		0.0593		0.2625		0.0964	79.95%
FRE12	SRI Fund	-0.0354		0.8680	***	0.2560	*	-0.1533		-0.0507		0.1879	80.03%
	Matched-portfolio	0.0028		0.7262	***	0.2059	***	-0.0126		-0.0542		0.0068	92.10%
FRE13	SRI Fund	-0.0082		0.8737	***	0.0916		-0.0536		-0.1963		0.5725	70.83%
	Matched-portfolio	0.0982		0.6807	***	0.2656	***	0.3533		-0.0150		0.0171	89.71%
FRE14	SRI Fund	0.0057		1.0179	***	-0.0580		0.2246		0.0274		0.4109	89.64%
	Matched-portfolio	-0.0487		1.0333	***	-0.0506		0.2569		-0.0110		0.1961	93.22%
FRE15	SRI Fund	0.0112		1.0347	***	-0.0237		-0.0661		-0.0603		0.8572	78.54%
	Matched-portfolio	0.0078		0.9313	***	0.1521	*	0.1307		-0.0364		0.1058	94.10%
FRE16	SRI Fund	0.0061		0.8810	***	-0.0072		0.1430		-0.0053		0.5095	89.96%
	Matched-portfolio	-0.2385		1.0022	***	0.3664	***	0.0750		0.0049		0.0001	92.64%
FRE17	SRI Fund	-0.2119		1.0674	***	-0.0433		-0.1165		0.0013		0.4927	90.93%
	Matched-portfolio	-0.1781		0.9955	***	0.3121	***	0.0619		-0.0227		0.0009	88.62%
FRE18	SRI Fund	-0.3613	**	1.0008	***	0.2031	**	0.0568		-0.0378		0.1073	88.41%
	Matched-portfolio	-0.0412		1.0486	***	-0.0120		-0.0256		-0.0110		0.9323	90.21%
FRE19	SRI Fund	-0.2576		1.0273	***	0.2363		-0.0836		-0.2454	***	0.0158	83.82%
	Matched-portfolio	-0.1427		1.0249	***	0.0218		0.0395		-0.0922	**	0.1002	94.19%
FRE20	SRI Fund	-0.0704		1.0442	***	0.0567		0.0194		-0.1313	***	0.0309	92.04%
	Matched-portfolio	-0.0291		1.0122	***	0.0003		-0.0094		-0.0719	*	0.3200	94.17%
FRE21	SRI Fund	-0.1160		1.1724	***	-0.2155	***	-0.0019		-0.0235		0.0019	95.34%
	Matched-portfolio	-0.6949		0.6023	***	0.5674	**	-0.0564		-0.4365	*	0.1642	40.14%

Appendix 4.6 – Fund Performance and Risk Estimates using the Unconditional 4-Factor Model (continued)

Code		α_p		β_p (MKT)		β_{1p} (SMB)		β_{2p} (HML)		β_{3p} (MOM)		*Wald*	R^2 *adj.*
FRE22	SRI Fund	-0.2605	**	0.9025	***	0.0547		0.2110	***	0.0396		0.0043	88.56%
	Matched-portfolio	-0.2067		0.7863	***	0.3639	***	0.0275		0.0074		0.0000	81.67%
FRE23	SRI Fund	0.0683		1.1072	***	-0.0749		0.0035		-0.1177	**	0.0158	92.51%
	Matched-portfolio	-0.2589	**	1.1003	***	0.1431	**	0.0836	*	-0.0647	*	0.0342	94.54%
FRE24	SRI Fund	-0.0097		1.1248	***	-0.0958		-0.1000		-0.0758		0.0187	92.01%
	Matched-portfolio	-0.1347		0.9531	***	0.1928	**	0.2585	***	-0.1163	**	0.0002	91.78%
FRE25	SRI Fund	-0.3643		0.9891	***	0.3072	*	0.1784		-0.3293	***	0.0010	81.64%
	Matched-portfolio	0.6374		1.0890	***	-0.0496		-0.0098		-0.1293	***	0.0135	34.23%
FRE26	SRI Fund	-0.4318	**	0.8822	***	0.1531	**	-0.1618	**	-0.0349		0.0565	81.96%
	Matched-portfolio	-0.1047		1.0118	***	0.2009	**	0.1652		-0.1155	**	0.0149	90.49%
FRE27	SRI Fund	-0.0582		1.0791	***	-0.0082		0.0562		-0.0743	*	0.1738	94.25%
	Matched-portfolio	0.0216		0.9917	***	0.1886	***	-0.0366		-0.0070		0.0069	92.95%
FRE28	SRI Fund	-0.0386		0.8984	***	0.1973	**	0.1222		-0.0507		0.1188	75.82%
	Matched-portfolio	-0.0535		1.0548	***	-0.0064		0.0375		-0.0368		0.8760	91.28%
FRE29	SRI Fund	-0.0087		1.0729	***	-0.0074		0.1114		-0.0739		0.7045	88.94%
	Matched-portfolio	0.2566		0.9594	***	-0.1005		0.1304		-0.1183		0.1098	90.60%
FRE30	SRI Fund	-0.1863		1.0769	***	0.0260		0.0672		-0.0182		0.5839	91.90%
	Matched-portfolio	-0.2156		0.7836	***	0.1703	**	-0.0886		-0.0210		0.1628	80.24%
FRE31	SRI Fund	0.0761		1.1558	***	0.0646		-0.3276	***	-0.0243		0.0321	90.57%
	Matched-portfolio	-0.2034	**	1.0883	***	0.0565		-0.0664		-0.0322		0.4767	95.16%
FRE32	SRI Fund	-0.0910		1.0799	***	-0.0344		0.0138		-0.0165		0.9791	88.88%
	Matched-portfolio	0.0659		0.9185	***	0.2136	**	-0.0155		0.0077		0.1606	88.57%
FRE33	SRI Fund	0.0522		0.8958	***	0.0045		0.0442		-0.1549		0.6901	72.73%
	Matched-portfolio	0.1886		0.9678	***	0.0511		0.1648		-0.0224		0.3430	93.02%
ESE1	SRI Fund	0.0893		0.8239	***	-0.1357		0.2983	**	-0.1246	***	0.0001	93.99%
	Matched-portfolio	-0.0338		0.9838	***	-0.0345		0.1764		-0.0333		0.0053	96.25%

Appendix 4.7 – Statistical Tests for the Differences in Performance and Risk Estimates between SRI and Conventional Funds using the Unconditional 4-Factor Model

This appendix reports the *t*-statistics and the *U*-statistics for the null hypothesis that the members of each group (SRI and conventional) have equal means/medians in terms of their performance (alphas) and risk estimates (betas of the market, size, book-to-market and momentum factors). In all cases, we also report the respective *p-values* for a two-sided test. In bold we indicate the cases in which we reject the null hypothesis at the usual significance levels. Panel A presents the results for Global equity funds from the EMU countries, Panel B for UK Global equity funds and Panel C for European equity funds.

Panel A: Global Equity Funds – EMU countries					
	α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)
t-statistic	0.4111	0.9117	0.6344	0.5057	0.4702
p-val	*0.6858*	*0.3740*	*0.5338*	*0.6192*	*0.6439*
U-statistic	0.5669	0.7181	1.5497	0.5669	0.1890
p-val	*0.5708*	*0.4727*	*0.1212*	*0.5708*	*0.8501*
Panel B: Global Equity Funds – UK					
	α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)
t-statistic	0.4287	**2.5639**	**1.7694**	0.6346	1.3405
p-val	*0.6747*	***0.0225***	***0.0986***	*0.5359*	*0.2014*
U-statistic	0.0525	**2.2580**	**1.9429**	0.2626	1.2077
p-val	*0.9581*	***0.0239***	***0.0520***	*0.7929*	*0.2271*
Panel C: European Equity Funds					
	α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)
t-statistic	1.2102	1.0858	**2.6245**	0.1919	0.9255
p-val	*0.2302*	*0.2812*	***0.0106***	*0.8484*	*0.3578*
U-statistic	1.2649	0.2378	**2.2703**	0.2919	0.9838
p-val	*0.2059*	*0.8120*	***0.0232***	*0.7704*	*0.3252*

Appendix 4.8 – Portfolio Performance and Risk Estimates for European Equity Funds using the Unconditional 4-Factor Model with Alternative Momentum Factors

This appendix presents estimates of performance (alphas expressed in percentage) and risk for equally-weighted portfolios of European equity SRI Funds and characteristics-matched portfolios of conventional funds using the unconditional 4-factor model of equation [4.3] with alternative momentum factors. $r_{m,t}$ is the excess return of the MSCI AC Europe TR index. SMB_t, HML_t and MOM_t are factor-mimicking portfolios for the size, book-to-market and momentum factors, respectively. In this case, MOM_t is the difference in the returns of a portfolio of past winners and a portfolio of past losers, which were computed based on the 18 Dow Jones Stoxx 600 Supersector indices (Panel A) or the 18 Dow Jones Euro Stoxx Supersector indices (Panel B). *Wald* corresponds to the probability values of the χ-square statistic of the Newey and West (1987) Wald test for the null hypothesis that the coefficients of the size (SMB), book-to-market (HML) and momentum (MOM) factors are jointly equal to zero. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987).

Panel A: Momentum Factor based on the Dow Jones 600 Supersector Indices													
Country		α_p		β_p (MKT)		β_{1p} (SMB)		β_{2p} (HML)		β_{3p} (MOM)		*Wald*	R^2 *adj.*
Belgium	SRI Funds	-0.2487	*	0.9266	***	0.2253	**	0.0527		-0.1004	**	0.0631	88.86%
	Matched-portfolios	-0.1357	*	1.0595	***	-0.0049		0.0564		0.0308		0.1505	96.88%
France	SRI Funds	-0.1775	*	1.0033	***	0.0606		-0.0108		-0.0680	*	0.3501	94.92%
	Matched-portfolios	-0.1035		0.9603	***	0.1631	***	0.0082		-0.0485	*	0.0296	95.00%
Germany	SRI Funds	-0.0160		0.9716	***	-0.0266		-0.0084		-0.0662	**	0.0184	96.20%
	Matched-portfolios	-0.6667	***	1.1692	***	0.5756	***	-0.5252	***	-0.0963		0.0000	85.35%
Spain	SRI Funds	0.0893		0.8239	***	-0.1357		0.2983	**	-0.1246	***	0.0001	93.99%
	Matched-portfolios	-0.0338		0.9838	***	-0.0345		0.1764		-0.0333		0.0053	96.25%
Panel B: Momentum Factor based on the Dow Jones EuroStoxx Supersector Indices													
Country		α_p		β_p (MKT)		β_{1p} (SMB)		β_{2p} (HML)		β_{3p} (MOM)		*Wald*	R^2 *adj.*
Belgium	SRI Funds	-0.2846	**	0.9252	***	0.2201	**	0.0785		-0.1087	**	0.0289	88.91%
	Matched-portfolios	-0.1241		1.0530	***	0.0036		0.0427		0.0113		0.5770	96.84%
France	SRI Funds	-0.1987	**	1.0120	***	0.0483		0.0109		-0.0459		0.5735	94.80%
	Matched-portfolios	-0.1200		0.9687	***	0.1514	***	0.0273		-0.0246		0.0297	94.91%
Germany	SRI Funds	-0.0329		0.9738	***	-0.0308		0.0031		-0.0672	**	0.0277	96.21%
	Matched-portfolios	-0.6988	***	1.1847	***	0.5538	***	-0.4891	***	-0.0528		0.0000	85.17%
Spain	SRI Funds	0.0069		0.8097	***	-0.1222		0.3707	***	-0.0883		0.0024	93.59%
	Matched-portfolios	-0.0505		0.9817	***	-0.0307		0.1834		-0.0367		0.0102	96.25%

Appendix 4.9 – Fund Performance and Risk Estimates using the Unconditional 5-Factor Model

This appendix presents estimates of performance (alphas expressed in percentage) and risk for each SRI fund in our sample, as well as for each characteristics-matched portfolio, using the unconditional 5-factor model of equation [4.4]. $r_{m,t}$ is the market index excess return (the MSCI AC World TR for Global equity funds and the MSCI AC Europe TR for European equity funds), SMB_t, HML_t and MOM_t are factor-mimicking portfolios for the size, book-to-market and momentum factors, respectively. $r_{lm,t} - r_{m,t}$ is the return difference between a local market index and the Global / European market indices used as benchmarks. *Wald* corresponds to the probability values of the χ-square statistic of the Newey and West (1987) Wald test for the null hypothesis that the coefficients of the size (SMB), book-to-market (HML), momentum (MOM) and local ($r_{lm,t} - r_{m,t}$) factors are jointly equal to zero. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for Global equity funds and Panel B for European equity funds.

Panel A: Global Equity Funds

Code		α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HBIAS)	*Wald*	R^2 *adj.*
ATG1	SRI Fund	-0.0244	0.9056***	0.0524	-0.2435	0.2051**	0.0575	0.0002	91.44%
	Matched-portfolio	-0.1004	0.8653***	0.0700	-0.0637	-0.0068	0.1536***	0.0000	94.18%
BEG1	SRI Fund	-0.1318	0.9933***	0.0369	0.0997	0.0079	0.0228	0.1390	95.77%
	Matched-portfolio	-0.2986***	1.0301***	-0.2444***	-0.0701	-0.0074	0.0684	0.0000	97.44%
DEG1	SRI Fund	-0.3926***	0.9436***	0.2667***	-0.2584**	-0.0465	0.2299***	0.0000	88.55%
	Matched-portfolio	-0.1434	1.0300***	0.0033	-0.4073***	0.0141	0.0844	0.0021	90.40%
DEG2	SRI Fund	-0.1768*	0.9339***	-0.1283**	-0.2012***	-0.0606**	0.1334***	0.0000	95.80%
	Matched-portfolio	-0.2913**	0.7791***	0.0853	-0.1592	0.1061*	0.2547***	0.0000	85.27%
DEG3	SRI Fund	-0.1997	0.9511***	0.1495	-0.0124	0.0185	0.0824	0.3546	90.06%
	Matched-portfolio	0.0169	0.9882***	-0.0504	-0.0774	0.1235***	0.1124***	0.0016	92.20%
FRG1	SRI Fund	-0.2667*	0.9192***	-0.0396	0.0240	0.0489	0.7415***	0.0000	92.79%
	Matched-portfolio	-0.2397	0.9583***	0.6521***	-0.0173	0.1993*	0.3606**	0.0007	88.24%
FRG2	SRI Fund	0.2775	0.8066***	-0.0758	-0.2005	-0.0071	0.5046***	0.0000	88.96%
	Matched-portfolio	-0.2902**	0.9403***	-0.2557***	0.0865	-0.0158	0.1860**	0.0440	97.86%
ITG1	SRI Fund	-0.3260***	0.8618***	0.0260	-0.2254***	-0.0562**	0.0304	0.0001	94.69%
	Matched-portfolio	-0.1577*	0.7983***	-0.0967**	0.1565***	-0.0017	0.0228	0.0000	97.18%
ITG2	SRI Fund	-0.3454***	0.6749***	-0.0558	0.0945	0.0530**	-0.0343	0.2092	96.61%
	Matched-portfolio	-0.1990**	0.8144***	-0.0979**	0.0993	0.0496*	0.0057	0.1670	97.35%
NLG1	SRI Fund	-0.1890	0.8369***	0.3057**	-0.1799	0.0917**	0.2805***	0.0033	86.87%
	Matched-portfolio	-0.2150	1.0054***	-0.0226	-0.1067	0.0035	-0.0273	0.7180	89.98%
UKG1	SRI Fund	-0.3943***	1.0311***	0.2147***	-0.1014	0.1199*	0.1380*	0.0000	92.65%
	Matched-portfolio	0.0383	1.1453***	0.0611	-0.0003	0.2867***	0.0530	0.0050	87.47%
UKG2	SRI Fund	0.2460	0.9645***	0.1803*	-0.0980	0.0650	0.1149	0.0011	90.57%
	Matched-portfolio	-0.1747*	0.9886***	-0.0027	-0.0953	0.1128**	0.0854	0.0073	92.96%
UKG3	SRI Fund	-0.3118**	1.0209***	-0.0799	-0.3671**	0.0575	0.1149	0.0021	91.24%
	Matched-portfolio	0.0471	1.0598***	0.0657	-0.0006	0.0262	0.1187	0.6589	94.36%
UKG4	SRI Fund	0.0466	1.0746***	0.4257***	0.2123*	-0.0007	0.3040**	0.0094	94.54%
	Matched-portfolio	0.0741	1.1223***	0.1894	-0.3974	0.2915	0.4030***	0.0000	92.48%
UKG5	SRI Fund	0.0620	0.9639***	0.2567***	-0.3176***	-0.0643	0.0179	0.0000	92.49%
	Matched-portfolio	-0.0890	0.9929***	0.1139*	0.1972**	0.0617	0.1457*	0.0000	92.92%
UKG6	SRI Fund	-0.3049***	1.0059***	0.3466***	-0.3162***	0.0899**	0.2417***	0.0000	91.92%
	Matched-portfolio	-0.4059***	1.1359***	0.1958**	-0.2450**	0.0778**	0.3387*	0.0013	92.28%
UKG7	SRI Fund	-0.2644*	1.0490***	0.5117***	0.0037	0.0644	0.2613***	0.0000	89.65%
	Matched-portfolio	-0.2980	1.1014***	0.3896***	-0.5064***	0.1746**	0.2243*	0.0000	84.34%
UKG8	SRI Fund	-0.3571	0.8401***	1.3340**	-0.2870	0.3470	-0.0060	0.0005	78.56%
	Matched-portfolio	-0.4279	1.0771***	0.0035	-1.0312***	0.1076	0.4547**	0.0000	90.08%

Appendix 4.9 – Fund Performance and Risk Estimates using the Unconditional 5-Factor Model (continued)

Panel B: European Equity Funds									
Code		α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HBIAS)	*Wald*	R^2 *adj.*
BEE1	SRI Fund	-0.2418 *	0.9008 ***	0.1456	-0.0380	-0.0726	0.0819	0.0000	88.72%
	Matched-portfolio	-0.1463	1.0470 ***	0.0206	0.0420	0.0598 *	-0.0263	0.0084	96.01%
BEE2	SRI Fund	-0.1220	0.9933 ***	0.1604	-0.1425	-0.1259 **	0.1477 **	0.0029	89.57%
	Matched-portfolio	-0.0513	1.1107 ***	-0.1547 **	0.1027	-0.0115	0.0670	0.0588	96.24%
DEE1	SRI Fund	-0.0355	0.9397 ***	-0.0120	-0.0124	-0.0658 **	0.1015 **	0.0001	96.43%
	Matched-portfolio	-0.6710 ***	1.1622 ***	0.5788 ***	-0.5261 ***	-0.0962	0.0223	0.0000	85.21%
FRE1	SRI Fund	-0.2842 ***	0.9450 ***	-0.0867 **	0.0496	0.0186	0.3033 ***	0.0000	97.39%
	Matched-portfolio	-0.0534	0.8990 ***	0.0957 *	0.3302 ***	0.1030 ***	0.1995	0.0000	94.78%
FRE2	SRI Fund	-0.1441	0.9808 ***	0.0183	0.1813	-0.0306	-0.1446	0.3272	97.92%
	Matched-portfolio	0.0032	0.7822 ***	0.0152	0.1562 *	-0.0562	0.3605 ***	0.0000	97.27%
FRE3	SRI Fund	-0.2137	0.8760 ***	-0.0280	0.2714	0.0255	0.2724 **	0.0213	91.43%
	Matched-portfolio	-0.0558	0.9452 ***	0.0634	0.2856	0.0463	0.5423 ***	0.0000	95.08%
FRE4	SRI Fund	-0.3479 ***	0.9130 ***	0.1133	0.3360 ***	0.0192	0.5995 ***	0.0000	92.61%
	Matched-portfolio	-0.2385 **	0.9979 ***	0.0847	-0.1018	0.0014	0.2752 *	0.0408	95.14%
FRE5	SRI Fund	-0.3785 ***	0.9380 ***	0.0069	0.2008 **	0.0580	0.2293 **	0.0080	96.98%
	Matched-portfolio	-0.2337 ***	0.9748 ***	0.0513	0.0107	-0.0251	0.6358 ***	0.0000	97.81%
FRE6	SRI Fund	-0.4103 ***	0.9534 ***	0.0223	0.2021 ***	-0.0159	0.4595 ***	0.0005	96.82%
	Matched-portfolio	-0.2540	0.9934 ***	0.1501 **	0.0905	-0.1335 **	0.2585	0.0105	92.66%
FRE7	SRI Fund	-0.2406 **	0.9245 ***	-0.1236 ***	0.0377	0.0022	0.3263 ***	0.0000	96.04%
	Matched-portfolio	-0.2992 ***	0.8078 ***	0.1069	0.2104 **	0.0358	0.4345 ***	0.0000	95.69%
FRE8	SRI Fund	-0.2086 ***	0.9915 ***	-0.0280	0.0677 **	-0.0296 *	0.1307	0.0000	98.74%
	Matched-portfolio	-0.3483 ***	0.9629 ***	0.2727 ***	-0.1662 **	0.1348 ***	0.3761 **	0.0000	92.70%
FRE9	SRI Fund	-0.3335 ***	0.9337 ***	0.0171	0.1938 **	0.0646	0.2721 ***	0.0005	97.27%
	Matched-portfolio	0.1663	0.8113 ***	0.2574 ***	-0.0451	-0.1946 **	0.5501 ***	0.0000	94.04%
FRE10	SRI Fund	-0.4699 **	0.8213 ***	0.2599 **	-0.0735	-0.1827 ***	0.5694 ***	0.0000	86.61%
	Matched-portfolio	-0.1020	0.9567 ***	0.2272	0.0339	0.0055	0.4506 ***	0.0406	93.21%
FRE11	SRI Fund	0.1478	0.9024 ***	-0.0740	0.0127	0.0001	0.7344 ***	0.0000	95.94%
	Matched-portfolio	-0.1690	0.8864 ***	-0.0136	0.0258	0.2967 *	0.7179 **	0.0008	84.03%
FRE12	SRI Fund	-0.1601	0.8446 ***	0.3653 ***	-0.2289	-0.0324	0.8591 ***	0.0000	85.33%
	Matched-portfolio	-0.0746	0.7117 ***	0.2738 ***	-0.0595	-0.0429	0.5330 ***	0.0000	95.34%
FRE13	SRI Fund	-0.0815	0.8312 ***	0.1816	-0.0433	-0.1566	0.6485 **	0.0402	72.74%
	Matched-portfolio	0.0685	0.6635 ***	0.3020 ***	0.3574	0.0011	0.2629	0.0000	90.20%
FRE14	SRI Fund	-0.0710	0.9987 ***	0.0140	0.1894	0.0526	0.5102 *	0.1189	90.87%
	Matched-portfolio	-0.1266	1.0138 ***	0.0224	0.2212	0.0145	0.5179 **	0.0253	94.50%
FRE15	SRI Fund	-0.0414	1.0094 ***	0.0282	-0.0669	-0.0397	0.4310	0.7496	79.12%
	Matched-portfolio	-0.0574	0.8999 ***	0.2165 ***	0.1297	-0.0109	0.5354 ***	0.0000	95.71%
FRE16	SRI Fund	-0.0638	0.8455 ***	0.0631	0.1448	0.0240	0.5969 ***	0.0022	92.24%
	Matched-portfolio	-0.2955 **	0.9733 ***	0.4238 ***	0.0764	0.0289	0.4872 ***	0.0000	93.73%
FRE17	SRI Fund	-0.3284 ***	1.0109 ***	0.0392	-0.0769	0.0435	0.8608 ***	0.0000	95.31%
	Matched-portfolio	-0.2585 *	0.9565 ***	0.3690 ***	0.0892	0.0065	0.5941 ***	0.0001	90.59%
FRE18	SRI Fund	-0.4116 ***	0.9696 ***	0.2657 ***	0.0550	0.0016	0.6701 ***	0.0000	90.84%
	Matched-portfolio	-0.1036	1.0099 ***	0.0657	-0.0279	0.0378	0.8318 ***	0.0000	94.09%
FRE19	SRI Fund	-0.2993	0.9921 ***	0.2943	-0.0509	-0.2186 ***	0.5257 *	0.0101	84.75%
	Matched-portfolio	-0.1890 *	0.9859 ***	0.0861	0.0758	-0.0624	0.5828 ***	0.0001	95.85%
FRE20	SRI Fund	-0.1180	1.0041 ***	0.1227	0.0565	-0.1008 ***	0.5978 ***	0.0001	93.62%
	Matched-portfolio	-0.0761	0.9726 ***	0.0654	0.0272	-0.0418	0.5902 ***	0.0001	95.99%
FRE21	SRI Fund	-0.1895 *	1.1349 ***	-0.1392 **	0.0150	0.0088	0.5658 ***	0.0000	96.62%
	Matched-portfolio	-0.7486	0.5749 ***	0.6232 **	-0.0440	-0.4129 *	0.4136	0.1553	40.00%

Appendix 4.9 – Fund Performance and Risk Estimates using the Unconditional 5-Factor Model (continued)

Code		α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HBIAS)	*Wald*	R^2 *adj.*
FRE22	SRI Fund	-0.3230 ***	0.8721 ***	0.0989 **	0.2322 ***	0.0622 *	0.4620 ***	0.0003	90.08%
	Matched-portfolio	-0.2470 *	0.7667 ***	0.3925 ***	0.0412	0.0220	0.2982	0.0000	82.24%
FRE23	SRI Fund	-0.0587	1.0455 ***	0.0151	0.0467	-0.0717 ***	0.9388 ***	0.0000	96.97%
	Matched-portfolio	-0.3439 ***	1.0590 ***	0.2033 ***	0.1124 **	-0.0339	0.6278 ***	0.0000	96.56%
FRE24	SRI Fund	-0.1238	1.0694 ***	-0.0150	-0.0613	-0.0345	0.8430 ***	0.0000	95.65%
	Matched-portfolio	-0.2156 *	0.9138 ***	0.2502 ***	0.2860 ***	-0.0870 **	0.5980 ***	0.0000	93.86%
FRE25	SRI Fund	-0.4533 *	0.9459 ***	0.3702 **	0.2086	-0.2970 ***	0.6576 ***	0.0000	83.30%
	Matched-portfolio	0.4736	1.0094 ***	0.0664	0.0458	-0.0699	1.2109 **	0.0093	36.64%
FRE26	SRI Fund	-0.4547 ***	0.8710 ***	0.1694 **	-0.1540 *	-0.0266	0.1697	0.0117	82.00%
	Matched-portfolio	-0.1962	0.9673 ***	0.2657 ***	0.1962 *	-0.0823 *	0.6761 ***	0.0000	92.90%
FRE27	SRI Fund	-0.1416	1.0386 ***	0.0508	0.0845	-0.0441 *	0.6159 ***	0.0000	96.31%
	Matched-portfolio	-0.0561	0.9540 ***	0.2436 ***	-0.0102	0.0212	0.5739 ***	0.0000	95.07%
FRE28	SRI Fund	-0.1249	0.8565 ***	0.2584 ***	0.1516	-0.0195	0.6377 ***	0.0013	78.08%
	Matched-portfolio	-0.1423	1.0117 ***	0.0565	0.0677	-0.0046	0.6561 ***	0.0000	93.70%
FRE29	SRI Fund	-0.1395	1.0468 ***	0.1100	0.0792	-0.0345	0.9053 ***	0.0006	93.99%
	Matched-portfolio	0.1269	0.9334 ***	0.0160	0.0984	-0.0793	0.8983 ***	0.0000	97.29%
FRE30	SRI Fund	-0.2667 **	1.0378 ***	0.0829 *	0.0945	0.0109	0.5946 ***	0.0002	93.81%
	Matched-portfolio	-0.2478	0.7679 ***	0.1931 **	-0.0777	-0.0093	0.2377 *	0.0919	80.56%
FRE31	SRI Fund	-0.0235	1.1074 ***	0.1351 **	-0.2938 ***	0.0118	0.7360 ***	0.0000	93.25%
	Matched-portfolio	-0.2753 ***	1.0534 ***	0.1074	-0.0420	-0.0062	0.5310 ***	0.0000	96.74%
FRE32	SRI Fund	-0.2218	1.0553 ***	0.0802	-0.0656	0.0026	0.9011 ***	0.0000	93.84%
	Matched-portfolio	-0.0442	0.8979 ***	0.3100 ***	-0.0823	0.0238	0.7583 ***	0.0000	92.66%
FRE33	SRI Fund	-0.0399	0.8577 ***	0.1236	-0.0282	-0.1224	0.8048 ***	0.0861	76.71%
	Matched-portfolio	0.1189	0.9390 ***	0.1413 ***	0.1100	0.0023	0.6094 ***	0.0000	95.56%
ESE1	SRI Fund	0.1198	0.8188 ***	-0.1320	0.3120 **	-0.1302 **	-0.0319	0.0006	93.87%
	Matched-portfolio	-0.1044	0.9957 ***	-0.0431	0.1448	-0.0202	0.0739	0.0014	96.34%

Appendix 4.10 – Statistical Tests for the Differences in Performance and Risk Estimates between SRI and Conventional Funds using the Unconditional 5-Factor Model

This appendix reports the *t*-statistics and the *U*-statistics for the null hypothesis that the members of each group (SRI and conventional) have equal means/medians in terms of their performance (alphas) and risk estimates (betas of the market, size, book-to-market, momentum and local factors). In all cases, we also report the respective *p-values* for a two-sided test. In bold we indicate the cases in which we reject the null hypothesis at the usual significance levels. Panel A presents the results for Global equity funds from the EMU countries, Panel B for UK Global equity funds and Panel C for European equity funds.

Panel A: Global Equity Funds – EMU countries						
	α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HBIAS)
t-statistic	0.2084	0.8974	0.5338	0.7991	0.6098	0.9543
p-val	*0.8373*	*0.3814*	*0.6000*	*0.4346*	*0.5496*	*0.3526*
U-statistic	0.1890	0.9449	0.9449	0.9449	0.4914	0.3402
p-val	*0.8501*	*0.3447*	*0.3447*	*0.3447*	*0.6232*	*0.7337*
Panel B: Global Equity Funds – UK						
	α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HBIAS)
t-statistic	0.0469	**2.5049**	1.7565	0.6559	1.0391	1.1845
p-val	*0.9633*	***0.0252***	*0.1008*	*0.5225*	*0.3164*	*0.2559*
U-statistic	-0.0525	**2.1529**	**1.8379**	0.2626	1.1027	0.9977
p-val	*0.9581*	***0.0313***	***0.0661***	*0.7929*	*0.2701*	*0.3184*
Panel C: European Equity Funds						
	α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HBIAS)
t-statistic	1.1490	1.0096	**2.6754**	0.2284	1.0016	0.2682
p-val	*0.2543*	*0.3161*	***0.0092***	*0.8200*	*0.3199*	*0.7893*
U-statistic	1.2757	0.4000	**2.4649**	0.4216	0.8432	0.6919
p-val	*0.2021*	*0.6892*	***0.0137***	*0.6733*	*0.3991*	*0.4890*

Appendix 4.11 – Portfolio Performance and Risk Estimates using the Unconditional 7-Factor Model

This appendix presents estimates of performance (alphas expressed in percentage) and risk for the equally-weighted portfolios of SRI Funds and the characteristics-matched portfolios of conventional funds using an unconditional 7-factor model, which controls for home biases in the market (HB_MKT), size (HB_SMB) and book-to-market (HB_HML) factors. The model is estimated for the period of January 2001 to December 2008. $r_{m,t}$ is the market index excess return (the MSCI AC World TR for Global equity funds and the MSCI AC Europe TR for European equity funds). SMB_t, HML_t and MOM_t are factor-mimicking portfolios for the size, book-to-market and momentum factors, respectively. $r_{lm,t} - r_{m,t}$ is the return difference between a local market index and the Global / European market indices used as benchmarks. $SMB_{lt} - SMB_t$ represents the return difference between the local and the international (Global or European) size factors, while $HML_{lt} - HML_t$ is the difference in the returns of the local and the international book-to-market factors. *Wald* corresponds to the probability values of the χ-square statistic of the Newey and West (1987) Wald test for the null hypothesis that the coefficients of the local size (HB_SMB) and local book-to-market (HB_HML) factors are jointly equal to zero. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for Global equity funds and Panel B for European equity funds.

Panel A: Global Equity Funds

Country		α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HB_MKT)	β_{5p} (HB_SMB)	β_{6p} (HB_HML)	*Wald*	R^2 *adj.*
Austria	SRI Funds	0.0043	0.8955 ***	0.0416	-0.0961	0.2464	0.0594	0.0112	0.0784	0.3125	91.62%
	Matched-portfolios	-0.0521	0.8547 ***	0.1000	0.0320	0.0412	0.1353 **	-0.0496	0.0164	0.7712	93.84%
Belgium	SRI Funds	-0.1498	0.9736 ***	0.0927	0.0120	-0.0176	-0.0015	-0.0167	0.0048	0.7558	96.55%
	Matched-portfolios	-0.2589 ***	1.0015 ***	-0.2414 ***	-0.0765	-0.0435	0.0511	-0.0006	0.0335 **	0.0322	97.63%
France	SRI Funds	-0.0725	0.8343 ***	-0.0180	-0.0136	0.0291	0.6540 ***	0.1148	0.0359	0.3748	93.99%
	Matched-portfolios	-0.3079	0.9075 ***	0.3562 ***	0.1909	0.1229	0.3165 ***	0.1994 **	0.0404	0.0383	93.88%
Germany	SRI Funds	-0.2713 ***	0.9365 ***	0.0795	-0.1464 *	-0.0716 *	0.1909 ***	0.0938 ***	0.0178	0.0019	95.01%
	Matched-portfolios	-0.1080	0.9078 ***	-0.0035	-0.2266 ***	0.0071	0.1762 ***	0.1198 ***	0.0398	0.0010	93.53%
Italy	SRI Funds	-0.3350 ***	0.7843 ***	0.0187	-0.1586 *	-0.0509 *	-0.0261	0.0050	-0.0366	0.3761	95.86%
	Matched-portfolios	-0.1728 **	0.8032 ***	-0.1079 **	0.1187 **	0.0175	0.0291 *	0.0220	0.0075	0.5939	97.93%
Netherlands	SRI Funds	-0.2443	0.8241 ***	0.2713 **	-0.1543	0.1622 ***	0.2170 ***	0.0130	0.0917 **	0.0338	87.96%
	Matched-portfolios	-0.1952	1.0764 ***	-0.0028	-0.1609 *	-0.0427	0.0396	0.0246	-0.1299 ***	0.0001	91.34%
UK	SRI Funds	-0.1365 *	1.0292 ***	0.1770 ***	-0.2405 ***	0.0711 *	0.1722 ***	0.0694 ***	-0.0362	0.0123	97.23%
	Matched-portfolios	-0.1211	1.0795 ***	0.1250 *	-0.2646 ***	0.1106 **	0.1825 **	0.0145	-0.0302	0.6486	95.83%

Appendix 4.11 – Portfolio Performance and Risk Estimates using the Unconditional 7-Factor Model (continued)

Panel B: European Equity Funds											
Country		α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HB_MKT)	β_{5p} (HB_SMB)	β_{6p} (HB_HML)	*Wald*	R^2 *adj.*
Belgium	SRI Funds	-0.2076	1.0089 ***	0.1489	-0.1871 *	-0.0946 *	0.1759 **	0.0305	-0.0679 *	0.1675	91.21%
	Matched-portfolios	-0.1448	1.0977 ***	-0.0076	0.0298	0.0257	0.0681	0.0458	-0.0406 *	0.1892	97.23%
France	SRI Funds	-0.1896 **	0.9580 ***	0.0941 **	0.0391	-0.0559 **	0.5530 ***	0.0686 **	0.0348	0.0130	97.45%
	Matched-portfolios	-0.1273 *	0.9082 ***	0.1871 ***	0.0734	-0.0468 **	0.4991 ***	0.0651 **	0.0398 *	0.0057	97.64%
Germany	SRI Funds	-0.0457	0.9332 ***	-0.0043	0.0009	-0.0560 *	0.1654 ***	0.0683	-0.0119	0.3001	96.79%
	Matched-portfolios	-0.8091 ***	1.1525 ***	0.4783 ***	-0.3554	-0.0977	0.1516	0.2270 ***	0.0868	0.0012	90.28%
Spain	SRI Funds	0.1126	0.8570 ***	-0.1433	0.2379 *	-0.1335 *	-0.0027	0.0332	-0.0846	0.0807	94.21%
	Matched-portfolios	-0.2310 *	0.9892 ***	-0.0438	0.1464	0.0430	0.0258	-0.1137 *	-0.0450	0.1468	96.65%

Appendix 4.12 – Fund Performance and Risk Estimates using the Conditional 5-Factor Model

This appendix presents estimates of performance (average conditional alphas expressed in percentage) and risk for each SRI fund in our sample, as well as for each characteristics-matched portfolio, using the conditional 5-factor model with time-varying alphas and betas of equation [4.9]. $r_{m,t}$ is the market index excess return (the MSCI AC World TR for Global equity funds and the MSCI AC Europe TR for European equity funds), SMB_t, HML_t and MOM_t are factor-mimicking portfolios for the size, book-to-market and momentum factors, respectively. $r_{lm,t} - r_{m,t}$ is the return difference between a local market index and the Global / European market indices used as benchmarks. The predetermined information variables are the default spread (DS), the dividend yield (DY) and the slope of the term structure (TS). All these variables are demeaned, lagged 1-month and stochastically detrended by subtracting a trailing moving average of their own past values. W_1, W_2 and W_3 correspond to the probability values of the χ-square statistic of the Newey and West (1987) Wald test on the existence of time-varying alphas, time-varying betas and the joint time-variation in alphas and betas, respectively. R^2 *adj.* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for Global equity funds and Panel B for European equity funds.

Panel A: Global Equity Funds

Code		α_{0p}	β_{0p} (MKT)	$\beta_{0,1p}$ (SMB)	$\beta_{0,2p}$ (HML)	$\beta_{0,3p}$ (MOM)	$\beta_{0,4p}$ (HBIAS)	W_1	W_2	W_3	R^2 *adj.*
ATG1	SRI Fund	-0.0423	0.7820 ***	0.2500 *	0.0539	0.3765	0.1878	0.0000	0.0000	0.0000	94.10%
	Matched-portfolio	-0.3057	0.7306 ***	0.2780 **	0.2434	0.0848	0.1514 **	0.0000	0.0000	0.0000	97.37%
BEG1	SRI Fund	-0.2221 **	0.9490 ***	0.1016	0.1518 **	0.0224	-0.1018 ***	0.1778	0.0000	0.0000	97.08%
	Matched-portfolio	-0.3175 ***	1.0263 ***	-0.1465 **	-0.0582	-0.0101	0.0777 *	0.0194	0.0000	0.0000	97.81%
DEG1	SRI Fund	-0.2495	0.9542 ***	0.1413	-0.1920 *	-0.0070	0.2487 ***	0.1023	0.0000	0.0000	90.06%
	Matched-portfolio	-0.1633	1.1176 ***	-0.0790	-0.2649 **	0.0570	0.0875	0.9562	0.0000	0.0000	91.44%
DEG2	SRI Fund	-0.3609 ***	0.9306 ***	-0.1727 **	-0.0877	-0.0470	0.1773 ***	0.2062	0.0000	0.0000	95.93%
	Matched-portfolio	-0.5979 ***	0.8746 ***	0.1574	-0.0432	0.0918	0.2396 ***	0.6795	0.0000	0.0000	88.34%
DEG3	SRI Fund	-0.3660 **	0.8409 ***	0.1646	-0.3311	-0.1353	0.1825 **	0.1934	0.0000	0.0000	92.00%
	Matched-portfolio	-0.2249	0.9578 ***	-0.0176	-0.0316	0.0230	0.1949 ***	0.5486	0.0000	0.0000	93.54%
FRG1	SRI Fund	-0.3267 **	0.9027 ***	-0.3316 ***	0.0872	0.1536	0.7003 ***	0.1319	0.0000	0.0000	93.36%
	Matched-portfolio	-0.4652	0.9721 ***	0.4181 **	0.2217	0.0002	0.3293 ***	0.1283	0.0000	0.0000	91.98%
FRG2	SRI Fund	0.0425	0.8513 ***	-0.3554	-0.9785	0.3597	0.5143 ***	0.6895	0.0000	0.0000	92.82%
	Matched-portfolio	-0.1815	0.9624 ***	-0.0063	0.0059	-0.0391	-0.0222	0.0467	0.0000	0.0000	98.49%
ITG1	SRI Fund	-0.4057 ***	0.8676 ***	-0.0012	-0.2736 ***	-0.0507	0.0789 *	0.5363	0.0000	0.0000	95.08%
	Matched-portfolio	-0.1871 *	0.8112 ***	-0.0680	0.0943	-0.0398	0.0307	0.7162	0.0000	0.0000	97.72%
ITG2	SRI Fund	-0.3267 ***	0.7133 ***	-0.0177	0.0195	0.0158	-0.0238	0.8434	0.0000	0.0000	97.35%
	Matched-portfolio	-0.2174 ***	0.8304 ***	-0.0186	0.0324	0.0153	0.0222	0.0001	0.0000	0.0000	98.31%
NLG1	SRI Fund	-0.1214	0.8762 ***	0.1835 *	-0.0504	0.1338 ***	0.2499 ***	0.5294	0.0000	0.0000	89.34%
	Matched-portfolio	-0.3367 *	0.9976 ***	-0.0480	-0.0507	-0.0394	0.0951	0.4781	0.0000	0.0000	91.33%
UKG1	SRI Fund	-0.4588 **	1.1449 ***	0.0667	-0.0997	0.0477	0.2355 **	0.2626	0.0000	0.0000	94.33%
	Matched-portfolio	-0.0726	1.2376 ***	0.0015	0.1628	0.2354 ***	0.1130	0.3439	0.0000	0.0000	88.35%
UKG2	SRI Fund	0.0049	0.9698 ***	0.1621 *	-0.0858	0.0516	0.2118 **	0.7003	0.0032	0.0000	91.89%
	Matched-portfolio	-0.2593 **	1.0013 ***	0.0264	-0.1130 *	0.1442 **	0.0681	0.3980	0.0000	0.0000	93.91%

Appendix 4.12 – Fund Performance and Risk Estimates using the Conditional 5-Factor Model (continued)

Code		α_{0p}	β_{0p} (MKT)	$\beta_{0,1p}$ (SMB)	$\beta_{0,2p}$ (HML)	$\beta_{0,3p}$ (MOM)	$\beta_{0,4p}$ (HBIAS)	W_1	W_2	W_3	R^2 *adj.*
UKG3	SRI Fund	-0.4563 **	1.0087 ***	-0.1805	-0.1640	0.1083	-0.0692	0.8573	0.0000	0.0000	92.31%
	Matched-portfolio	0.1427	1.0976 ***	0.0021	-0.0138	-0.0630	0.2044 **	0.0167	0.0002	0.0003	94.44%
UKG4	SRI Fund	0.3655	0.8071 ***	0.6970 ***	0.5638 **	0.3349	0.2012	0.0067	0.0000	0.0000	96.94%
	Matched-portfolio	-0.5046	0.9937 ***	0.2842	-0.7085 **	-0.1001	0.6277 ***	0.0423	0.0000	0.0000	96.95%
UKG5	SRI Funds	0.0930	0.9643 ***	0.1797 **	-0.3481 ***	-0.0705	0.0097	0.0688	0.0000	0.0000	92.40%
	Matched-portfolio	-0.0841	1.0324 ***	0.1104 *	0.1296 **	0.0851 *	0.1400 *	0.0462	0.0000	0.0000	94.38%
UKG6	SRI Fund	-0.4552 ***	1.0261 ***	0.3259 ***	-0.3150 ***	0.0755	0.1423 **	0.9655	0.0000	0.0000	93.50%
	Matched-portfolio	-0.3099 **	1.1523 ***	0.1816 *	-0.3451 ***	0.1090	0.2558 **	0.3961	0.0000	0.0000	94.65%
UKG7	SRI Fund	-0.5725 ***	1.0179 ***	0.4346 ***	0.0914	0.1991 ***	0.0994	0.5015	0.0006	0.0000	91.75%
	Matched-portfolio	-0.2828	1.1108 ***	0.3647 ***	-0.4887 ***	-0.0348	0.2637 **	0.4832	0.0000	0.0000	88.63%
UKG8+	SRI Funds	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	Matched-portfolio	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
					Panel B: European Equity Funds						
Code		α_{0p}	β_{0p} (MKT)	$\beta_{0,1p}$ (SMB)	$\beta_{0,2p}$ (HML)	$\beta_{0,3p}$ (MOM)	$\beta_{0,4p}$ (HBIAS)	W_1	W_2	W_3	R^2 *adj.*
BEE1	SRI Fund	-0.2022	0.9168 ***	0.0332	0.0891	0.0535	0.0371	0.9399	0.0000	0.0000	89.55%
	Matched-portfolio	-0.0452	1.0501 ***	0.0026	0.1048 *	0.1197 ***	-0.0159	0.7498	0.0021	0.0000	96.36%
BEE2	SRI Fund	0.0251	1.0735 ***	-0.0137	-0.0856	-0.0833	0.1033	0.0894	0.0000	0.0000	91.87%
	Matched-portfolio	-0.0587	1.1372 ***	-0.1737 *	0.0511	-0.0049	0.1001	0.2342	0.0000	0.0000	97.18%
DEE1	SRI Fund	0.0229	0.9470 ***	-0.0149	-0.0386	-0.0463	0.1208 *	0.2099	0.1025	0.1742	96.17%
	Matched-portfolio	-0.6394 ***	1.1590 ***	0.5574 ***	-0.4585 **	0.0041	0.1357	0.4466	0.0000	0.0000	84.91%
FRE1	SRI Fund	-0.2967 ***	0.9642 ***	-0.1420 ***	0.0105	-0.0090	0.2169 ***	0.1212	0.0000	0.0000	98.06%
	Matched-portfolio	0.0139	0.9137 ***	0.0443	0.3209 ***	0.1318 **	0.2069 *	0.6474	0.0000	0.0000	95.70%
FRE2	SRI Fund	-0.1794	1.0012 ***	-0.0147	0.3022	0.1938	-0.0670	0.1030	0.0000	0.0000	99.27%
	Matched-portfolio	0.3145	0.5389 **	0.1241	0.3927	0.0609	0.1011	0.7505	0.0000	0.0000	97.85%
FRE3	SRI Fund	-0.1339	0.9368 ***	-0.0747	0.1113	-0.0265	0.1583	0.1366	0.0002	0.0000	93.56%
	Matched-portfolio	-0.1288	1.0436 ***	0.1592 **	0.0102	-0.0762	0.4096 ***	0.6359	0.0000	0.0000	96.88%
FRE4	SRI Fund	-0.2359 **	0.9409 ***	0.0656	0.2412 **	0.0015	0.3684 **	0.0582	0.0000	0.0000	93.59%
	Matched-portfolio	-0.2125 **	1.0330 ***	0.1233	-0.0889	-0.0570	0.2065	0.3837	0.0000	0.0000	96.01%
FRE5	SRI Fund	-0.2308 *	0.8851 ***	-0.0141	0.1389 *	0.1357 **	0.2107 **	0.0051	0.0000	0.0000	97.74%
	Matched-portfolio	-0.3417 ***	0.9741 ***	0.0046	0.1017 **	0.0251	0.4078 ***	0.2786	0.0000	0.0000	98.88%
FRE6	SRI Fund	-0.2879 ***	0.9354 ***	-0.0643	0.2071 **	0.0369	0.3420 ***	0.0053	0.0000	0.0000	97.69%
	Matched-portfolio	-0.1800	1.0160 ***	0.0516	0.2906 *	-0.0355	0.0667	0.1544	0.0000	0.0000	94.71%

Appendix 4.12 – Fund Performance and Risk Estimates using the Conditional 5-Factor Model (continued)

Code		α_{0p}	β_{0p} (MKT)	$\beta_{0,1p}$ (SMB)	$\beta_{0,2p}$ (HML)	$\beta_{0,3p}$ (MOM)	$\beta_{0,4p}$ (HBIAS)	W_1	W_2	W_3	R^2 *adj.*
FRE7	SRI Fund	-0.1713	0.9426 ***	-0.0628	-0.0572	-0.0619	0.1897	0.6412	0.0181	0.0000	96.33%
	Matched-portfolio	-0.3319 **	0.8695 ***	0.0947	0.0940	-0.1338 ***	0.3579 ***	0.0031	0.0000	0.0000	97.48%
FRE8	SRI Fund	-0.1559 ***	0.9993 ***	-0.0419	0.0278	-0.0302	0.0815	0.2687	0.0004	0.0000	98.81%
	Matched-portfolio	-0.3015 **	0.9977 ***	0.2807 ***	-0.1530 *	0.1386 **	0.3377 ***	0.2759	0.0000	0.0000	94.37%
FRE9	SRI Fund	-0.1453	0.8953 ***	-0.0041	0.1260 *	0.1374 **	0.1854 **	0.0332	0.0000	0.0000	98.04%
	Matched-portfolio	0.1062	0.8934 ***	0.1014	0.0020	-0.3547 ***	0.4650 ***	0.1420	0.0000	0.0000	96.22%
FRE10	SRI Fund	-0.3685	0.8123 ***	0.1920	0.0892	-0.0737	0.4101 ***	0.6274	0.0000	0.0000	88.88%
	Matched-portfolio	-0.0249	0.9704 ***	0.0592	0.1137	0.0902	0.4824 ***	0.3405	0.2311	0.0000	94.29%
FRE11	SRI Fund	-0.0440	0.9671 ***	-0.1912 **	-0.0342	0.0404	0.4709 ***	0.8722	0.0000	0.0000	96.60%
	Matched-portfolio	-0.1432	0.9450 ***	-0.0145	0.2464	0.0075	0.4710 **	0.9841	0.0000	0.0000	94.83%
FRE12	SRI Fund	-0.5886 **	0.9345 ***	0.1111	0.1501	0.0198	0.8397 ***	0.3390	0.0000	0.0000	90.36%
	Matched-portfolio	0.0384	0.7434 ***	0.2220 ***	-0.1182	-0.1161 **	0.3173 ***	0.2407	0.0000	0.0000	96.63%
FRE13	SRI Fund	-0.2457	0.9094 ***	0.2332	-0.4173	-0.2451	0.3423	0.5742	0.0000	0.0000	82.29%
	Matched-portfolio	0.1672	0.6759 ***	0.2913 ***	0.2371	-0.0506	0.2667	0.8634	0.0000	0.0000	92.42%
FRE14	SRI Fund	-0.0329	1.1103 ***	-0.0248	-0.0036	-0.1066	0.4166 ***	0.1623	0.0000	0.0000	92.93%
	Matched-portfolio	0.1654	1.0803 ***	-0.0005	-0.0902	-0.1699 ***	0.3010 **	0.0042	0.0000	0.0000	96.19%
FRE15	SRI Fund	0.0265	0.9990 ***	-0.1150	0.2145	0.0768	0.5903 **	0.8238	0.0000	0.0000	80.86%
	Matched-portfolio	-0.0020	0.9316 ***	0.1486 *	0.1623	0.0013	0.4080 ***	0.4821	0.0004	0.0000	96.10%
FRE16	SRI Fund	-0.2010	0.9102 ***	-0.0280	0.1473	0.0038	0.5555 ***	0.6681	0.0000	0.0000	93.79%
	Matched-portfolio	-0.2442	1.0287 ***	0.3361 ***	0.0882	0.0337	0.3392 **	0.5063	0.0123	0.0000	94.47%
FRE17	SRI Fund	-0.4686 ***	1.0212 ***	0.0142	-0.0184	0.0518	0.7929 ***	0.8369	0.0000	0.0000	95.97%
	Matched-portfolio	-0.2887 *	0.9527 ***	0.3873 ***	0.0323	-0.0343	0.4719 ***	0.8492	0.0000	0.0000	93.54%
FRE18	SRI Fund	-0.2879 *	0.9911 ***	0.1625 *	0.0933	0.0277	0.5540 ***	0.6300	0.0000	0.0000	91.53%
	Matched-portfolio	-0.0004	0.9765 ***	0.0641	-0.0434	0.0900 *	0.7162 ***	0.2513	0.0000	0.0000	95.30%
FRE19	SRI Fund	-0.1572	1.0260 ***	0.2838	-0.0395	-0.1819	0.3470	0.0614	0.1041	0.0000	84.22%
	Matched-portfolio	-0.2251 **	1.0009 ***	0.0709	0.1478 **	-0.0041	0.4271 ***	0.5038	0.0000	0.0000	96.47%
FRE20	SRI Fund	-0.0430	0.9818 ***	0.0892	0.1474 *	-0.0232	0.3492 ***	0.7830	0.0000	0.0000	95.07%
	Matched-portfolio	-0.0308	0.9779 ***	0.0473	0.0459	-0.0267	0.4814 ***	0.5792	0.0005	0.0000	96.09%
FRE21	SRI Fund	-0.2468 **	1.1250 ***	-0.2248 ***	0.1091	0.0452	0.5093 ***	0.8936	0.0000	0.0000	96.88%
	Matched-portfolio	-0.3779	0.5355 **	0.9844	-0.1552	-0.7494	0.5048	0.5526	0.5114	0.0001	42.34%
FRE22	SRI Fund	-0.0614	0.9262 ***	0.1015	0.1301	0.0261	0.3140 **	0.0135	0.0095	0.0000	91.12%
	Matched-portfolio	-0.0558	0.8131 ***	0.3877 ***	0.0704	0.0008	0.1550	0.4692	0.0000	0.0000	84.06%

Appendix 4.12 – Fund Performance and Risk Estimates using the Conditional 5-Factor Model (continued)

Code		α_{0p}		β_{0p} (MKT)		$\beta_{0,1p}$ (SMB)		$\beta_{0,2p}$ (HML)		$\beta_{0,3p}$ (MOM)		$\beta_{0,4p}$ (HBIAS)		W_1	W_2	W_3	R^2 *adj.*
FRE23	SRI Fund	-0.0810		1.0605	***	0.0214		0.0130		-0.0766	*	0.8269	***	0.1382	0.0000	0.0000	97.30%
	Matched-portfolio	-0.2065	*	1.0758	***	0.1575	***	0.1166		0.0072		0.4643	***	0.3544	0.0002	0.0000	97.28%
FRE24	SRI Fund	-0.0415		1.0578	***	-0.0411		-0.0924		-0.0004		0.7179	***	0.4717	0.0000	0.0000	96.12%
	Matched-portfolio	-0.0683		0.9313	***	0.2212	***	0.2466	***	-0.1139	**	0.4622	***	0.2783	0.0000	0.0000	94.55%
FRE25	SRI Fund	-0.2224		0.9206	***	0.2383		0.3362		-0.1329		0.3461	*	0.4506	0.0000	0.0000	84.41%
	Matched-portfolio	0.6104		0.9417	***	0.1232		0.2703		0.0387		1.4689		0.8042	0.9862	0.9707	25.48%
FRE26	SRI Fund	-0.3754	**	0.9555	***	0.1003		-0.1223		0.0332		-0.0804		0.2420	0.0000	0.0000	85.53%
	Matched-portfolio	-0.1393		0.9754	***	0.2758	***	0.2470	**	-0.0551		0.4922	***	0.6397	0.0218	0.0000	92.86%
FRE27	SRI Fund	-0.0100		1.0196	***	0.0009		0.0196		-0.0169		0.5238	***	0.1751	0.0000	0.0000	97.12%
	Matched-portfolio	0.1547		0.9606	***	0.2048	***	-0.0107		0.0726		0.4600	***	0.2194	0.0012	0.0000	95.70%
FRE28	SRI Fund	0.2827		0.8601	***	0.1282		0.1110		0.0241		0.6261	***	0.2829	0.0000	0.0000	77.62%
	Matched-portfolio	-0.0065		1.0039	***	0.0403		0.0416		0.0338		0.5393	***	0.4549	0.0001	0.0000	93.79%
FRE29	SRI Fund	-0.2453		1.1786	***	0.0094		-0.0252		-0.2628	*	0.7750	***	0.3890	0.0000	0.0000	94.36%
	Matched-portfolio	0.0200		0.9129	***	-0.0867		0.1630		-0.0207		0.7202	***	0.4511	0.0000	0.0000	97.93%
FRE30	SRI Fund	-0.2445	**	1.0647	***	0.0596		0.0328		0.0310		0.4539	***	0.4591	0.2398	0.0000	93.90%
	Matched-portfolio	-0.1832		0.7294	***	0.1278		-0.1482		-0.0501		0.2842	*	0.0020	0.0199	0.0000	83.67%
FRE31	SRI Fund	-0.0329		1.1160	***	0.1908	***	-0.2613	**	0.0166		0.5987	***	0.2336	0.0003	0.0000	94.39%
	Matched-portfolio	-0.2334	*	1.0341	***	0.1113		-0.0343		0.0082		0.4448	***	0.5351	0.0031	0.0000	97.04%
FRE32	SRI Fund	-0.2811		1.1040	***	-0.1172		-0.0356		-0.0116		0.6755	***	0.4171	0.0000	0.0000	94.44%
	Matched-portfolio	-0.2855		1.0169	***	0.1324		0.0405		-0.0397		0.5878	***	0.7635	0.0000	0.0000	95.34%
FRE33	SRI Fund	0.0434		0.8188	***	-0.1682		0.0850		-0.1823		0.7693	***	0.0192	0.0000	0.0000	82.51%
	Matched-portfolio	0.0706		0.9659	***	0.1005		0.0534		-0.0401		0.4451	***	0.9748	0.0000	0.0000	95.47%
ESE1	SRI Fund	-0.0822		0.7987	***	-0.1526	*	0.1145		-0.1697	*	-0.0423		0.0000	0.0000	0.0000	98.06%
	Matched-portfolio	-0.4211	***	1.0012	***	0.0127		0.0787		0.0017		-0.0041		0.6715	0.0000	0.0000	97.79%

+ The conditional model was not estimated for this fund, since it only had 24 monthly observations for the returns.

Appendix 4.13 – Statistical Tests for the Differences in Performance and Risk Estimates between SRI and Conventional Funds using the Conditional 5-Factor Model

This appendix reports the *t*-statistics and the *U*-statistics for the null hypothesis that the members of each group (SRI and conventional) have equal means/medians in terms of their performance (average conditional alphas) and risk estimates (average conditional betas of the market, size, book-to-market, momentum and local factors). In all cases, we also report the respective *p-values* for a two-sided test. In bold we indicate the cases in which we reject the null hypothesis at the usual significance levels. Panel A presents the results for Global equity funds from the EMU countries, Panel B for UK Global equity funds and Panel C for European equity funds.

Panel A: Global Equity Funds – EMU countries						
	α_{0p}	β_{0p} (MKT)	$\beta_{0,1p}$ (SMB)	$\beta_{0,2p}$ (HML)	$\beta_{0,3p}$ (MOM)	$\beta_{0,4p}$ (HBIAS)
t-statistic	0.9492	1.4062	0.5708	1.5402	1.1919	1.2220
p-val	*0.3551*	*0.1767*	*0.5752*	*0.1409*	*0.2488*	*0.2375*
U-statistic	0.1890	1.4741	-0.0378	1.2473	0.4158	0.9449
p-val	*0.8501*	*0.1405*	*0.9698*	*0.2123*	*0.6776*	*0.3447*
Panel B: Global Equity Funds – UK						
	α_{0p}	β_{0p} (MKT)	$\beta_{0,1p}$ (SMB)	$\beta_{0,2p}$ (HML)	$\beta_{0,3p}$ (MOM)	$\beta_{0,4p}$ (HBIAS)
t-statistic	0.0985	**1.9394**	0.8574	0.8550	0.7881	1.4590
p-val	*0.9232*	***0.0763***	*0.4080*	*0.4093*	*0.4459*	*0.1702*
U-statistic	0.2556	**1.6611**	0.7667	0.3833	0.2556	1.1500
p-val	*0.7983*	***0.0967***	*0.4433*	*0.7015*	*0.7983*	*0.2502*
Panel C: European Equity Funds						
	α_{0p}	β_{0p} (MKT)	$\beta_{0,1p}$ (SMB)	$\beta_{0,2p}$ (HML)	$\beta_{0,3p}$ (MOM)	$\beta_{0,4p}$ (HBIAS)
t-statistic	1.4709	1.2798	**3.6797**	0.4924	0.4372	0.0644
p-val	*0.1457*	*0.2047*	***0.0004***	*0.6240*	*0.6633*	*0.9488*
U-statistic	1.3730	0.3027	**3.7189**	0.4432	0.0973	0.4216
p-val	*0.1698*	*0.7621*	***0.0002***	*0.6576*	*0.9225*	*0.6733*

Appendix 4.14 – Fund Performance and Risk Estimates during Recession and Expansion Periods

This appendix presents estimates of performance (alphas expressed in percentage) and risk for each SRI fund in our sample, as well as for each characteristics-matched portfolio, across recession and expansion periods, based on the NBER business cycles. A dummy variable with a value of one in recessions and zero in expansions is included in our unconditional 5-factor model, as specified in equation [4.18]. $r_{m,t}$ is the market index excess return (the MSCI AC World TR for Global equity funds and the MSCI AC Europe TR for European equity funds), SMB_t, HML_t and MOM_t are factor-mimicking portfolios for the size, book-to-market and momentum factors, respectively. $r_{lm,t} - r_{m,t}$ is the return difference between a local market index and the Global / European market indices used as benchmarks. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for Global equity funds and Panel B for European equity funds.

Panel A: Global Equity Funds

Code		α_p	$\alpha_{rec,p}$	β_p (MKT)	$\beta_{rec,p}$ (MKT)	β_{1p} (SMB)	$\beta_{1rec,p}$ (SMB)	β_{2p} (HML)	$\beta_{2rec,p}$ (HML)	β_{3p} (MOM)	$\beta_{3rec,p}$ (MOM)	β_{4p} (HBIAS)	$\beta_{4rec,p}$ (HBIAS)	R^2 *adj.*
ATG1	SRI Fund	0.00	-0.47	0.84 ***	0.10	0.02	0.42	0.22	-0.66	0.39	-0.14	0.03	-0.09	90.8%
	Matched-Portfolio	0.00	-0.36	0.78 ***	0.11	0.25 ***	0.15	0.54 *	-0.54	0.18	-0.05	-0.08	0.19	94.1%
BEG1	SRI Fund	-0.19	0.29	0.97 ***	0.02	-0.03	0.13	0.25 ***	-0.34 ***	0.03	-0.04	-0.05 *	0.09 ***	96.2%
	Matched-Portfolio	-0.32 ***	-0.05	1.01 ***	0.06	-0.30 ***	0.26 ***	0.01	-0.25 ***	-0.02	0.10 **	0.06 *	-0.04	97.8%
DEG1	SRI Fund	-0.28	-0.03	0.89 ***	0.15	0.11	0.17	-0.08	-0.27	-0.04	0.03	0.16 ***	0.24 ***	89.4%
	Matched-Portfolio	-0.03	-0.37	1.02 ***	0.00	-0.23 **	0.50 ***	-0.16 **	-0.60 ***	0.02	0.02	-0.01	0.15	91.8%
DEG2	SRI Fund	-0.18	-0.01	0.93 ***	0.00	-0.18 **	0.14	-0.14	-0.10	-0.04	-0.02	0.13 ***	-0.02	95.6%
	Matched-Portfolio	-0.45 ***	0.14	0.87 ***	-0.23 ***	0.09	0.18	-0.01	-0.62 **	0.10	0.06	0.20 ***	-0.04	87.2%
DEG3	SRI Fund	-0.16	-0.08	0.84 ***	0.16	0.27 **	-0.25	0.07	-0.21	-0.01	0.03	0.14 **	-0.12	89.7%
	Matched-Portfolio	-0.12	0.05	0.94 ***	-0.03	-0.07	-0.20	0.48 ***	-1.40 ***	0.21 ***	-0.27 *	0.16 ***	-0.19 ***	95.3%
FRG1	SRI Fund	-0.29 **	-0.30	0.92 ***	-0.04	-0.19	0.66 *	0.01	0.33	0.22 **	-0.08	0.66 ***	0.04	93.1%
	Matched-Portfolio	-0.20	-0.54	0.97 ***	-0.02	0.36 **	1.84 ***	0.29	0.37	0.26 *	0.46	0.26	-0.31	90.4%
FRG2	SRI Fund	0.72 *	-1.18 ***	0.80 ***	-0.11	-0.27	0.18	0.60	-0.98	0.18	-0.28	0.43 ***	0.07	88.2%
	Matched-Portfolio	-0.27	0.02	0.90 ***	0.07	-0.20 *	-0.03	-0.14	0.33	-0.13	0.16	0.11	0.10	97.6%
ITG1	SRI Fund	-0.37 ***	-0.06	0.88 ***	-0.03	-0.02	0.26	-0.15	-0.11	-0.03	0.00	0.05 *	-0.18	94.6%
	Matched-Portfolio	-0.18 **	0.02	0.79 ***	0.04	-0.01	-0.09	0.08	0.06	-0.05 ***	0.12 ***	0.05 ***	-0.16	97.6%
ITG2	SRI Fund	-0.39 ***	-0.07	0.69 ***	0.03	0.00	0.14	-0.02	0.31 ***	0.01	0.19 ***	0.00	-0.29 ***	97.4%
	Matched-Portfolio	-0.17 *	-0.26	0.80 ***	0.06	-0.05	0.02	0.01	0.26	0.01	0.14 **	0.01	-0.16	97.6%
NLG1	SRI Fund	0.00	-0.30	0.73 ***	0.33 ***	0.11	0.53 **	0.02	-0.36 **	0.04	0.33 ***	0.17 ***	0.08	91.2%
	Matched-Portfolio	-0.27 **	0.38	0.99 ***	0.05	-0.02	-0.10	-0.11	0.05	0.02	-0.07	-0.01	-0.01	89.5%
UKG1	SRI Fund	-0.39 **	0.15	1.01 ***	0.07	0.23 ***	0.07	-0.17	0.09	0.02	0.27 **	0.12	0.00	92.6%
	Matched-Portfolio	-0.03	0.05	1.10 ***	0.03	0.13	-0.31	0.33 **	-0.78 ***	0.31 ***	-0.07	-0.16	0.43 **	88.6%
UKG2	SRI Fund	0.25	-0.33	0.98 ***	-0.05	0.23 **	-0.17	-0.14 ***	0.03	0.05	0.07	0.25 ***	-0.50 *	90.6%
	Matched-Portfolio	-0.20 **	0.29	0.93 ***	0.16 **	-0.04	0.02	-0.03	-0.17	0.13 ***	0.04	-0.01	0.18	93.2%

Appendix 4.14 – Fund Performance and Risk Estimates during Recession and Expansion Periods (continued)

Code		α_p	$\alpha_{rec,p}$	β_p (MKT)	$\beta_{rec,p}$ (MKT)	β_{1p} (SMB)	$\beta_{1rec,p}$ (SMB)	β_{2p} (HML)	$\beta_{2rec,p}$ (HML)	β_{3p} (MOM)	$\beta_{3rec,p}$ (MOM)	β_{4p} (HBIAS)	$\beta_{4rec,p}$ (HBIAS)	R^2 *adj.*
UKG3	SRI Fund	-0.23	-0.13	1.03 ***	-0.09	-0.12	0.12	-0.26	-0.23	0.13	-0.34	-0.01	0.49 **	91.5%
	Matched-Portfolio	-0.02	0.93 ***	1.04 ***	0.02	0.02	0.27	0.18 *	-0.27	0.08	-0.16	0.05	0.44 ***	94.5%
UKG4	SRI Fund	0.37	-1.17 **	0.92 ***	0.08	0.39 ***	0.85 **	0.58 *	0.05	0.12	0.22	-0.03	0.40	96.0%
	Matched-Portfolio	0.11	-0.22	1.03 ***	0.07	0.24	-0.17	-0.09	-0.45	0.58 *	-0.35	0.30 *	0.01	91.1%
UKG5	SRI Fund	0.21	-0.38	0.92 ***	0.18 **	0.26 ***	-0.05	-0.37 ***	0.31 *	-0.11 *	0.17	-0.04	0.14	92.7%
	Matched-Portfolio	-0.15	0.34	0.92 ***	0.17 ***	0.06	0.11	0.32 ***	-0.45 ***	0.07 ***	0.10	-0.03	0.31 ***	94.2%
UKG6	SRI Fund	-0.35 ***	0.28	0.95 ***	0.19 ***	0.44 ***	-0.45 ***	-0.22 ***	-0.35 ***	0.05 *	0.11	0.07	0.43 ***	93.3%
	Matched-Portfolio	-0.27 ***	-0.55	1.02 ***	0.19 **	0.06	0.30 **	-0.06	-0.67 ***	0.11 ***	0.03	-0.03	0.70 ***	95.0%
UKG7	SRI Fund	-0.29 *	0.47	0.96 ***	0.30 ***	0.50 ***	-0.20	0.06	-0.03	0.06	0.08	0.15	0.27	90.1%
	Matched-Portfolio	-0.26	-0.37	1.15 ***	-0.17	0.48 ***	-0.42	-0.50 ***	-0.12	0.21 ***	-0.36 **	0.23	0.08	84.6%
UKG8	SRI Fund	0.15	-1.79	0.32	0.51	1.52 *	0.81	-0.77	1.44	0.77 **	0.06	0.03	-0.05	79.1%
	Matched-Portfolio	-0.90	-0.59	1.51 ***	-0.53 **	1.19 *	-1.55 **	-3.84 **	2.60 *	-0.21	0.09	0.13	0.05	93.4%
Panel B: European Equity Funds														
Code		α_p	$\alpha_{rec,p}$	β_p (MKT)	$\beta_{rec,p}$ (MKT)	β_{1p} (SMB)	$\beta_{1rec,p}$ (SMB)	β_{2p} (HML)	$\beta_{2rec,p}$ (HML)	β_{3p} (MOM)	$\beta_{3rec,p}$ (MOM)	β_{4p} (HBIAS)	$\beta_{4rec,p}$ (HBIAS)	R^2 *adj.*
BEE1	SRI Fund	-0.28 *	0.53 *	0.84 ***	0.18 **	0.06	0.14	0.06	-0.15	-0.03	-0.04	0.04	0.02	89.0%
	Matched-Portfolio	-0.13	0.08	1.02 ***	0.04	-0.13	0.44 ***	0.09 *	0.03	0.11 **	-0.03	0.00	-0.12 *	96.7%
BEE2	SRI Fund	-0.26	0.81 **	0.97 ***	0.07	0.07	0.06	0.00	-0.13	0.00	-0.24 **	0.07	0.13	90.0%
	Matched-Portfolio	-0.14	0.26	1.15 ***	-0.12 *	-0.27 ***	0.28 **	0.17 **	-0.17	0.08 *	-0.16 ***	0.06	0.02	96.6%
DEE1	SRI Fund	-0.09	0.22	0.94 ***	0.02	0.01	-0.05	0.01	-0.08	-0.06	0.00	0.09	0.01	96.3%
	Matched-Portfolio	-0.73 **	0.94 **	1.09 ***	0.25 **	0.57 ***	-0.09	-0.53 *	0.11	-0.11	0.08	0.05	0.03	85.0%
FRE1	SRI Fund	-0.26 ***	0.01	0.98 ***	-0.10 ***	-0.10 **	-0.01	-0.04	0.41 ***	0.04	-0.09 *	0.26 ***	-0.04	97.8%
	Matched-Portfolio	0.02	-0.17	0.85 ***	0.08	0.01	0.24 ***	0.36 ***	-0.13	0.10 **	0.08	0.20	0.18	95.1%
FRE2	SRI Fund	-0.19 **	-0.13	1.09 ***	-0.12	-0.03	0.04	0.23	-0.22	-0.05	-0.01	-0.16 **	0.08	97.7%
	Matched-Portfolio	-0.02	0.16	0.51 ***	0.31 ***	0.10 **	-0.14 **	0.44 ***	-0.27	0.20	-0.25 *	0.31 **	0.07	97.6%
FRE3	SRI Fund	-0.22	-0.09	0.88 ***	-0.01	-0.07	0.09	0.32	-0.25	0.06	-0.10	0.23	0.15	90.8%
	Matched-Portfolio	-0.14	-0.24	0.98 ***	-0.12 *	0.06	0.16	0.29	-0.10	0.02	0.14	0.44 **	0.46 **	95.2%
FRE4	SRI Fund	-0.38 ***	0.20	0.93 ***	-0.05	0.00	0.25	0.36 **	0.03	0.08	-0.08	0.48 ***	0.30	92.6%
	Matched-Portfolio	-0.33 ***	0.21	1.05 ***	-0.10 *	0.14 *	-0.11	-0.12	0.08	0.01	-0.07	0.24	-0.03	95.2%

Appendix 4.14 – Fund Performance and Risk Estimates during Recession and Expansion Periods (continued)

Code		α_p	$\alpha_{rec,p}$	β_p (MKT)	$\beta_{rec,p}$ (MKT)	β_{1p} (SMB)	$\beta_{1rec,p}$ (SMB)	β_{2p} (HML)	$\beta_{2rec,p}$ (HML)	β_{3p} (MOM)	$\beta_{3rec,p}$ (MOM)	β_{4p} (HBIAS)	$\beta_{4rec,p}$ (HBIAS)	R^2 *adj.*
FRE5	SRI Fund	-0.29 **	-0.10	0.89 ***	0.05	0.02	-0.05	0.20 *	0.01	0.12 **	-0.15 **	0.31 **	-0.31 **	97.2%
	Matched-Portfolio	-0.30 ***	-0.03	1.05 ***	-0.17 **	-0.02	0.20 ***	-0.01	0.09	0.00	-0.05	0.61 ***	-0.12	98.1%
FRE6	SRI Fund	-0.38 **	-0.22	0.94 ***	-0.01	0.02	0.04	0.24 **	-0.15	-0.02	-0.01	0.52 ***	-0.18	96.7%
	Matched-Portfolio	-0.43 ***	1.04	1.00 ***	0.03	0.04	0.26	0.27 **	-0.36	-0.05	-0.11	0.21	-0.13	93.0%
FRE7	SRI Fund	-0.26 *	-0.03	0.97 ***	-0.06	-0.08	-0.09	-0.04	0.12	-0.04	0.04	0.39 ***	-0.16	95.8%
	Matched-Portfolio	-0.33 ***	-0.38	0.85 ***	-0.03	0.21 ***	-0.31 ***	0.13	-0.11	0.03	-0.10	0.49 ***	-0.03	96.4%
FRE8	SRI Fund	-0.24 ***	0.09	1.01 ***	-0.05 **	-0.05	0.07	0.07 **	0.00	-0.02	-0.03	0.11	0.00	98.7%
	Matched-Portfolio	-0.25 **	-0.24	0.94 ***	0.03	0.21 ***	0.11	-0.21 **	0.24	0.14 **	0.00	0.36 **	0.14	92.7%
FRE9	SRI Fund	-0.27 **	0.04	0.90 ***	0.04	0.00	0.02 *	0.23	-0.05	0.12 **	-0.13	0.32 **	-0.23	97.3%
	Matched-Portfolio	0.08	0.14	0.85 ***	0.00	0.30 ***	-0.24 **	-0.08	-0.25	-0.13 *	-0.26 **	0.52 ***	-0.01	94.5%
FRE10	SRI Fund	-0.49 **	0.72 *	0.82 ***	-0.01	0.03	0.38 **	0.06	0.05	-0.02	-0.35 ***	0.60 ***	-0.66	88.0%
	Matched-Portfolio	-0.09	-0.06	1.00 ***	-0.13 *	0.11	0.31	-0.01	0.19	0.05	-0.05	0.33 **	0.25	93.3%
FRE11	SRI Fund	0.04	-0.61 ***	0.99 ***	-0.19 **	-0.17 *	0.18	-0.07	0.17	0.12 *	-0.12	0.60 ***	0.38 **	96.5%
	Matched-Portfolio	-0.03	-1.31	0.93 ***	-0.04	-0.04	-0.03	0.22	-0.62	0.07	0.32	0.61 ***	1.01	85.1%
FRE12	SRI Fund	-0.24	1.11	0.92 ***	-0.15	0.24	0.34	-0.24	0.24	0.13	-0.38 ***	0.91 ***	-1.01 ***	87.7%
	Matched-Portfolio	-0.01	-0.24 *	0.66 ***	0.04	0.27 ***	0.02	-0.06	0.17	0.00	0.00	0.46 ***	0.30 *	95.4%
FRE13	SRI Fund	-0.25	-2.56 ***	1.10 ***	-0.86 ***	-0.04	0.91 **	0.15	-1.19 ***	0.06	-0.46	0.42	0.55	84.6%
	Matched-Portfolio	0.29	-0.88 ***	0.56 ***	0.21 *	0.17 *	0.07	0.51 *	-0.42	0.08	-0.19 **	0.29	0.38 *	92.2%
FRE14	SRI Fund	-0.18	-0.41 *	1.11 ***	-0.20 *	-0.04	0.07	0.13	0.00	0.14	-0.18	0.29	0.79 **	91.3%
	Matched-Portfolio	-0.18	0.06	1.06 ***	-0.09	-0.08	0.23 *	0.26	-0.13	0.09	-0.13	0.35	0.50	94.6%
FRE15	SRI Fund	-0.09	-0.54	1.09 ***	-0.20	-0.19	0.32	0.01	-0.03	0.13	-0.27 **	0.06	1.18 **	79.9%
	Matched-Portfolio	-0.07	-0.07	0.90 ***	-0.01	0.13	0.16	0.21	-0.14	0.04	-0.06	0.43 ***	0.34	95.7%
FRE16	SRI Fund	-0.09	-0.48	0.89 ***	-0.11	-0.05	0.14	0.20	-0.06	0.13 **	-0.19 **	0.37 **	0.73 **	93.0%
	Matched-Portfolio	-0.36 **	0.23	1.00 ***	-0.01	0.37 ***	0.02	0.10	0.04	0.08	-0.08	0.33 *	0.46 *	93.7%
FRE17	SRI Fund	-0.30 **	-0.24	1.03 ***	-0.06	0.00	0.09	-0.13	0.29 **	0.05	0.03	0.73 ***	0.63 ***	95.6%
	Matched-Portfolio	-0.17	-0.52 *	1.01 ***	-0.19 **	0.33 ***	0.13	-0.01	0.53 **	0.02	-0.06	0.51 **	0.29	91.1%
FRE18	SRI Fund	-0.44 **	0.10	0.97 ***	0.00	0.14	0.10	0.10	0.22	0.11 *	-0.20 **	0.47 **	0.74 **	92.1%
	Matched-Portfolio	-0.10	-0.09	1.04 ***	-0.10	0.04	0.04	-0.04	0.19	0.08 *	-0.13 **	0.79 ***	0.07	94.0%
FRE19	SRI Fund	-0.52 **	1.06 **	1.02 ***	0.00	0.14	0.36	0.03	-0.11	-0.14	-0.06	0.27	0.74	85.1%
	Matched-Portfolio	-0.27 **	0.15	1.00 ***	-0.04	0.02	0.15	0.14 *	-0.18	-0.01	-0.06	0.48 ***	0.31	95.8%

Appendix 4.14 – Fund Performance and Risk Estimates during Recession and Expansion Periods (continued)

Code		α_p	$\alpha_{rec,p}$	β_p (MKT)	$\beta_{rec,p}$ (MKT)	β_{1p} (SMB)	$\beta_{1rec,p}$ (SMB)	β_{2p} (HML)	$\beta_{2rec,p}$ (HML)	β_{3p} (MOM)	$\beta_{3rec,p}$ (MOM)	β_{4p} (HBIAS)	$\beta_{4rec,p}$ (HBIAS)	R^2 *adj.*
FRE20	SRI Fund	-0.16	0.01	1.02 ***	-0.04	0.01	0.18	0.10	-0.01	-0.02	-0.14	0.43 **	0.53	93.8%
	Matched-Portfolio	-0.14	-0.04	1.02 ***	-0.12 ***	0.01	0.12	0.05	-0.01	0.02	-0.12	0.44 ***	0.42	96.2%
FRE21	SRI Fund	-0.30 **	0.10	1.17 ***	-0.08	-0.23 ***	0.10	0.14 *	-0.28 *	0.14 ***	-0.27 ***	0.47 ***	0.09	97.1%
	Matched-Portfolio	-0.89	1.06	0.53 *	0.19	0.77 *	-0.14	-0.10	-0.02	-0.58	0.44	0.40	0.30	37.3%
FRE22	SRI Fund	-0.42 ***	0.52 **	0.87 ***	0.04	0.06	0.05	0.26 ***	0.01	0.10 **	-0.01	0.34 **	0.49	90.1%
	Matched-Portfolio	-0.26	0.03	0.78 ***	-0.02	0.39 ***	0.01	-0.03	0.33 *	0.00	0.11	0.12	0.88 **	82.6%
FRE23	SRI Fund	-0.09	-0.38 *	1.10 ***	-0.16 ***	0.02	0.09	0.06	-0.11	-0.06	0.01	0.86 ***	0.39 *	97.2%
	Matched-Portfolio	-0.29 ***	-0.20	1.06 ***	-0.03	0.10 *	0.23 **	0.10	0.16	0.01	-0.04	0.53 ***	0.43	96.8%
FRE24	SRI Fund	-0.15	-0.05	1.12 ***	-0.17 **	-0.12	0.29 **	-0.03	0.03	0.04	-0.15 **	0.78 ***	0.10	95.9%
	Matched-Portfolio	-0.25	0.18	0.94 ***	-0.06	0.17 **	0.16	0.27 **	0.25 **	-0.04	-0.06	0.46 ***	0.53	94.2%
FRE25	SRI Fund	-0.67 **	0.88	1.02 ***	-0.23 *	0.23	0.51	0.34 *	-0.39	-0.19	-0.24	0.66 ***	-0.47	84.0%
	Matched-Portfolio	0.69	-1.04	0.97 ***	0.01	-0.02	0.21	0.05	-0.13	-0.05	-0.03	1.31	-0.27	33.0%
FRE26	SRI Fund	-0.61 ***	0.36	0.92 ***	-0.08	0.09	0.17	-0.08	-0.08	0.06	-0.09	-0.07	1.00 *	82.8%
	Matched-Portfolio	-0.33 *	0.54 *	1.01 ***	-0.10 *	0.26 **	0.04	0.22 *	0.01	-0.05	-0.10	0.64 ***	-0.10	92.8%
FRE27	SRI Fund	-0.14	-0.26	1.06 ***	-0.08 *	-0.03	0.18 *	0.12	-0.03	0.02	-0.09	0.50 ***	0.49	96.5%
	Matched-Portfolio	-0.07	0.15	0.97 ***	-0.05	0.16 **	0.21 **	-0.02	0.17	0.06	-0.04	0.48 ***	0.35	95.3%
FRE28	SRI Fund	-0.17	-0.04	0.92 ***	-0.20	0.14	0.22	0.16	0.30	0.09	-0.24 *	0.46 *	0.51	78.3%
	Matched-Portfolio	-0.21	0.11	1.05 ***	-0.13	-0.04	0.26 *	0.12	-0.04	0.07 *	-0.15 **	0.57 ***	0.21	93.8%
FRE29	SRI Fund	-0.31	-0.29	1.15 ***	-0.18	-0.03	0.21 *	0.09	-0.10	0.09	-0.18	0.71 **	0.45	94.0%
	Matched-Portfolio	0.09	-0.03	0.85 ***	0.07	-0.04	0.09	0.23 *	-0.27 *	0.13 **	-0.31 ***	0.83 ***	0.02	97.7%
FRE30	SRI Fund	-0.38 **	0.16	1.09 ***	-0.12 **	0.03	0.22 **	0.15	-0.20	0.05	-0.03	0.47 ***	0.52	94.0%
	Matched-Portfolio	-0.05	-0.66	0.75 ***	0.00	0.28 ***	-0.26 **	-0.19 **	0.39 *	-0.07	-0.01	0.42 ***	-0.84 ***	81.5%
FRE31	SRI Fund	-0.08	0.06	1.18 ***	-0.22 ***	0.09	0.19 *	-0.33 ***	0.26	0.05	-0.10	0.65 ***	0.15	93.6%
	Matched-Portfolio	-0.31 **	0.09	1.09 ***	-0.08 **	0.12	-0.06	-0.05	0.18 **	0.02	-0.10 **	0.49 ***	0.00	96.8%
FRE32	SRI Fund	-0.21	-0.74 *	1.09 ***	-0.16 **	0.00	0.20	-0.11	0.24	0.14	-0.16	0.70 ***	0.57	94.5%
	Matched-Portfolio	-0.06	0.20	0.92 ***	-0.10	0.26 **	0.16	-0.18	0.48	0.11	-0.10	0.67 ***	0.00	92.8%
FRE33	SRI Fund	0.13	-1.10	0.82 ***	-0.06	-0.05	0.35	0.03	0.05	0.13	-0.41 **	0.63 **	0.64	78.9%
	Matched-Portfolio	0.08	-0.33	0.99 ***	-0.10 *	0.13 *	0.00	0.05	0.10	0.03	-0.04	0.55 ***	0.20	95.3%
ESE1	SRI Fund	0.04	0.11	0.84 ***	0.00	0.05	-0.40 ***	0.17	0.00	-0.13	-0.14	0.03	-0.18 **	94.8%
	Matched-Portfolio	-0.16	0.53	0.97 ***	0.12	-0.04	0.02	0.15	-0.01	-0.03	0.12	-0.03	0.30 **	97.0%

Appendix 4.15 – Statistical Tests for the Differences in Performance and Risk Estimates between SRI and Conventional Funds during Expansion Periods

This appendix reports the *t*-statistics and the *U*-statistics for the null hypothesis that the members of each group (SRI and conventional) have equal means/medians in terms of their performance (alphas) and risk estimates (betas of the market, size, book-to-market, momentum and local factors) over periods of expansion, as defined in regression [4.18]. In all cases, we also report the respective *p-values* for a two-sided test. In bold we indicate the cases in which we reject the null hypothesis at the usual significance levels. Panel A presents the results for Global equity funds from the EMU countries, Panel B for UK Global equity funds and Panel C for European equity funds.

Panel A: Global Equity Funds – EMU countries						
	α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HBIAS)
t-statistic	0.7804	1.4017	0.0292	0.2003	0.2542	1.2551
p-val	*0.4453*	*0.1780*	*0.9770*	*0.8435*	*0.8022*	*0.2255*
U-statistic	0.1134	1.3229	0.4158	0.0378	0.1143	0.8693
p-val	*0.9097*	*0.1859*	*0.6776*	*0.9698*	*0.9097*	*0.3847*
Panel B: Global Equity Funds – UK						
	α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HBIAS)
t-statistic	1.1718	**1.8999**	0.7418	0.5854	0.1771	0.1129
p-val	*0.2608*	***0.0782***	*0.4705*	*0.5676*	*0.8620*	*0.9117*
U-statistic	0.5776	**2.0479**	1.1027	0.7877	0.9977	0.0525
p-val	*0.5635*	***0.0406***	*0.2701*	*0.4309*	*0.3184*	*0.9581*
Panel C: European Equity Funds						
	α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HBIAS)
t-statistic	**1.7661**	**1.9790**	**3.6248**	0.0986	0.9545	0.4322
p-val	***0.0816***	***0.0516***	***0.0005***	*0.9217*	*0.3430*	*0.6669*
U-statistic	**1.9514**	1.2865	**3.2973**	0.1730	0.9081	0.1946
p-val	***0.0510***	*0.1983*	***0.0010***	*0.8627*	*0.3638*	*0.8457*

Appendix 4.16 – Statistical Tests for the Differences in Performance and Risk Estimates between SRI and Conventional Funds during Recession Periods

This appendix reports the *t*-statistics and the *U*-statistics for the null hypothesis that the members of each group (SRI and conventional) have equal means/medians in terms of their performance (alphas) and risk estimates (betas of the market, size, book-to-market, momentum and local factors) over periods of recession, as defined in regression [4.18]. In all cases, we also report the respective *p-values* for a two-sided test. In bold we indicate the cases in which we reject the null hypothesis at the usual significance levels. Panel A presents the results for Global equity funds from the EMU countries, Panel B for UK Global equity funds and Panel C for European equity funds.

Panel A: Global Equity Funds – EMU countries						
	α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HBIAS)
t-statistic	0.4036	0.1698	0.0686	0.1445	0.5648	1.1952
p-val	*0.6912*	*0.8671*	*0.9461*	*0.8867*	*0.5792*	*0.2475*
U-statistic	0.8693	0.0378	1.2473	0.3402	0.4914	0.7181
p-val	*0.3847*	*0.9698*	*0.2123*	*0.7337*	*0.6232*	*0.4727*
Panel B: Global Equity Funds – UK						
	α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HBIAS)
t-statistic	0.5027	0.8147	1.6753	**2.3802**	1.2080	1.0965
p-val	*0.6230*	*0.4289*	*0.1161*	***0.0321***	*0.2471*	*0.2914*
U-statistic	0.6826	0.6826	1.4178	**2.2580**	0.5776	0.6826
p-val	*0.4948*	*0.4948*	*0.1563*	***0.0239***	*0.5635*	*0.4948*
Panel C: European Equity Funds						
	α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HBIAS)
t-statistic	0.9962	0.6945	1.0182	0.7468	**2.6194**	0.3552
p-val	*0.3225*	*0.4896*	*0.3120*	*0.4576*	***0.0107***	*0.7235*
U-statistic	1.3946	0.0649	1.5676	1.0270	**1.9459**	0.9514
p-val	*0.1631*	*0.9483*	*0.1170*	*0.3044*	***0.0517***	*0.3414*

Appendix 4.17 – Selectivity and Timing Estimates using the Conditional Multi-Factor Version of the Treynor-Mazuy Model

This appendix presents estimates of estimates of selectivity (alphas expressed in percentage) and timing (average conditional gammas) for each SRI fund in our sample, as well as for each characteristics-matched portfolio, using the conditional multi-factor version of the Treynor-Mazuy Model (equation [4.14]), which allows for time-varying timing coefficients. $r_{m,t}$ is the market index excess return (the MSCI AC World TR for Global equity funds and the MSCI AC Europe TR for European equity funds), SMB_t, HML_t and MOM_t are factor-mimicking portfolios for the size, book-to-market and momentum factors, respectively. $r_{lm,t} - r_{m,t}$ is the return difference between a local market index and the Global / European market indices used as benchmarks. The predetermined information variables are the default spread (DS), the dividend yield (DY) and the slope of the term structure (TS). All these variables are demeaned, lagged 1-month and stochastically detrended by subtracting a trailing moving average of their own past values. W_1, W_2 and W_3 are the probability values of the χ-square statistic of the Newey and West (1987) Wald test on the existence of time-varying betas (for the 5 factors), time-varying market timing coefficients and the joint time-variation in all coefficients, respectively. R^2 *adj.* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for Global equity funds and Panel B for European equity funds.

Panel A: Global Equity Funds							
Code		α_p	γ_{0p}	W_1	W_2	W_3	R^2 *adj.*
ATG1	SRI Fund	0.0526	-6.2815 *	0.0000	0.0125	0.0000	94.73%
	Matched-portfolio	0.0843	-6.6014 ***	0.0000	0.1644	0.0000	98.19%
BEG1	SRI Fund	-0.2459	0.3606	0.0000	0.7069	0.0000	96.95%
	Matched-portfolio	-0.1434	-1.1123 **	0.0000	0.0138	0.0000	97.96%
DEG1	SRI Fund	-0.2409	-0.4769	0.0000	0.0525	0.0000	90.02%
	Matched-portfolio	-0.0788	-0.4071	0.0000	0.0512	0.0000	91.82%
DEG2	SRI Fund	-0.0311	-2.0078 ***	0.0000	0.0293	0.0000	96.36%
	Matched-portfolio	-0.5802 ***	-0.9366	0.0004	0.0086	0.0000	88.78%
DEG3	SRI Fund	-0.1596	-1.7601	0.0000	0.5065	0.0000	91.79%
	Matched-portfolio	0.0322	-3.2973	0.0000	0.3443	0.0000	94.22%
FRG1	SRI Fund	-0.1830	-0.9183	0.0000	0.0000	0.0000	94.86%
	Matched-portfolio	-0.0930	-4.0017 **	0.0000	0.6623	0.0000	91.78%
FRG2	SRI Fund	0.0792	-6.8074	0.0000	0.1873	0.0000	93.17%
	Matched-portfolio	-0.4014	2.7575	0.0000	0.0001	0.0000	98.53%
ITG1	SRI Fund	-0.2292	-1.2190 **	0.0000	0.0141	0.0000	95.52%
	Matched-portfolio	-0.1949	-0.0859	0.0000	0.9986	0.0000	97.62%
ITG2	SRI Fund	-0.3315 ***	-0.0980	0.0000	0.3966	0.0000	97.40%
	Matched-portfolio	-0.1094 *	-0.6724 **	0.0000	0.0000	0.0000	98.41%
NLG1	SRI Fund	-0.0662	-0.0143	0.0000	0.6990	0.0000	89.15%
	Matched-portfolio	-0.2528	0.1948	0.0000	0.4269	0.0000	91.38%
UKG1	SRI Fund	-0.2865	-1.2674	0.0000	0.1301	0.0000	94.73%
	Matched-portfolio	-0.2424	1.2553	0.0001	0.0000	0.0000	91.05%
UKG2	SRI Fund	0.1707	-1.0576	0.0000	0.6992	0.0000	92.12%
	Matched-portfolio	-0.1985	-0.6374	0.0000	0.1131	0.0000	94.06%
UKG3	SRI Fund	-0.2571	-1.7371	0.0000	0.5433	0.0000	92.50%
	Matched-portfolio	0.0148	-0.4595	0.0343	0.3230	0.0443	93.80%
UKG4	SRI Fund	0.2692	-0.8300	0.0000	0.3243	0.0000	96.67%
	Matched-portfolio	-0.2465	-2.0231	0.0000	0.0056	0.0000	98.39%
UKG5	SRI Fund	0.1338	0.3116	0.0000	0.0034	0.0000	92.84%
	Matched-portfolio	-0.1805	-0.0178	0.0000	0.0062	0.0000	94.41%
UKG6	SRI Fund	-0.3583 **	-0.5070	0.0000	0.5776	0.0000	93.58%
	Matched-portfolio	-0.3731 **	0.5256	0.0000	0.0304	0.0000	94.93%
UKG7	SRI Fund	-0.4026 **	-0.4322	0.0000	0.8220	0.0000	91.60%
	Matched-portfolio	-0.2705	0.1355	0.0000	0.3523	0.0000	88.68%
UKG8^{+}	SRI Fund	n.a	n.a	n.a.	n.a.	n.a.	n.a.
	Matched-portfolio	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Appendix 4.17 – Selectivity and Timing Estimates using the Conditional Multi-Factor Version of the Treynor-Mazuy Model (continued)

Panel B: European Equity Funds									
Code		α_p		γ_{0p}		W_1	W_2	W_3	R^2 *adj.*
BEE1	SRI Fund	-0.0858		-0.4608		0.0000	0.1366	0.0000	89.91%
	Matched-portfolio	0.0699		-0.6170	*	0.0000	0.0022	0.0000	96.77%
BEE2	SRI Fund	-0.0619		0.2352		0.0037	0.0646	0.0000	91.62%
	Matched-portfolio	-0.0306		-0.4052		0.0000	0.4236	0.0000	97.21%
DEE1	SRI Fund	0.0439		-0.2059		0.0061	0.0001	0.0000	96.62%
	Matched-portfolio	-0.5436	*	-0.9420		0.0000	0.1409	0.0000	85.02%
FRE1	SRI Fund	-0.3175	***	0.2046		0.0000	0.7258	0.0000	97.94%
	Matched-portfolio	0.1336		-0.4747		0.0000	0.0226	0.0000	96.08%
FRE2	SRI Fund	-0.0547		-0.6751		0.0000	0.0165	0.0000	99.41%
	Matched-portfolio	0.0062		-3.0052		0.0000	0.5162	0.0000	98.34%
FRE3	SRI Fund	-0.1861		0.5877		0.0133	0.2840	0.0000	93.78%
	Matched-portfolio	-0.0855		-0.1534		0.0000	0.4176	0.0000	97.06%
FRE4	SRI Fund	-0.2783		-0.2524		0.0000	0.1039	0.0000	93.34%
	Matched-portfolio	-0.2143		-0.2464		0.0000	0.0489	0.0000	96.25%
FRE5	SRI Fund	-0.1951		-0.9869	**	0.0000	0.0015	0.0000	97.42%
	Matched-portfolio	-0.2967	***	-0.2539		0.0000	0.0152	0.0000	98.92%
FRE6	SRI Fund	-0.4063	***	0.2639		0.0000	0.0036	0.0000	97.54%
	Matched-portfolio	-0.2087		-0.3659		0.0000	0.0003	0.0000	95.09%
FRE7	SRI Fund	-0.1695		-0.0921		0.0000	0.0170	0.0000	96.67%
	Matched-portfolio	-0.4003	***	0.4852		0.0000	0.0434	0.0000	97.42%
FRE8	SRI Fund	-0.1486	*	-0.1456		0.0153	0.0195	0.0000	98.88%
	Matched-portfolio	-0.3663	**	0.1012		0.0000	0.7595	0.0000	94.17%
FRE9	SRI Fund	-0.1304		-0.9262	**	0.0000	0.0025	0.0000	97.84%
	Matched-portfolio	-0.0346		1.1035		0.0000	0.0481	0.0000	96.78%
FRE10	SRI Fund	-0.7843	**	2.1168	**	0.0000	0.2777	0.0000	89.44%
	Matched-portfolio	0.0179		-0.0063		0.0001	0.3321	0.0000	94.36%
FRE11	SRI Fund	0.1049		-1.0223		0.0000	0.3642	0.0000	96.64%
	Matched-portfolio	0.1254		-2.9996	***	0.0000	0.2758	0.0000	95.86%
FRE12	SRI Fund	-0.5050	*	-0.3731		0.0000	0.8201	0.0000	89.50%
	Matched-portfolio	0.1076		-1.5953	**	0.0000	0.0507	0.0000	97.07%
FRE13	SRI Fund	-0.6629	**	2.8725		0.0000	0.0116	0.0000	84.78%
	Matched-portfolio	0.1361		-0.0346		0.0000	0.0705	0.0000	92.98%
FRE14	SRI Fund	-0.3736	*	1.7476	**	0.0000	0.6206	0.0000	93.50%
	Matched-portfolio	-0.0685		0.6884		0.0000	0.0296	0.0000	96.16%
FRE15	SRI Fund	0.1949		-1.3725		0.0000	0.8315	0.0000	81.20%
	Matched-portfolio	0.0165		-0.1323		0.0000	0.4597	0.0000	96.10%
FRE16	SRI Fund	-0.0583		-0.5179		0.0000	0.8857	0.0000	93.80%
	Matched-portfolio	-0.1622		-0.7768		0.0000	0.8300	0.0000	94.54%
FRE17	SRI Fund	-0.3397	**	-0.7028		0.0000	0.9199	0.0000	96.07%
	Matched-portfolio	-0.4382	**	0.8881		0.0000	0.2147	0.0000	93.58%
FRE18	SRI Fund	-0.1946		-0.5387		0.0007	0.2898	0.0000	92.04%
	Matched-portfolio	-0.2310		1.0107		0.0000	0.8766	0.0000	95.30%
FRE19	SRI Fund	-0.1453		-0.3874		0.0001	0.0080	0.0000	86.44%
	Matched-portfolio	-0.1045		-0.7422		0.0008	0.5401	0.0000	96.60%
FRE20	SRI Fund	-0.0810		0.0129		0.0000	0.6259	0.0000	95.11%
	Matched-portfolio	-0.1454		0.6386		0.0000	0.0677	0.0000	96.24%
FRE21	SRI Fund	-0.2691		-0.0568		0.0000	0.9517	0.0000	96.84%
	Matched-portfolio	-0.0543		-4.1394		0.1038	0.4781	0.0000	46.26%
FRE22	SRI Fund	-0.2017		-0.0069		0.0000	0.0608	0.0000	90.63%
	Matched-portfolio	0.2503		-1.8020	**	0.0001	0.0125	0.0000	85.14%
FRE23	SRI Fund	-0.1962		0.3240		0.0001	0.2688	0.0000	97.17%
	Matched-portfolio	-0.1976		-0.1757		0.0000	0.1114	0.0000	97.33%

Appendix 4.17 – Selectivity and Timing Estimates using the Conditional Multi-Factor Version of the Treynor-Mazuy Model (continued)

Code		α_p		γ_{0p}		W_1	W_2	W_3	R^2 adj.
FRE24	SRI Fund	-0.2034		0.5820		0.0000	0.1089	0.0000	96.21%
	Matched-portfolio	-0.1483		0.3630		0.0000	0.4309	0.0000	94.46%
FRE25	SRI Fund	-0.7040	*	2.2276	**	0.0000	0.1708	0.0000	84.76%
	Matched-portfolio	1.3857		-3.1863		0.9671	0.6591	0.9158	25.08%
FRE26	SRI Fund	-0.4991	**	0.5101		0.0000	0.0115	0.0000	86.09%
	Matched-portfolio	-0.4241		1.2220	*	0.0039	0.4289	0.0000	92.85%
FRE27	SRI Fund	-0.1120		0.2887		0.0000	0.2467	0.0000	96.94%
	Matched-portfolio	0.0544		0.2336		0.0000	0.2451	0.0000	95.54%
FRE28	SRI Fund	0.0391		0.9119		0.0025	0.1868	0.0000	77.52%
	Matched-portfolio	-0.1278		0.4666		0.0040	0.8648	0.0000	93.66%
FRE29	SRI Fund	-0.2406		-1.7662		0.0000	0.6653	0.0000	94.05%
	Matched-portfolio	0.0645		-0.2673		0.0000	0.7721	0.0000	97.78%
FRE30	SRI Fund	-0.4147	**	0.5452		0.0095	0.5767	0.0000	93.77%
	Matched-portfolio	-0.2161		1.0496		0.0021	0.4105	0.0000	80.76%
FRE31	SRI Fund	-0.2675		1.2334	***	0.0075	0.3720	0.0000	94.76%
	Matched-portfolio	-0.1897		-0.3826		0.0000	0.7102	0.0000	96.99%
FRE32	SRI Fund	-0.2518		-0.4740		0.0055	0.6212	0.0000	94.14%
	Matched-portfolio	-0.1613		-1.5306	*	0.0000	0.3925	0.0000	95.36%
FRE33	SRI Fund	-0.2725		0.6750		0.0000	0.0088	0.0000	82.66%
	Matched-portfolio	-0.0898		1.5709	*	0.0000	0.8917	0.0000	96.08%
ESE1	SRI Fund	-0.3712		2.8041	*	0.0000	0.2000	0.0000	96.39%
	Matched-portfolio	-0.4110	*	0.2208		0.0000	0.8983	0.0000	97.56%

$^{+}$ The model was not estimated for this fund, due to the insufficient number of observations.

Appendix 4.18 – Selectivity and Timing Estimates using the Conditional Multi-Factor Version of the Henriksson-Merton Model

This appendix presents estimates of estimates of selectivity (alphas expressed in percentage) and timing (average conditional gammas) for each SRI fund in our sample, as well as for each characteristics-matched portfolio, using the conditional multi-factor version of the Henriksson-Merton model (equation [4.17]). $r_{m,t}$ is the market index excess return (the MSCI AC World TR for Global equity funds and the MSCI AC Europe TR for European equity funds), SMB_t, HML_t and MOM_t are factor-mimicking portfolios for the size, book-to-market and momentum factors, respectively. $r_{lm,t} - r_{m,t}$ is the return difference between a local market index and the Global / European market indices used as benchmarks. The predetermined information variables are the default spread (DS), the dividend yield (DY) and the slope of the term structure (TS). All these variables are demeaned, lagged 1-month and stochastically detrended by subtracting a trailing moving average of their own past values. *Wald* corresponds to the probability value of the χ-square statistic of the Newey and West (1987) Wald test on the existence of time-varying betas (for the 5 factors). R^2 *adj.* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for Global equity funds and Panel B for European equity funds.

Panel A: Global Equity Funds							
Code		α_p		γ_p		*Wald*	R^2 *adj.*
ATG1	SRI Fund	0.4814		-0.3961		0.0000	96.76%
	Matched-portfolio	0.4020		-0.6178		0.0000	98.13%
BEG1	SRI Fund	-0.2820		0.0540		0.0000	96.95%
	Matched-portfolio	-0.0825		-0.1556	**	0.0000	97.88%
DEG1	SRI Fund	-0.0830		-0.1149		0.0000	90.19%
	Matched-portfolio	-0.0418		-0.0544		0.0000	91.56%
DEG2	SRI Fund	0.0287		-0.2585	**	0.0000	96.18%
	Matched-portfolio	-0.5651	**	-0.1003		0.0000	88.39%
DEG3	SRI Fund	-0.2915		0.0084		0.0000	91.43%
	Matched-portfolio	0.1001		-0.3037		0.0000	93.67%
FRG1	SRI Fund	-0.0780		-0.1575		0.0000	94.37%
	Matched-portfolio	0.0901		-0.3646		0.0000	91.92%
FRG2	SRI Fund	0.3585		-0.5235		0.0000	90.49%
	Matched-portfolio	-0.3931		0.1792		0.0000	98.19%
ITG1	SRI Fund	-0.1923		-0.1475		0.0002	95.20%
	Matched-portfolio	-0.1782		-0.0122		0.0000	97.69%
ITG2	SRI Fund	-0.3273	***	-0.0108		0.0000	97.37%
	Matched-portfolio	-0.0869		-0.0835	*	0.0000	98.33%
NLG1	SRI Fund	-0.0562		-0.0227		0.0000	89.16%
	Matched-portfolio	-0.2337		-0.0167		0.0000	91.03%
UKG1	SRI Fund	-0.0354		-0.2848	**	0.0000	94.92%
	Matched-portfolio	-0.3691		0.2308		0.0000	90.63%
UKG2	SRI Fund	0.2751		-0.1805		0.0000	92.05%
	Matched-portfolio	-0.1196		-0.1119		0.0000	93.96%
UKG3	SRI Fund	-0.1334		-0.2409		0.0000	92.58%
	Matched-portfolio	0.1284		-0.0882		0.0136	94.01%
UKG4	SRI Fund	0.8074		-0.3784		0.0000	97.58%
	Matched-portfolio	0.1221		-0.3932	**	0.0000	98.29%
UKG5	SRI Fund	0.2571		-0.0583		0.0000	92.80%
	Matched-portfolio	-0.1471		0.0023		0.0000	94.38%
UKG6	SRI Fund	-0.3613	*	-0.0378		0.0000	93.48%
	Matched-portfolio	-0.3549	*	0.0391		0.0000	94.86%
UKG7	SRI Fund	-0.4077		-0.0470		0.0001	91.60%
	Matched-portfolio	-0.2647		-0.0203		0.0000	88.75%
UKG8+	SRI Fund	n.a		n.a		n.a.	n.a.
	Matched-portfolio	n.a.		n.a.		n.a.	n.a.

Appendix 4.18 – Selectivity and Timing Estimates using the Conditional Multi-Factor Version of the Henriksson-Merton Model (continued)

Panel B: European Equity Funds							
Code		α_p		γ_p		*Wald*	R^2 *adj.*
BEE1	SRI Fund	-0.1160		-0.0241		0.0000	89.64%
	Matched-portfolio	0.2024		-0.1532	**	0.0000	96.61%
BEE2	SRI Fund	-0.2121		0.1463		0.0000	92.05%
	Matched-portfolio	-0.0727		-0.0040		0.0000	97.19%
DEE1	SRI Fund	0.0141		0.0107		0.0000	96.44%
	Matched-portfolio	-0.5138		-0.1073		0.0000	84.71%
FRE1	SRI Fund	-0.2899	*	0.0030		0.0000	97.95%
	Matched-portfolio	0.1681		-0.0728		0.0000	95.90%
FRE2	SRI Fund	0.0206		-0.3137	*	0.0000	99.32%
	Matched-portfolio	0.0639		0.2377		0.0000	98.16%
FRE3	SRI Fund	-0.2619		0.1347		0.0002	93.60%
	Matched-portfolio	-0.0118		-0.0399		0.0000	97.10%
FRE4	SRI Fund	-0.2222		-0.0375		0.0000	93.45%
	Matched-portfolio	-0.0860		-0.0990		0.0000	96.24%
FRE5	SRI Fund	-0.0601		-0.1864	*	0.0000	97.48%
	Matched-portfolio	-0.2518	*	-0.0673		0.0000	98.91%
FRE6	SRI Fund	-0.3028		-0.0092		0.0000	97.62%
	Matched-portfolio	-0.1076		-0.0637		0.0000	94.96%
FRE7	SRI Fund	-0.1735		0.0068		0.0010	96.39%
	Matched-portfolio	-0.3171	**	-0.0411		0.0000	97.36%
FRE8	SRI Fund	-0.0913		-0.0436		0.0000	98.88%
	Matched-portfolio	-0.3293		0.0036		0.0000	94.25%
FRE9	SRI Fund	-0.0184		-0.1545		0.0000	97.90%
	Matched-portfolio	-0.1564		0.2362		0.0000	96.55%
FRE10	SRI Fund	-0.9793	**	0.3882	**	0.0000	89.21%
	Matched-portfolio	0.1272		-0.0810		0.0000	94.32%
FRE11	SRI Fund	0.2258		-0.2350		0.0000	96.63%
	Matched-portfolio	0.4073		-0.4739	**	0.0000	95.81%
FRE12	SRI Fund	-0.3149		-0.2646		0.0000	89.94%
	Matched-portfolio	0.2999		-0.2645	**	0.0000	97.26%
FRE13	SRI Fund	-0.6117		0.3070		0.0000	82.95%
	Matched-portfolio	0.2294		-0.0618		0.0000	92.45%
FRE14	SRI Fund	-0.4903		0.3203	*	0.0000	93.33%
	Matched-portfolio	-0.0726		0.1569		0.0000	96.36%
FRE15	SRI Fund	0.5302		-0.3737		0.0000	81.29%
	Matched-portfolio	0.0381		-0.0310		0.0000	96.10%
FRE16	SRI Fund	0.0017		-0.1121		0.0003	93.84%
	Matched-portfolio	0.0255		-0.2021		0.0000	94.72%
FRE17	SRI Fund	-0.1933		-0.1842	*	0.0000	96.14%
	Matched-portfolio	-0.4370		0.1039		0.0000	93.49%
FRE18	SRI Fund	-0.1324		-0.0869		0.0000	91.94%
	Matched-portfolio	-0.3531	*	0.2022		0.0000	95.31%
FRE19	SRI Fund	-0.0056		-0.0717		0.0000	85.77%
	Matched-portfolio	-0.0441		-0.1117		0.0000	96.53%
FRE20	SRI Fund	-0.1824		0.0878		0.0000	95.09%
	Matched-portfolio	-0.2146		0.1289		0.0000	96.22%
FRE21	SRI Fund	-0.3131		0.0182		0.0000	96.85%
	Matched-portfolio	0.8679		-0.9986	*	0.0002	47.70%
FRE22	SRI Fund	-0.1142		-0.0062		0.0000	91.23%
	Matched-portfolio	0.4652	*	-0.3346	*	0.0000	84.81%
FRE23	SRI Fund	-0.2111		0.0516		0.0000	97.18%
	Matched-portfolio	-0.1380		-0.0473		0.0000	97.33%

Appendix 4.18 – Selectivity and Timing Estimates using the Conditional Multi-Factor Version of the Henriksson-Merton Model (continued)

Code		α_p		γ_p		*Wald*	R^2 *adj.*
FRE24	SRI Fund	-0.2762		0.1264		0.0000	96.13%
	Matched-portfolio	-0.2369		0.1113		0.0000	94.52%
FRE25	SRI Fund	-0.8966	*	0.3999		0.0000	84.53%
	Matched-portfolio	2.7997		-1.1879		0.9222	27.33%
FRE26	SRI Fund	-0.3882		0.0309		0.0000	86.46%
	Matched-portfolio	-0.5867	*	0.2507	*	0.0000	92.86%
FRE27	SRI Fund	-0.1454		0.0685		0.0000	96.98%
	Matched-portfolio	-0.0077		0.0857		0.0000	95.62%
FRE28	SRI Fund	0.2109		0.0348		0.0002	78.03%
	Matched-portfolio	-0.2341		0.1308		0.0000	93.69%
FRE29	SRI Fund	0.1234		-0.3280		0.0000	94.99%
	Matched-portfolio	0.1991		-0.1566		0.0000	97.95%
FRE30	SRI Fund	-0.4309		0.1027		0.0000	93.92%
	Matched-portfolio	-0.2991		0.1645		0.0000	81.42%
FRE31	SRI Fund	-0.4327	*	0.2285	**	0.0000	94.67%
	Matched-portfolio	-0.1476		-0.0646		0.0000	96.98%
FRE32	SRI Fund	-0.1934		-0.0509		0.0000	94.13%
	Matched-portfolio	0.0419		-0.3144	**	0.0000	95.56%
FRE33	SRI Fund	0.0129		-0.0950		0.0000	83.19%
	Matched-portfolio	-0.2398		0.2833	**	0.0000	95.90%
ESE1	SRI Fund	-0.6097		0.3151	*	0.0000	97.49%
	Matched-portfolio	-0.5297	**	0.1028		0.0000	97.68%

+ The model was not estimated for this fund, due to the insufficient number of observations.

Appendix 4.19 – Statistical Tests for the Differences in Selectivity and Timing Estimates between SRI and Conventional Funds

This appendix reports the *t*-statistics and the *U*-statistics for the null hypothesis that the members of each group (SRI and conventional) have equal means/medians in terms of their selectivity (alphas) and timing abilities (gammas and average conditional gammas). In all cases, we also report the respective *p-values* for a two-sided test. In bold we indicate the cases in which we reject the null hypothesis at the usual significance levels. We present the results for two market timing models: the conditional multi-factor version of the Treynor-Mazuy model and the conditional multi-factor version of the Henriksson-Merton model. Panels A and B present the results for Global equity funds from the EMU countries, Panels C and D for UK Global equity funds and Panels E and F for European equity funds.

Panel A: Global Equity Funds – EMU countries – Conditional Multi-Factor Treynor-Mazuy Model			**Panel B: Global Equity Funds – EMU countries – Conditional Multi-Factor Henriksson-Merton Model**		
	α_{p}	γ_{0p}		α_{p}	γ_{p}
t-statistic	0.5004	0.4392	*t*-statistic	0.4512	0.0428
p-val	*0.6228*	*0.6657*	*p-val*	*0.6572*	*0.9663*
U-statistic	0.1890	0.3402	*U*-statistic	0.1134	-0.0378
p-val	*0.8501*	*0.7337*	*p-val*	*0.9097*	*0.9698*
Panel C: Global Equity Funds – UK – Conditional Multi-Factor Treynor-Mazuy Model			**Panel D: Global Equity Funds – UK – Conditional Multi-Factor Henriksson-Merton Model**		
	α_{p}	γ_{0p}		α_{p}	γ_{p}
t-statistic	0.9426	1.3274	*t*-statistic	1.1243	1.4502
p-val	*0.3645*	*0.2091*	*p-val*	*0.2829*	*0.1726*
U-statistic	0.0000	1.2778	*U*-statistic	0.7667	1.4055
p-val	1.0000	*0.2013*	*p-val*	*0.4433*	*0.1599*
Panel E: European Equity Funds – Conditional Multi-Factor Treynor-Mazuy Model			**Panel F: European Equity Funds – Conditional Multi-Factor Henriksson-Merton Model**		
	α_{p}	γ_{0p}		α_{p}	γ_{p}
t-statistic	**2.5492**	**2.0781**	*t*-statistic	**2.1202**	1.3677
p-val	***0.0129***	***0.0413***	*p-val*	***0.0374***	*0.1756*
U-statistic	**2.4973**	1.2000	*U*-statistic	**1.8811**	0.8432
p-val	***0.0125***	*0.2301*	*p-val*	***0.0600***	*0.3991*

CHAPTER 5

PERFORMANCE AND PERFORMANCE PERSISTENCE OF EUROPEAN SOCIALLY RESPONSIBLE FUNDS: FRENCH EVIDENCE

5.1 Introduction

The main objective of this chapter is to investigate the performance and performance persistence of French SRI funds. According to recent statistics, France has surpassed the UK and is currently the most important European SRI fund market in terms of assets under management. In fact, from 1999 to 2010, the weight of the UK SRI market on the total European assets under management has decreased from 42% to 15%, while the weight of the French market has increased from 1% to 35% (Vigeo, 2010). In the period of 2007 to 2010 alone, despite difficult times for the financial markets, the growth rate of SRI assets under management in France reached an astonishing 198%, rising from €8.9 billion to €26.5 billion. In addition, from 2006 to 2009, France was also the leading European SRI market in terms of number of funds and was only narrowly surpassed by Belgium in 2010. Nevertheless, the number of French SRI funds increased from 93 in June 2007 to 215 in June 2010, which represents a growth rate of 131% in just three-years.[79]

Despite this remarkable growth, very few attempts have been made to analyse the performance of French SRI funds and the few studies we are aware of (e.g.: Renneboog *et al.*, 2008b; Cortez *et al.*, 2009; Amenc and LeSourd, 2010; LeSourd, 2010) present some important limitations. These are mainly associated with the performance evaluation models used, which do not allow for time-varying risk, time-varying performance and/or do not control for common investment styles, and the lack of any comparisons between SRI and conventional funds. Hence, we contribute to the international mutual fund performance literature by performing a comprehensive investigation of the performance and investment styles of 33 French SRI funds investing in European equities, over the period of January 2000 through December 2008, in comparison with characteristics-matched samples of conventional funds. As far as we are aware of, this is the first investigation to use the matched-pairs approach in the French SRI fund market. In addition, we also analyse if performance and investment styles are somewhat related to market states (i.e., recession and expansion periods).

To overcome many of the shortcomings of previous research, we evaluate performance by means of robust conditional multi-factor models, which allow for time-

[79] Another important aspect to mention is that France was the first European country to make ethical reporting mandatory. In fact, since 2001, all listed companies in France must publish information regarding their social, environmental and ethical initiatives in their annual reports (Renneboog *et al.*, 2008a). Besides, recently approved laws require companies to offer at least one solidarity fund, which is often an SRI fund, in employee savings plans (EUROSIF, 2010).

varying alphas and betas. In fact, the use of a proper multi-factor model is critical to distinguish between returns that are related with the social screens employed by SRI funds and returns that are solely due to common investment styles. Besides, several recent SRI fund studies (e.g.: Bauer *et al.*, 2006; Bauer *et al.*, 2007; Gregory and Whittaker, 2007; Liedekerke *et al.*, 2007; Cortez *et al.*, 2009, *forthcoming*) have found evidence of time-varying betas, which clearly supports the use of conditional models. Moreover, we also control for home biases in portfolio composition, as well as spurious regression biases, which are avoided through an appropriate econometric treatment of the public information variables used in the conditional models.

Another important aspect we address, which remains practically unexplored in the French SRI fund market, is the decomposition of fund's overall performance in its selectivity and timing components. Additionally, we investigate not only the market timing abilities of French SRI fund managers, but also their style timing abilities, a topic that has only been investigated so far for the US (e.g.: Ferruz, Muñoz and Vicente, 2010) and the UK (e.g.: Gregory and Whittaker, 2007) SRI fund markets.

Furthermore, to the best of our knowledge, the issue of performance persistence of SRI funds has only been analysed for the UK market (e.g.: Gregory and Whittaker, 2007). In this way, another objective of this chapter is to evaluate and compare the performance persistence of French SRI and conventional funds over both short and longer time horizons. We begin by assessing performance persistence by means of the commonly used contingency tables methodology, using different performance measures. Afterwards, we assess persistence on the basis of performance-ranked portfolio strategies using alternative evaluation models, including conditional specifications that consider time-varying betas, as well as time-varying alphas and betas. If SRI funds have a more long-term perspective than conventional funds, they may exhibit higher performance persistence at longer than at shorter time horizons. Besides, if SRI funds constitute a more homogeneous group than conventional funds, differences in performance between SRI fund portfolios of past winners and past losers should be lower than for their conventional peers, meaning that investment strategies consisting of buying past winners and selling past losers ought to be less important in the SRI context.

This chapter is organized as follows: Section 2 presents the (overall) performance and the timing models used. Section 3 describes the data. Section 4 presents and discusses our empirical results. Finally, section 5 summarises our main findings and presents some concluding remarks.

5.2 Performance Evaluation Models

5.2.1 Overall Performance

To evaluate fund performance and, subsequently, performance persistence, we use unconditional and conditional versions of a 5-factor model, which incorporates an additional local factor into the well-known Carhart (1997) 4-factor model. Since we are dealing with French funds with a European investment universe, this specification allows us to take potential home biases into account. In this way, the unconditional 5-factor model is based on the following regression:

$$r_{p,t} = \alpha_p + \beta_p\, r_{m,t} + \beta_{1p}\mathrm{SMB}_t + \beta_{2p}\,\mathrm{HML}_t + \beta_{3p}\,\mathrm{MOM}_t + \beta_{4p}\left(r_{lm,t} - r_{m,t}\right) + \varepsilon_{p,t} \qquad [5.1]$$

where $r_{p,t}$ represents the excess return of portfolio *p* over period *t*, $r_{m,t}$ represents the market's excess return during the same period, β_p is the systematic risk of the portfolio, SMB_t is the return difference between a portfolio of small caps and a portfolio of large caps, HML_t is the return difference between a portfolio of high book-to-market stocks and a portfolio of low book-to-market stocks, MOM_t is the return difference between a portfolio of past winners and a portfolio of past losers, $(r_{lm,t} - r_{m,t})$ is the return difference between a local (in this case, French) market index and a European market index and $\varepsilon_{p,t}$ is a residual term. A statistically significant positive (negative) alpha indicates superior (inferior) performance.

Since expected returns and risk are, in reality, time-varying, unconditional models can generate biased performance estimates, particularly when fund managers are engaged in market timing abilities or follow dynamic investment strategies that result in time-varying risk (e.g.: Jensen, 1972; Dybvig and Ross, 1985; Grinblatt and Titman, 1989). In this way, following Ferson and Schadt (1996), we also use a partial conditional version of our 5-factor model, in which betas are allowed to vary over time as linear functions of a vector of predetermined information variables, Z_{t-1}. This vector represents the public information available at time *t-1* relevant for predicting returns at time *t*. In this way, our partial conditional 5-factor model is based on the following regression:

$$r_{p,t} = \alpha_p + \beta_{0p}\, r_{m,t} + \beta_p'(z_{t-1}\, r_{m,t}) + \beta_{1p}\mathrm{SMB}_t + \beta_{1p}'(z_{t-1}\,\mathrm{SMB}_t) + \beta_{2p}\mathrm{HML}_t + \beta_{2p}'(z_{t-1}\,\mathrm{HML}_t) + \\ + \beta_{3p}\mathrm{MOM}_t + \beta_{3p}'(z_{t-1}\,\mathrm{MOM}_t) + \beta_{4p}(r_{lm,t} - r_{m,t}) + \beta_{4p}'[z_{t-1}\cdot(r_{lm,t} - r_{m,t})] + \varepsilon_{p,t} \qquad [5.2]$$

where z_{t-1} is a vector of the deviations of Z_{t-1} from the (unconditional) average values, $\beta_p', \beta_{1p}', \beta_{2p}', \beta_{3p}'$ and β_{4p}' are vectors that measure the relationship between the conditional betas and the information variables, and $\beta_{0p}, \beta_{1p}, \beta_{2p}, \beta_{3p}$ and β_{4p} are average betas, which represent the (unconditional) mean of the conditional betas. In this model, if the manager uses only publicly available information, his/her conditional alpha will be zero, consistent with the semi-strong form of market efficiency of Fama (1970).

Furthermore, if alphas are also allowed to vary over time as a linear function of vector Z_{t-1}, as proposed by Christopherson *et al.* (1998), the partial conditional model can be extended to its full conditional version, where both alphas and betas are time-varying. The full conditional 5-factor version writes as:

$$r_{p,t} = \alpha_{0p} + A_p'\, z_{t-1} + \beta_{0p}\, r_{m,t} + \beta_p'(z_{t-1}\, r_{m,t}) + \beta_{1p}\mathrm{SMB}_t + \beta_{1p}'(z_{t-1}\,\mathrm{SMB}_t) + \beta_{2p}\mathrm{HML}_t + \beta_{2p}'(z_{t-1}\,\mathrm{HML}_t) + \\ + \beta_{3p}\mathrm{MOM}_t + \beta_{3p}'(z_{t-1}\,\mathrm{MOM}_t) + \beta_{4p}(r_{lm,t} - r_{m,t}) + \beta_{4p}'[z_{t-1}\cdot(r_{lm,t} - r_{m,t})] + \varepsilon_{p,t} \qquad [5.3]$$

where α_{0p} is an average alpha and vector A_p' measures the relationship between the conditional alphas and the information variables.

5.2.2 Selectivity, Market Timing and Style Timing

To decompose overall performance in its timing and selectivity components, we use conditional multi-factor versions of the Treynor and Mazuy (1966) and the Henriksson and Merton (1981) models, the two most widely used market timing models in finance literature.

Our conditional 5-factor version of the Treynor and Mazuy (1966) model is based on Ferson and Schadt (1996), Bollen and Busse (2001) and Ferson and Qian (2004). First, combining the conditional approach of Ferson and Schadt (1996) with the multi-factor approach of Bollen and Busse (2001), we add the quadratic term of the original Treynor and Mazuy (1966) regression to equation [5.2]. Then, following Ferson and Qian (2004), we allow the timing coefficient itself to vary over time as a function of the predetermined information variables and, consequently, replace the fixed timing coefficient of the original regression for a time-varying one. This yields the following market timing model:

$$r_{p,t} = \alpha_p + \beta_{0p}\, r_{m,t} + \beta'_{0p}(z_{t-1}\, r_{m,t}) + \beta_{1p}\mathrm{SMB}_t + \beta'_{1p}(z_{t-1}\,\mathrm{SMB}_t) + \beta_{2p}\mathrm{HML}_t + \beta'_{2p}(z_{t-1}\,\mathrm{HML}_t) +$$
$$+ \beta_{3p}\mathrm{MOM}_t + \beta'_{3p}(z_{t-1}\,\mathrm{MOM}_t) + \beta_{4p}(r_{lm,t} - r_{m,t}) + \beta'_{4p}[z_{t-1}\cdot(r_{lm,t} - r_{m,t})] + \gamma_{0p}\, r_{m,t}^{\;2} + \gamma'_{0p}\,(z_{t-1}\, r_{m,t}^{\;2}) + \varepsilon_{p,t} \qquad [5.4]$$

where α_p measures conditional selectivity, γ_{0p} measures conditional market timing, vector γ'_{0p} captures the variability (if it exists) in the manager's market timing ability over different states of the economy and $\varepsilon_{p,t}$ is an error term.

Additionally, to investigate the abilities of French fund managers in timing different investment styles, we follow Lu (2005) and modify regression [5.4] in order to measure the manager's timing ability not only with respect to the market, but also with respect to the size, book-to-market, momentum and local factors. This results in the following regression:

$$r_{p,t} = \alpha_p + \beta_{0p}\, r_{m,t} + \beta'_{0p}(z_{t-1}\, r_{m,t}) + \beta_{1p}\mathrm{SMB}_t + \beta'_{1p}(z_{t-1}\,\mathrm{SMB}_t) + \beta_{2p}\mathrm{HML}_t + \beta'_{2p}(z_{t-1}\,\mathrm{HML}_t) +$$
$$+ \beta_{3p}\mathrm{MOM}_t + \beta'_{3p}(z_{t-1}\,\mathrm{MOM}_t) + \beta_{4p}(r_{lm,t} - r_{m,t}) + \beta'_{4p}\left[z_{t-1}\cdot(r_{lm,t} - r_{m,t})\right] + \gamma_{0p}\, r_{m,t}^{\;2} + \gamma'_{0p}\left(z_{t-1}\, r_{m,t}^{\;2}\right) +$$
$$+ \gamma_{1p}\,\mathrm{SMB}_t^{\;2} + \gamma'_{1p}\left(z_{t-1}\, SMB_t^{\;2}\right) + \gamma_{2p}\,\mathrm{HML}_t^{\;2} + \gamma'_{2p}\left(z_{t-1}\,\mathrm{HML}_t^{\;2}\right) + \gamma_{3p}\,\mathrm{MOM}_t^{\;2} + \gamma'_{3p}\left(z_{t-1}\,\mathrm{MOM}_t^{\;2}\right) +$$
$$+ \gamma_{4p}\left(r_{lm,t} - r_{m,t}\right)^2 + \gamma'_{4p}\left[z_{t-1}\cdot\left(r_{lm,t} - r_{m,t}\right)^2\right] + \varepsilon_{p,t} \qquad [5.5]$$

where γ_{0p} measures conditional market timing abilities, and γ_{1p}, γ_{2p}, γ_{3p} and γ_{4p} measure the manager's conditional timing abilities in relation to the size, book-to-market, momentum and local factors, respectively. In regression [5.5], vectors γ'_{0p}, γ'_{1p}, γ'_{2p}, γ'_{3p} and γ'_{4p} capture any variability in timing abilities over different states of the economy.

For the conditional 5-factor version of the Henriksson and Merton (1981) model we follow a similar procedure. First, we pick up the conditional version of this model developed by Ferson and Schadt (1996) and extend it to a multi-factor framework by adding the additional size, book-to-market, momentum and local factors, as well as their cross products with each of the predetermined information variables. As a result, we obtain the following regression:

$$r_{p,t} = \alpha_p + b_{dp}\, r_{m,t} + \beta'_{dp}(z_{t-1}\, r_{m,t}) + \beta_{1p}\mathrm{SMB}_t + \beta'_{1p}(z_{t-1}\,\mathrm{SMB}_t) + \beta_{2p}\mathrm{HML}_t + \beta'_{2p}(z_{t-1}\,\mathrm{HML}_t) + \beta_{3p}\mathrm{MOM}_t + $$
$$+ \beta'_{3p}(z_{t-1}\,\mathrm{MOM}_t) + \beta_{4p}(r_{lm,t} - r_{m,t}) + \beta'_{4p}[z_{t-1}\cdot(r_{lm,t} - r_{m,t})] + \gamma_p\,(D_t\, r_{m,t}) + \Delta'_p\,(z_{t-1}\, D_t\, r_{m,t}) + \varepsilon_{p,t} \qquad [5.6]$$

where α_p measures conditional selectivity, γ_p measures conditional market timing and D_t is a dummy variable that equals one if the difference between the market excess return and the conditional mean of that excess return, $r_{m,t} - E(r_{m,t}|z_{t-1})$, is positive, and zero otherwise. The conditional mean is estimated by regressing the market excess return on the lagged information variables. In this way, following Ferson and Schadt (1996), we assume that the manager attempts to forecast the deviation from the expected excess return, conditional on the public information variables. If this forecast is positive, the portfolio conditional beta will be of $\beta_{up}(Z_{t-1}) = b_{up} + \beta'_{up}\, z_{t-1}$, whereas if this forecast is negative, the portfolio conditional beta will be of $\beta_{dp}(Z_{t-1}) = b_{dp} + \beta'_{dp}\, z_{t-1}$. Therefore, in regression [5.6], $\gamma_p = b_{up} - b_{dp}$ and $\Delta'_p = \beta_{up} - \beta_{dp}$. Under the null hypothesis of no market timing ability, coefficients γ_p and Δ'_p will be zero.

To investigate style timing abilities, we follow Lu (2005) and modify regression [5.6] to be able to measure the manager's timing abilities in relation to the size, book-to-market, momentum and local factors too. The result is the following regression:

$$r_{p,t} = \alpha_p + b_{dp}\, r_{m,t} + \beta'_{dp}\left(z_{t-1}\, r_{m,t}\right) + \beta_{1p}\mathrm{SMB}_t + \beta'_{1p}\left(z_{t-1}\,\mathrm{SMB}_t\right) + \beta_{2p}\mathrm{HML}_t + \beta'_{2p}\left(z_{t-1}\,\mathrm{HML}_t\right) +$$
$$+ \beta_{3p}\mathrm{MOM}_t + \beta'_{3p}\left(z_{t-1}\,\mathrm{MOM}_t\right) + \beta_{4p}\left(r_{lm,t} - r_{m,t}\right) + \beta'_{4p}\left[z_{t-1}\cdot\left(r_{lm,t} - r_{m,t}\right)\right] + \gamma_{0p}\left(D_{0t}\, r_{m,t}\right) + \Delta'_{0p}\left(z_{t-1}\, D_{0t}\, r_{m,t}\right) +$$
$$+ \gamma_{1p}\left(D_{1t}\,\mathrm{SMB}_t\right) + \Delta'_{1p}\left(z_{t-1}\, D_{1t}\,\mathrm{SMB}_t\right) + \gamma_{2p}\left(D_{2t}\,\mathrm{HML}_t\right) + \Delta'_{2p}\left(z_{t-1}\, D_{2t}\,\mathrm{HML}_t\right) + \gamma_{3p}\left(D_{3t}\,\mathrm{MOM}_t\right) +$$
$$+ \Delta'_{3p}\left(z_{t-1}\, D_{3t}\,\mathrm{MOM}_t\right) + \gamma_{4p}\left[D_{4t}\left(r_{lm,t} - r_{m,t}\right)\right] + \Delta'_{4p}\left[z_{t-1}\, D_{4t}\left(r_{lm,t} - r_{m,t}\right)\right] + \varepsilon_{p,t} \qquad [5.7]$$

where D_{0t} equals one if the difference between the market excess return and the conditional mean of that excess return is positive, and zero otherwise. In a similar manner, D_{1t}, D_{2t}, D_{3t} and D_{4t} are dummy variables that equal one when the difference between the returns of each factor (size, book-to-market, momentum and local factor, respectively) and the conditional mean of those returns are positive, and zero otherwise. The conditional means are estimated by regressing the returns of each factor on the lagged information variables.

5.3 Data

5.3.1 Sample

To identify existing French SRI funds we used the "SRI funds service", provided by Vigeo and Morningstar Europe,[80] which classifies funds according to Morningstar categories. Since the most important segment of the French SRI fund market is clearly the one investing at a European level, we focus our analysis in fund categories which invest in European or Eurozone equities. Our sample period covers January 2000 to December 2008.

By the end of the sample period, the "SRI funds service" reported the existence of 50 SRI French funds investing at a European level, divided in the following Morningstar categories: "Europe Large Cap Blend Equity" (11 funds), "Europe Large Cap Growth Equity" (1 fund), "Europe Large Cap Value Equity" (3 funds), "Europe Mid Cap Equity" (1 fund), "Europe Small Cap Equity" (1 fund), "Eurozone Large Cap Equity" (31 funds) and "Eurozone Mid Cap Equity" (2 funds).[81]

Since we want to focus our analysis on diversified, actively managed retail funds, we verified each fund's investment policy, through information available at the "SRI funds service" or, whenever necessary, from the individual funds' prospectuses.[82] With this procedure, we identified 4 funds of funds, 1 index fund and 4 institutional funds, which were excluded. In this way, all funds in our samples (both SRI and conventional) are retail funds, directly available to individual investors. Besides, they all have an initial investment amount lower or equal to €5.000. In addition, to avoid duplications, whenever we had an accumulation and an income part of the same fund, only one was included in our sample. One additional fund was excluded on the basis of this criteria. Finally, only funds with records available on Datastream and with at least 24 monthly observations across our sample period were selected, which resulted in the exclusion of another 4 funds. For the remaining funds, we

[80] The free version of this service is available online at http://customer.morningstareurope.com/it/avanzi/fundselect/index_free.aspx, accessed in January 2009.

[81] It should be mentioned that, by the end of December 2008, the "SRI funds service" also reported the existence of 3 French SRI funds investing in Global equity, one of which was an index fund.

[82] The individual funds' prospectuses were obtained from the Morningstar website, the management companies' websites or through the website of the French National Securities Market Commission – *Autorité des Marchés Financiers* (http://www.amf-france.org).

used the "SRI funds service" to collect their respective inception dates[83] and International Securities Identification Numbers (ISIN).

To be able to create our matched-sample, we used the French Morningstar website[84] to identify all conventional funds available to investors in France within the same investment categories of each of our SRI funds. Then, we collected their inception dates and ISIN. After taking into account the same selection criteria we did in the SRI fund sample, we began our matching procedure based on fund age and investment category.[85] In this way, for each SRI fund we selected a portfolio of three conventional funds with the same Morningstar category (i.e., with the same investment universe and style) and inception dates that had to be within 12 months of that of the SRI fund with which they were matched. Despite our efforts, we could not create matched-portfolios for 3 SRI funds and had to exclude them from our sample as well. As a consequence, our final sample consists of 33 French SRI funds investing in European/Eurozone equities (described in detail in Appendix 5.1) and 99 characteristics-matched conventional funds.

Since we were not able to identify non-surviving SRI funds, we recognise that both our SRI and conventional fund samples can suffer from survivorship bias. However, since we also match on fund age, both types of funds will have identical life spans, so we believe this shortcoming won't significantly distort our matched-pairs analysis.

5.3.2 Fund Returns, Benchmark Indices and Factors

For each fund in our sample, we began by collecting the end of month total return index from Datastream. Monthly fund returns, including reinvestment of dividends, were continuously compounded and denominated in Euros. Returns are net of operating expenses, but gross of any sales charge, with the risk-free rate being proxied by the 1-month Euribor.

To conduct some of our empirical tests, we created two equally-weighted portfolios, one for the SRI funds and another for the conventional funds. Appendix 5.2 presents some summary statistics for the excess returns of these portfolios. Monthly excess returns are, on average, negative and not normally distributed for both portfolios (according to the Jarque-

[83] Therefore, we assume that the inception date provided by the "SRI funds service" is the date when each fund began adopting an SRI investment policy.
[84] Available at http://www.morningstar.fr.
[85] Since we were not able to gather information on each funds' Total Net Assets, we did not match on size. Nevertheless, some studies have shown that size does not seem to have a significant influence on SRI fund performance (e.g.: Gregory *et al.*, 1997; Kreander *et al.*, 2005; Renneboog *et al.*, 2008b), unlike age (e.g.: Gregory *et al.*, 1997; Renneboog *et al.*, 2008b). Additionally, matching on size would also have involved a trade-off with the other criteria, and would have inhibited the creation of many of our matched-portfolios.

Bera test statistic). Although mean excess returns are lower for the SRI funds than for their matched-portfolios, and SRI funds have a higher overall volatility than their peers, (unreported) statistical tests showed that we cannot reject the hypothesis of equal means, medians or variances between the two series of returns (at the usual significance levels).

Market returns were also continuously compounded and proxied by the MSCI AC Europe TR index. As additional risk factors, we use a size, a book-to-market, a momentum and a local factor. The small minus big (SMB) factor is the difference in returns between a portfolio of small caps, represented by the MSCI AC Europe Small Cap index, and a portfolio of large caps, proxied by the MSCI AC Europe Large Cap index. The high minus low (HML) factor is the difference in returns between a portfolio of high book-to-market stocks (value stocks) and a portfolio of low book-to-market stocks (growth stocks), represented by the MSCI AC Europe Value and MSCI AC Europe Growth indices, respectively. Momentum (MOM) is the difference in returns between a portfolio of past winners and a portfolio of past losers. Following Banegas *et al.* (2009), we constructed a European momentum factor that corresponds to the return difference between the top 6 and the bottom 6 sectors of the 18 Dow Jones Stoxx 600 Supersector indices.[86] Top and bottom sectors were chosen based on their previous 12-month performance, with portfolios being rebalanced on a monthly basis. Finally, the local factor was estimated as the return difference between the MSCI France TR index and the MSCI AC Europe TR index. Data for the construction of all these factors was collected from Datastream.

Appendix 5.3 presents some summary statistics for the risk factors, as well as their correlation matrix. The results show that the hypothesis of normality is rejected for the market, size and book-to-market factors, whereas the momentum and local factors exhibit a normal distribution according to the Jarque-Bera test. In addition, given the reasonably low correlations between the factors (ranging from -0.4101 to 0.2772), multicollinearity will not significantly affect our results.

[86] Although there are actually 19 Dow Jones Supersector indices, the Real Estate index is only available from 2001.

5.3.3 Information Variables

As public information variables we use a set of 1-month lagged instruments that previous studies (e.g.: Fama and French, 1989; Pesaran and Timmermann, 1995; Avramov and Chordia, 2006) have shown useful in predicting stock returns: a measure of the slope of the term structure, the dividend yield of a market index and a default spread. Although we are investigating European-based funds, with European investment universes, we use Global information variables, because unreported stock return predictability tests showed that these present a much higher explanatory power of stock returns than European variables. Another argument that can be used to justify the use of global information variables is the increasing degree of integration of financial markets. In this line of reasoning, the SRI fund studies of Schröder (2004), Liedekerke *et al.* (2007) and Cortez *et al.* (2009, *forthcoming*) also use global information variables.

The slope of the term structure variable corresponds to the annualized yield spread between 10-year US Government bonds and 3-month US Treasury bills. The dividend yield variable is the dividend payments in the prior 12 months divided by the current price of the MSCI AC World index. The default spread variable is the difference between Moody's US BAA-rated and AAA-rated corporate bond yields. Data on these public information variables was obtained from Datastream and MSCI.

To avoid spurious regression biases and also solve non-stationarity problems associated with these variables, they were stochastically detrended by subtracting a trailing moving average of their own past values, as suggested by Campbell (1991) and Ferson *et al.* (2003a). The number of lags used in the detrendings was determined for each individual series, after a detailed study of their characteristics. In this way, to solve the persistence and non-stationarity problems and, simultaneously, try not to lose any long-term relationships that really exist between the variables, each series was stochastically detrended with the maximum number of lags that allowed us to obtain a stationary time series.[87] As a result, we used a 3-month lag for the default spread variable, a 6-month lag for the dividend yield and a 12-month lag for the term structure variable. Another important aspect of this procedure was that it led to first-order autocorrelation coefficients below 0.90, the level in which spurious regressions become a problem, as suggested by Ferson *et al.* (2003b). Furthermore, the information

[87] Consistent with the results of Leite and Cortez (2009), we found that using shorter detrending periods decreases the first-order autocorrelation coefficients of the series and also the correlations between the variables. However, as shown by these authors, this may also compromise the significance of the information variables, meaning that we may lose valuable long-term relationships between the variables if we use too short detrending periods.

variables were also demeaned, as in Ferson and Schadt (1996), to allow an easier interpretation of the estimated coefficients and to minimize scale problems. Appendix 5.4 presents some summary statistics for the variables, where we can see that the correlations between the instruments range from 0.2758 to 0.6716. Thus, we should avoid multicollinearity concerns.

5.4 Empirical Results

5.4.1 Fund Performance

Table 5.1 presents the results of applying unconditional and conditional versions of our 5-factor model to the equally-weighted portfolios of SRI and conventional funds. To further enhance comparability we also estimate the results for a "difference" portfolio, constructed by subtracting the returns of the matched-portfolios from the returns of the SRI funds, to explore the differences in performance and investment styles in detail.[88] Our conclusions are six-fold.

[88] It is worth to mention that all results we report for these "difference" portfolios are from regressions that present significant *F*-tests at conventional levels.

Table 5.1 – Performance and Risk Estimates of French SRI and Conventional Funds

This table presents estimates of performance (alphas and average conditional alphas expressed in percentage) and risk (betas and average conditional betas) for the equally-weighted portfolio of SRI funds and the characteristics-matched portfolio of conventional funds using three 5-factor models: the unconditional model of equation [5.1], presented in Panel A, the partial conditional model (with time-varying betas only) of equation [5.2], presented in Panel B, and the full conditional model (with time-varying alphas and betas) of equation [5.3], presented in Panel C. *Difference* is a portfolio constructed by subtracting the returns of the matched portfolios from the returns of the SRI funds. $r_{m,t}$ is the excess return of the MSCI AC Europe TR index. SMB_t, HML_t and MOM_t are factor-mimicking portfolios for the size, book-to-market and momentum factors, respectively. $r_{lm,t} - r_{m,t}$ is the return difference between the local (French) market index and the European market index used as benchmark. The predetermined information variables are the default spread, the dividend yield and the slope of the term structure. All these variables are demeaned, lagged 1-month and stochastically detrended by subtracting a trailing moving average of their own past values. *Wald* corresponds to the probability values of the χ-square statistic of the Newey and West (1987) Wald test for the null hypothesis that the coefficients of the size, book-to-market, momentum and local factors are jointly equal to zero. W_1, W_2 and W_3 correspond to the probability values of the χ-square statistic of the Newey and West (1987) Wald test on the existence of time-varying alphas, time-varying betas and the joint time-variation in alphas and betas, respectively. R^2 *adj.* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987).

Panel A: Unconditional 5-Factor Model

	α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HBIAS)	*Wald*	R^2 *adj.*
SRI Funds	-0.2488 ***	0.9687 ***	0.1111 **	0.0134	-0.0422	0.5265 ***	0.0000	96.67%
Matched-portfolios	-0.1736 **	0.9263 ***	0.2127 ***	0.0320	-0.0231	0.5179 ***	0.0000	96.83%
Difference	-0.0752	0.0424 ***	-0.1016 ***	-0.0187	-0.0191	0.0086	0.0000	29.67%

Panel B: Partial Conditional 5-Factor Model

	α_p	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HBIAS)	W_2	R^2 *adj.*
SRI Funds	-0.2367 ***	0.9680 ***	0.0640	0.0508	-0.0022	0.4242 ***	0.0000	96.73%
Matched-portfolios	-0.1223	0.9275 ***	0.2035 ***	0.0458	-0.0183	0.4438 ***	0.0000	96.99%
Difference	-0.1143 *	0.0405 ***	-0.1395 ***	0.0050	0.0161	-0.0195	0.0000	41.73%

Panel C: Full Conditional 5-Factor Model

	α_{0p}	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HBIAS)	W_1	W_2	W_3	R^2 *adj.*
SRI Funds	-0.1347	0.9795 ***	0.0767	0.0045	-0.0199	0.4145 ***	0.1223	0.0000	0.0000	96.85%
Matched-portfolios	-0.0809	0.9357 ***	0.2177 ***	0.0325	-0.0280	0.4374 ***	0.6769	0.0021	0.0000	96.94%
Difference	-0.0539	0.0438 ***	-0.1410 ***	-0.0280	0.0081	-0.0229	0.0163	0.0000	0.0000	47.54%

First, in terms of model specifications, the results of the Wald tests for the unconditional model confirm the importance of controlling for the additional factors, especially the size and local factors. As expected, the explanatory power of the conditional models is higher than the unconditional version, with SRI funds presenting higher adjusted R^2's with the full conditional specification and conventional funds with the partial conditional model. The results of the Wald tests clearly show the existence of time-varying betas for both fund groups, but no evidence of time-varying alphas. However, the joint time-variation of alphas and betas cannot be rejected for both fund portfolios, as well as for our "difference" portfolios, which exhibit both time-varying alphas and betas.

Second, in terms of performance estimates, the results of the unconditional model show that both SRI and conventional funds exhibit significantly negative alphas at the 5% level, but differences between them are not statistically significant. With the partial conditional model, the significant underperformance of French SRI funds investing at a European level, which is consistent with the results of Cortez *et al.* (2009) and Le Sourd (2010), is maintained, but conventional funds now exhibit neutral performance. As a consequence, differences in the alphas of both fund groups reach an average of 0.1143% per month and are now significant, although only at the 10% level, in line with the results of Renneboog *et al.* (2008b). In fact, we observe that alpha estimates improve from the unconditional to the partial conditional model and from the latter to the full conditional specification. In the latter case, the performance of both fund groups improves considerably and becomes neutral.[89] In this way, unlike Cortez *et al.* (2009), French SRI funds do not present significantly negative alphas after controlling for time-varying alphas and betas. With the full conditional model, differences in performance between French SRI funds and their matched-portfolios are smaller and not statistically significant. Therefore, although SRI funds perform slightly worse than their matched-portfolios according to all three models, differences in alphas are not statistically significant in most cases and, especially, in our more robust specification.[90]

Third, under all specifications, French SRI funds have significantly higher market exposures than their conventional peers. This evidence is in contrast with the results of Renneboog *et al.* (2008b), who found no significant differences between the market exposures

[89] Therefore, in line with Christopherson *et al.* (1998), the performance of our fund portfolios is significantly better with the full conditional model than with the unconditional model.

[90] It is worth to mention that we have also used unconditional, partial conditional and full conditional versions of both the Carhart (1997) 4-factor model and the Fama and French (1993, 1996) 3-factor model, and obtained very similar results. With the 4-factor model, significant differences between the performance of SRI and conventional funds were only found with the partial conditional model and only at the 10% level. On the other hand, with the 3-factor model, none of the differences in performance was statistically significant.

of French SRI and conventional funds, but is consistent with results reported by Amenc and Le Sourd (2010) for the period of 2008-2009. In addition, as in Cortez *et al.* (2009), we have also found not only that French SRI funds are more exposed to conventional than to SRI benchmarks, but also that conventional indices have a higher explaining power of SRI fund returns than SRI indices, as we can confirm in Appendix 5.5. However, in our case, differences are marginal.

Fourth, conventional funds show significant small-cap biases according to all models, whereas SRI funds only exhibit a similar tilt under the unconditional model. This evidence suggests that the small-cap bias found by Le Sourd (2010) for French SRI funds may hold only when unconditional performance evaluation models are used.[91] In clear contrast with most previous studies on SRI funds, conducted in many worldwide markets, French SRI funds are significantly less exposed to small caps than their matched-portfolios and differences are significant at the 1% level in all models. This is certainly one of our most surprising findings and is also in contrast with the results of Renneboog *et al.* (2008b), who found no significant differences in size factor exposures of French SRI and conventional funds, with both fund categories exhibiting clear small-cap biases.

Fifth, we find no significant exposures from both SRI and conventional funds to either the book-to-market or momentum factors. These results are in line with those of Le Sourd (2010), who has also reported an absence of any growth or value tendencies for French SRI funds. Renneboog *et al.* (2008b) have also found no significant exposures to the book-to-market factor for both fund categories and to the momentum factor from the conventional funds. However, they found that French SRI funds had significantly (at the 5% level) negative exposures to the momentum factor, in contrast with our findings. Nevertheless, we do not find any significant differences between French SRI and conventional funds in terms of their exposures to both the book-to-market and momentum factors, in line with the results of this last work.

Sixth, all models show that French SRI and conventional funds are both significantly biased towards local stocks, but differences between the two groups are not statistically significant. Nevertheless, we corroborate previous findings of significant home biases from internationally-oriented SRI funds, in line with the results of Bauer *et al.* (2006), Gregory and Whittaker (2007) and Cortez *et al.* (*forthcoming*), among others.

[91] In addition, since all of our funds are classified as “Large Cap” funds, our results seem to uncover some misclassification issues in the Morningstar classification scheme.

5.4.2 Performance and Investment Styles across Different Market States

To evaluate fund performance and risk estimates during expansion and recession periods we add a dummy variable to the unconditional 5-factor model of equation [5.1], in order to obtain the coefficients for each market regime. Consequently, our new specification is given by the following regression:

$$r_{p,t} = \alpha_p + \alpha_{rec,p}\,\mathrm{D_t} + \beta_p\, r_{m,t} + \beta_{rec,p}\, r_{m,t}\,\mathrm{D_t} + \beta_{1p}\mathrm{SMB_t} + \beta_{1rec,p}\mathrm{SMB_t}\,\mathrm{D_t} + \beta_{2p}\,\mathrm{HML_t} + \beta_{2rec,p}\,\mathrm{HML_t}\,\mathrm{D_t} +$$

$$+ \beta_{3p}\,\mathrm{MOM_t} + \beta_{3rec,p}\,\mathrm{MOM_t}\,\mathrm{D_t} + \beta_{4p}\left(r_{lm,t} - r_{m,t}\right) + \beta_{4rec,p}\left(r_{lm,t} - r_{m,t}\right)\mathrm{D_t} + \varepsilon_{p,t} \qquad [5.8]$$

where D_t is a dummy variable that takes a value of zero in periods of expansion and a value of one in periods of recession.

Table 5.2 presents the results of applying equation [5.8] to the equally-weighted portfolios of SRI and conventional funds. In terms of performance, both SRI and conventional funds exhibit significantly (at the 5% level) negative alphas during periods of expansion, where SRI funds underperform their conventional peers by approximately 0.12% per month. During recessions, performance improves for both fund groups, but still remains negative (approximately, -0.21% and -0.18% per month for SRI and conventional funds, respectively). In fact, although alphas increase considerably more for SRI funds than for the matched-portfolios, none of these increases is statistically significant.

With respect to market exposures, the results show that SRI funds have significantly lower market betas during recessions than during expansions, whereas for conventional funds differences are not statistically significant. During expansion periods, fund betas are considerably higher for SRI funds than for conventional funds. On the other hand, during recessions, betas become very similar between both fund groups (0.899 for SRI funds and 0.889 for conventional funds).

Table 5.2 – Performance and Risk Estimates during Recession and Expansion Periods

This table presents estimates of performance (alphas expressed in percentage) and risk for the equally-weighted portfolios of SRI and conventional funds across recession and expansion periods, based on the NBER business cycles. A dummy variable with a value of one in recessions and zero in expansions is included in our unconditional 5-factor model, as specified in equation [5.8]. $r_{m,t}$ is the excess return of the MSCI AC Europe TR index. SMB_t, HML_t and MOM_t are factor-mimicking portfolios for the size, book-to-market and momentum factors, respectively. $r_{lm,t} - r_{m,t}$ is the return difference between the local (French) market index and the European market index used as benchmark. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987).

	α_p		$\alpha_{rec,p}$	β_p (MKT)		$\beta_{rec,p}$ (MKT)		β_{1p} (SMB)		$\beta_{1rec,p}$ (SMB)		β_{2p} (HML)	$\beta_{2rec,p}$ (HML)	β_{3p} (MOM)	$\beta_{3rec,p}$ (MOM)		β_{4p} (HBIAS)		$\beta_{4rec,p}$ (HBIAS)	R^2 *adj.*
SRI Funds	-0.312	***	0.102	1.007	***	-0.108	***	0.043		0.157	**	0.050	0.007	0.025	-0.133	***	0.432	***	0.264	96.9%
Matched-Portfolios	-0.193	**	0.011	0.947	***	-0.058		0.194	***	0.051		0.025	0.088	-0.006	-0.033		0.466	***	0.175	96.7%

In addition, we find evidence of some significant shifts in investment styles across different market states.

In terms of the size factor, SRI funds show a significantly higher exposure to small caps during recessions than during expansions. On the other hand, conventional funds exhibit a statistically significant positive exposure to the size factor during expansions and no significant changes during recessions.

With regard to the momentum factor, we find that SRI funds are significantly less exposed to momentum strategies during recessions than during expansions, whereas conventional funds exhibit no significant shifts in the momentum factor exposure.

In terms of the book-to-market and local factor exposures, we find no significant changes during expansion and recession periods for both SRI and conventional funds.

5.4.3 Selectivity, Market Timing and Style Timing Abilities

Even if we have not found many significant differences between the performance of French SRI funds and their matched-portfolios, performance metrics used so far have assessed fund managers' overall performance skills only. Hence, despite overall performance being comparable between both fund groups, it is interesting to distinguish selectivity and timing abilities and check whether these skills are also similar among them or if one group offsets the other in a specific type of skill. To evaluate and compare the selectivity and market timing abilities of SRI and conventional French fund managers, we use conditional multi-factor versions of the original Treynor and Mazuy (1966) and Henriksson and Merton (1981) models. The results of our analysis are presented in Table 5.3.

Table 5.3 – Selectivity and Market Timing Estimates of French SRI and Conventional Funds

This table presents estimates of estimates of selectivity (alphas expressed in percentage) and market timing (gammas and average conditional gammas) for the portfolio of SRI funds and the characteristics-matched portfolio of conventional funds, using two model specifications: (1) the conditional 5-factor version of the Treynor-Mazuy Model of equation [5.4], presented in Panel A; (2) the conditional 5-factor version of the Henriksson-Merton Model of equation [5.6], presented in Panel B. $r_{m,t}$ is the excess return of the MSCI AC Europe TR index. SMB_t, HML_t and MOM_t are factor-mimicking portfolios for the size, book-to-market and momentum factors, respectively. $r_{lm,t} - r_{m,t}$ is the return difference between the local market index and the European market index used as benchmark. The predetermined information variables are the default spread, the dividend yield and the slope of the term structure. All these variables are demeaned, lagged 1-month and stochastically detrended by subtracting a trailing moving average of their own past values. W_1, W_2 and W_3 are the probability values of the χ-square statistic of the Newey and West (1987) Wald test on the existence of time-varying betas (for the 5 factors), time-varying market timing coefficients and the joint time-variation in all coefficients, respectively. R^2 *adj.* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987).

Panel A: Conditional Multi-Factor Treynor-Mazuy Model						
	α_p	γ_{0p}	W_1	W_2	W_3	R^2 *adj.*
SRI Funds	-0.2676 **	0.4612	0.0029	0.0527	0.0000	96.83%
Matched-portfolios	-0.1011	0.0151	0.0622	0.5321	0.0000	96.93%
Difference	-0.1665 **	0.4461 **	0.0000	0.0006	0.0000	44.84%
Panel B: Conditional Multi-Factor Henriksson-Merton Model						
	α_p	γ_p	W_1			R^2 *adj.*
SRI Funds	-0.2639	0.0712	0.0000			96.90%
Matched-portfolios	-0.0396	-0.0257	0.0000			96.96%
Difference	-0.2244 *	0.0969 *	0.0000			46.51%

At conventional levels, the results of the Wald tests confirm the existence of time-varying betas for both SRI and conventional funds with both the Treynor-Mazuy (TM) and the Henriksson-Merton (HM) model. With the TM model we also find evidence of time-varying timing coefficients for the SRI funds,[92] but not for their matched-portfolios. However, using the same model, we cannot reject the joint time variation in all coefficients for both fund categories. In addition, our "difference" portfolios unequivocally (at the 1% level) exhibit both time-varying betas and time-varying timing coefficients, which support the use of our conditional multi-factor models.

With regard to selectivity, Table 5.3 shows that all estimates are negative, but the only statistically significant coefficient is found for the SRI funds with the TM model, meaning that selectivity estimates are neutral in most cases. If we focus on the estimates of the "difference" portfolios, we can see that French SRI funds significantly underperform their peers under both model specifications. With the TM model the selectivity estimates of the SRI funds are significantly lower (at the 5% level) by approximately 0.17% per month, on average. With the HM model this difference is even higher (approximately 0.22% per month,

[92] It is worth to mention that these results are in line with those of Ferson and Qian (2004), who report significant time-varying conditional timing abilities for US conventional funds, associated with variables like dividend yields and the slope of the term structure, among others.

on average), but only significant at the 10% level. Therefore, it seems like the additional information provided by screening activities does not compensate for the fact that, with a restricted investment universe, undervalued securities should have less importance in absolute terms.

In terms of market timing, it seems that both SRI and conventional fund managers in our samples do not have the ability to successfully time the market, in line with the findings of Renneboog *et al.* (2008b), who have also found little evidence of market timing abilities for French SRI fund managers. With the TM model both timing coefficients are positive, while with the HM model SRI funds present a positive gamma and conventional funds exhibit a negative gamma, although all these coefficients are not statistically significant. In this way, our results are in line with those of Girard *et al.* (2007) for US SRI funds. On the other hand, unlike many previous studies on conventional funds (e.g.: Cumby and Glen, 1990; Fletcher, 1995; Ferson and Schadt, 1996; Sawicki and Ong, 2000) and most of the existing studies on SRI mutual funds (e.g.: Kreander *et al.*, 2002, 2005; Gregory and Whittaker, 2007; Renneboog *et al.*, 2008b; Ferruz, Muñoz and Vargas, 2010; Ferruz, Muñoz and Vicente, 2010), we do not find evidence of any significantly negative or "perverse" timing abilities, which could possibly reflect some sort of model misspecification. Furthermore, consistent with previous studies on conventional mutual funds (e.g.: Ferson and Schadt, 1996; Bollen and Busse, 2001), the results of the two market timing models are very similar.

However, when we look at the estimates of the "difference" portfolios we find a very interesting result: French SRI fund managers exhibit significantly better timing abilities than conventional fund managers and this inference in valid with both the TM (at the 5% level) and the HM (at the 10% level) models.

Additionally, we also investigate the style timing abilities of French fund managers. This approach allows us to measure the manager's timing abilities not only in relation to the market but also in relation to specific investment styles or market segments. In fact, a fund manager can obtain a better performance if he/she can predict which investment style(s) will perform the best and increase his/her exposition to that specific style(s). Although we can find many studies in the finance literature about the market timing abilities of mutual fund managers, there are only a few studies which have measured managers' timing abilities with respect to their investment styles or market segments (e.g.: Daniel, Grinblatt, Titman and Wermers, 1997; Chan, Chen and Lakonishok, 2002; Glassman and Riddick, 2006).[93] In the

[93] Using an approach based on portfolio-holdings, Daniel *et al.* (1997) found no evidence of style timing abilities (or "characteristic timing") for a sample of 2,500 US equity funds during the period of 1975 to 1994. Chan *et al.* (2002) have also concluded that US fund managers did

SRI context, this evidence is even scarcer. The only studies we are aware of that incorporate an analysis of style timing abilities are those of Gregory and Whittaker (2007), for UK funds, and Ferruz, Muñoz and Vicente (2010), for US SRI funds.

Therefore, to assess the style timing abilities of French SRI and conventional fund managers, we modified our conditional multi-factor versions of the TM and the HM models to allow an investigation of timing abilities not only in relation to the market factor, but also in relation to the size, book-to-market, momentum and local factors.[94] The results are presented in Table 5.4.

Table 5.4 – Style Timing Abilities of French SRI and Conventional Funds

This table presents estimates of estimates of selectivity (alphas expressed in percentage) and timing with respect to the market (γ_{0p}), size (γ_{1p}), book-to-market (γ_{2p}), momentum (γ_{3p}) and local factors (γ_{4p}) for the portfolio of SRI funds and the characteristics-matched portfolio of conventional funds. Panel A presents the results for the conditional 5-factor version of the Treynor-Mazuy Model of equation [5.5], while Panel B presents the results for the conditional 5-factor version of the Henriksson-Merton Model of equation [5.7]. $r_{m,t}$ is the excess return of the MSCI AC Europe TR index. SMB_t, HML_t and MOM_t are factor-mimicking portfolios for the size, book-to-market and momentum factors, respectively. $r_{lm,t} - r_{m,t}$ is the return difference between the local market index and the European market index used as benchmark. The predetermined information variables are the default spread, the dividend yield and the slope of the term structure. All these variables are demeaned, lagged 1-month and stochastically detrended by subtracting a trailing moving average of their own past values. R^2 *adj.* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987).

Panel A: Conditional Multi-Factor Treynor-Mazuy Model							
	α_p	γ_{0p}	γ_{1p}	γ_{2p}	γ_{3p}	γ_{4p}	R^2 *Adj.*
SRI Funds	-0.5298 **	0.8860	2.7756 *	3.7564	-2.3728 ***	9.5155	97.54%
Matched-portfolios	-0.3156	-0.0135	2.3450 *	4.5707	-2.3537 **	11.5808	97.46%
Difference	-0.2142 **	0.8995 **	0.4306	-0.8143	-0.0190	-2.0653	47.09%
Panel B: Conditional Multi-Factor Henriksson-Merton Model							
	α_p	γ_{0p}	γ_{1p}	γ_{2p}	γ_{3p}	γ_{4p}	R^2 *Adj.*
SRI Funds	-0.3674	0.1120	0.0239	-0.1315	-0.0867	0.1084	97.15%
Matched-portfolios	-0.1194	-0.0166	-0.0475	-0.0898	-0.0723	0.1851	97.11%
Difference	-0.2480 *	0.1285 **	0.0715	-0.0417	-0.0144	-0.0767	44.23%

Overall, we find very little evidence of style timing abilities for French fund managers. Using the TM model, both SRI and conventional funds exhibit significant abilities to time the size factor (although only at the 10% level) and significant negative abilities to time the

not possess the ability to time the style factors, based on an unconditional multi-factor version of the Henriksson and Merton (1981) model. Glassman and Riddick (2006) used both portfolio weights and returns-based methodologies to distinguish between world market timing (i.e., reallocation of all equity market funds to or from cash) and national market timing (i.e., reallocation of funds from those equity markets expected to have relatively low returns to those expected to have relatively high returns) for a sample of US global equity funds. Based on an unconditional multi-factor version of the Treynor and Mazuy (1966) quadratic regression, in which they include multiple national market indices, the authors found no evidence of world market timing, but did find evidence of national market timing during the late 1980s and early 1990s.

[94] It is important to mention that the approach of Gregory and Whittaker (2007) is based on an unconditional multi-factor version of the Treynor-Mazuy model, while the approach of Ferruz, Muñoz and Vicente (2010) uses conditional 4-factor versions of the Treynor-Mazuy and the Henriksson-Merton models. Our approach is similar to that of Ferruz, Muñoz and Vicente (2010), but we use conditional 5-factor versions of the two market timing models instead.

momentum factor. Within the HM model context, none of the timing coefficients is statistically significant, consistent with the evidence of Gregory and Whittaker (2007) for UK funds investing internationally. When we focus on the differences between SRI and conventional funds, we can see that there are no significant differences in their abilities to time the size, book-to-market, momentum and local factors. However, in line with our previous inferences, French SRI funds are significantly better market timers than their conventional counterparts and differences are significant at the 5% level in both of our models. In addition, both the TM (at the 5% level) and the HM (at the 10% level) models confirm that French SRI funds are significantly worse than their peers in terms of selectivity.

5.4.4 Performance Persistence

In this section, we assess and compare the performance persistence of French SRI and conventional funds. The main methodology we use follows most recent studies on performance persistence and focuses on portfolios of funds sorted by past performance. In fact, after comparing the specification and power of several persistence tests, using alternative return-generating processes, Carpenter and Lynch (1999) conclude that "*both the t-test for the difference between the top and bottom-ranked portfolios without overlapping evaluation periods and the chi-squared test on counts of winners and losers are well specified and powerful*" (Carpenter and Lynch, 1999, p. 342) against the alternatives considered.[95] In addition, although the authors find that difference *t*-tests are more powerful than chi-squared tests, they also recognise that "*chi-squared tests with one-year ranking and evaluation periods are the most robust to the presence of survivorship bias*" (Carpenter and Lynch, 1999, p. 367), a problem that might affect both our SRI and conventional fund samples. Therefore, besides performance-ranked portfolios, we also use contingency tables to assess the persistence phenomenon within our SRI and conventional fund samples, in a similar way to Gregory and Whittaker (2007).[96]

[95] These alternatives included cross-sectional regressions, another widely used persistence evaluation methodology. In fact, Carpenter and Lynch (1999) showed that "*the t-test for the slope coefficient in the cross-sectional regression of current performance on past performance is neither well specified nor powerful*" (Carpenter and Lynch, 1999, p. 342), reason for which we chose not to use this methodology.
[96] It is worth to mention that while we focus on *t*-tests without overlapping evaluation periods, Gregory and Whittaker (2007) also use the *t*-tests with overlapping observations described in Carpenter and Lynch (1999), since the latter are slightly more powerful than the former under some return-generating processes. However, the overlapping nature of the data requires the calculation of Newey-West standard errors with an appropriate number of lags and the authors recognise that these "*Newey-West standard errors do not fully correct for overlapping evaluation periods in small samples*" (Carpenter and Lynch, 1999, p. 367). In light of this evidence, and given our sample size, we chose to use non-overlapping evaluation periods.

5.4.4.1 Contingency Tables

To investigate performance persistence on the basis of contingency tables, we begin by classifying funds into winners (losers) in each of two consecutive time periods of 6, 12 and 36 months,[97] according to whether they are above (below) median performance, measured in several ways. For the 6 and 12-month horizons we consider absolute (excess) returns only, since the number of observations in each time period does not enable a robust estimation of alphas. For the 36-month period we measure performance on the basis of absolute (excess) returns, unconditional 5-factor alphas and also both partial and full conditional 5-factor alphas.

Afterwards, we count the frequency in which winners or losers repeat and allocate funds into one of four categories, based upon two-period performance: winner-winner (WW), winner-loser (WL), loser-winner (LW) and loser-loser (LL). Evidence of performance persistence is consistent with having more funds in either the WW or LL categories, while reversals in performance will result in having more funds in the WL or LW categories. Then, following Carpenter and Lynch (1999), we compute the number of funds in the contingency table (N) and the value of two common persistence measures: the cross-product ratio, $CP = (WW \times LL)/(WL \times LW)$, and the percentage of repeat winners, $PRW = WW/(N/2)$.

The statistical significance of the CP ratio is evaluated using the log-odds ratio proposed by Brown and Goetzmann (1995), which is equal to $\ln(CP)$. The null hypothesis of no persistence, under which the log-odds ratio will equal zero, is then tested using the Z-test, which corresponds to the log-odds ratio divided by the standard error. The standard error has a standard normal distribution and is computed as follows: $\sqrt{(1/WW)+(1/LL)+(1/WL)+(1/LW)}$. A significantly positive log-odds ratio is evidence of performance persistence, whereas a significantly negative ratio is evidence of reversals in performance. To evaluate the significance of PRW, we use a chi-squared statistic with 1 degree of freedom, $CHI = \left[\left(WW - N/4\right)^2 + \left(WL - N/4\right)^2 + \left(LW - N/4\right)^2 + \left(LL - N/4\right)^2\right] / \left(N/4\right)$. The hypothesis of independence is rejected if CHI exceeds the relevant critical value (3.84 for a 5% significance test).

[97] We use three different time periods in order to analyse if conclusions on performance persistence depend on the evaluation horizon used, as reported by many previous studies. It should also be noted that contingency tables consider only funds with data available through both the ranking and evaluation periods. Moreover, in our particular case, the availability of data on Datastream can also be considered an additional constraint.

We begin by examining the persistence of relative fund rankings using 6, 12 and 36-month excess returns. Table 5.5 reports the results of our repeat winner tests over consecutive 6-month periods.

Table 5.5 – Performance Persistence: Contingency Tables Based on 6-Month Returns

This table reports the results of the repeat winner tests estimated over consecutive 6-month periods between January 2000 and December 2008. Winners (losers) are defined as funds with a 6-month excess return higher (lower) than the median of the excess returns of all funds in their category (SRI or conventional). Columns 2 to 5 indicate the number of funds in the winner/winner (WW), winner/loser (WL), loser/winner (LW) and loser/loser (LL) categories. Columns 6 and 7 report the cross-product ratio (CP) and the Z-statistic (Z), respectively. Columns 8 and 9 report the percentage of repeat winners (PRW) and the chi-squared statistic (CHI), respectively. The cases in which CP or PRW are statistically significant at the 5% level are reported in bold. Panel A presents the results for SRI funds, while Panel B refers to the characteristics-matched conventional funds.

Panel A: SRI Funds								
Semesters	**WW**	**WL**	**LW**	**LL**	**CP**	**Z**	**PRW**	**CHI**
2000 1st - 2000 2nd	2	4	4	2	0.25	-1.13	0.33	1.33
2000 2nd - 2001 1st	6	2	2	6	9.00	1.90	**0.75**	**4.00**
2001 1st - 2001 2nd	4	4	4	4	1.00	0.00	0.50	0.00
2001 2nd - 2002 1st	3	7	7	3	0.18	-1.74	0.30	3.20
2002 1st - 2002 2nd	5	5	5	6	1.20	0.21	0.48	0.14
2002 2nd - 2003 1st	4	6	6	5	0.56	-0.66	0.38	0.52
2003 1st - 2003 2nd	7	5	5	7	1.96	0.81	0.58	0.67
2003 2nd - 2004 1st	4	10	10	5	**0.20**	**-2.00**	**0.28**	**4.24**
2004 1st - 2004 2nd	12	3	3	12	**16.00**	**3.04**	**0.80**	**10.80**
2004 2nd - 2005 1st	6	10	10	6	0.36	-1.40	0.38	2.00
2005 1st - 2005 2nd	7	9	9	7	0.60	-0.71	0.44	0.50
2005 2nd - 2006 1st	7	9	9	7	0.60	-0.71	0.44	0.50
2006 1st - 2006 2nd	9	7	7	9	1.65	0.71	0.56	0.50
2006 2nd - 2007 1st	9	7	7	9	1.65	0.71	0.56	0.50
2007 1st - 2007 2nd	11	5	5	12	**5.28**	**2.20**	**0.67**	**5.18**
2007 2nd - 2008 1st	7	9	9	8	0.69	-0.53	0.42	0.33
2008 1st - 2008 2nd	7	9	9	8	0.69	-0.53	0.42	0.33
All	110	111	111	116	1.04	0.19	0.49	0.20
Panel B: Conventional Funds								
Semesters	**WW**	**WL**	**LW**	**LL**	**CP**	**Z**	**PRW**	**CHI**
2000 1st - 2000 2nd	8	7	7	8	1.31	0.36	0.53	0.13
2000 2nd - 2001 1st	13	8	8	13	2.64	1.53	0.62	2.38
2001 1st - 2001 2nd	12	9	9	13	1.93	1.06	0.56	1.19
2001 2nd - 2002 1st	13	11	11	14	1.50	0.71	0.53	0.55
2002 1st - 2002 2nd	16	12	12	17	1.89	1.19	0.56	1.46
2002 2nd - 2003 1st	18	11	11	19	2.83	1.93	**0.61**	**3.85**
2003 1st - 2003 2nd	18	15	15	19	1.52	0.85	0.54	0.76
2003 2nd - 2004 1st	22	19	19	22	1.34	0.66	0.54	0.44
2004 1st - 2004 2nd	26	18	18	26	2.09	1.70	0.59	2.91
2004 2nd - 2005 1st	31	16	16	31	**3.75**	**3.04**	**0.66**	**9.57**
2005 1st - 2005 2nd	23	24	24	24	0.96	-0.10	0.48	0.03
2005 2nd - 2006 1st	25	22	22	26	1.34	0.72	0.53	0.54
2006 1st - 2006 2nd	25	22	22	26	1.34	0.72	0.53	0.54
2006 2nd - 2007 1st	29	18	18	30	**2.69**	**2.34**	**0.61**	**5.59**
2007 1st - 2007 2nd	27	22	22	28	1.56	1.10	0.55	1.24
2007 2nd - 2008 1st	22	27	27	23	0.69	-0.90	0.44	0.84
2008 1st - 2008 2nd	28	21	21	29	1.84	1.50	0.57	2.29
All	356	282	282	368	**1.65**	**4.44**	**0.55**	**20.10**

For SRI funds, the Z-test provides evidence of significant positive (at the 5% level) persistence for only 2 semesters (in a total of 17), whereas significant reversals are found in only 1 semester. For conventional funds, we find similar evidence, with evidence of significant positive persistence being observed for only 2 semesters and no evidence of significant reversals. The results of the chi-squared tests are similar to the results obtained with the Z-tests. For SRI funds, we find significantly higher percentages of repeat winners than would be expected under the null hypothesis (i.e., 50%) for only 3 semesters and significantly lower percentages for only 1 semester. For conventional funds, PRW is significantly greater than 50% for only 3 semesters.

Nevertheless, the aggregate results show evidence of significant performance persistence for conventional funds using both Z-tests and chi-squared tests, but no such evidence for SRI funds. At the 6-month horizon, SRI funds exhibit a significantly lower percentage of repeat winners than their matched-portfolios, consistent with the findings of Gregory and Whittaker (2007) for both domestic and international UK funds. However, even though we find evidence of significant performance persistence for the conventional funds, we are not able to assess whether this persistence is due to good performing or bad performing funds. Among SRI funds, the number of funds in each of the four categories is practically the same.[98]

In Table 5.6 we report the results for fund performance persistence using 12-month excess returns, in a similar way to Brown and Goetzmann (1995), Malkiel (1995) and Fletcher and Forbes (2002), among others.

[98] Nevertheless, it is important to refer that the higher persistence found for the conventional funds could also reflect higher number of funds in the sample. In fact, one limitation inherent to contingency tables is that it is probably easier to find significant persistent patterns in large samples than in small samples.

Table 5.6 – Performance Persistence: Contingency Tables Based on 12-Month Returns

This table reports the results of the repeat winner tests estimated over consecutive 12-month periods between January 2000 and December 2008. Winners (losers) are defined as funds with a 12-month excess return higher (lower) than the median of the excess returns of all funds in their category (SRI or conventional). Columns 2 to 5 indicate the number of funds in the winner/winner (WW), winner/loser (WL), loser/winner (LW) and loser/loser (LL) categories. Columns 6 and 7 report the cross-product ratio (CP) and the Z-statistic (Z), respectively. Columns 8 and 9 report the percentage of repeat winners (PRW) and the chi-squared statistic (CHI), respectively. The cases in which CP or PRW are statistically significant at the 5% level are reported in bold. Panel A presents the results for SRI funds, while Panel B refers to the characteristics-matched conventional funds.

Panel A: SRI Funds								
Years	**WW**	**WL**	**LW**	**LL**	**CP**	**Z**	**PRW**	**CHI**
2000 - 2001	3	3	3	3	1.00	0.00	0.50	0.00
2001 - 2002	5	3	3	5	2.78	0.99	0.63	1.00
2002 - 2003	2	8	8	3	**0.09**	**-2.27**	**0.19**	**5.86**
2003 - 2004	7	5	5	7	1.96	0.81	0.58	0.67
2004 - 2005	8	7	7	8	1.31	0.36	0.53	0.13
2005 - 2006	9	7	7	9	1.65	0.71	0.56	0.50
2006 - 2007	8	8	8	8	1.00	0.00	0.50	0.00
2007 - 2008	10	6	6	11	3.06	1.54	0.61	2.52
All	52	47	47	54	1.27	0.85	0.52	0.76
Panel B: Conventional Funds								
Years	**WW**	**WL**	**LW**	**LL**	**CP**	**Z**	**PRW**	**CHI**
2000 - 2001	10	5	5	10	4.00	1.79	0.67	3.33
2001 - 2002	15	6	6	16	**6.67**	**2.79**	**0.70**	**8.44**
2002 - 2003	14	14	14	15	1.07	0.13	0.49	0.05
2003 - 2004	20	13	13	21	2.49	1.82	0.60	3.39
2004 - 2005	27	17	17	27	**2.52**	**2.11**	**0.61**	**4.55**
2005 - 2006	28	19	19	29	2.25	1.94	0.59	3.82
2006 - 2007	27	20	20	28	1.89	1.53	0.57	2.39
2007 - 2008	21	28	28	22	0.59	-1.30	0.42	1.73
All	162	122	122	168	**1.83**	**3.57**	**0.56**	**13.01**

Shifting from 6 to 12-month periods has little impact on our results. For SRI funds, both the Z-test and the chi-squared test show no evidence of significant positive persistence and evidence of significant reversals only for the period of 2002-2003, with PRW being significantly lower than 50%. For conventional funds, both tests show evidence of significant performance persistence for the periods of 2001-2002 and 2004-2005, with PRW being significantly greater than 50% in both occasions.

Considering all periods, both Z-tests and chi-squared tests show no evidence of significant performance persistence for SRI funds, but conventional funds do exhibit significant persistence, with PRW reaching 56%. In line with the results of Gregory and Whittaker (2007), SRI funds show significantly less repeat winners than their peers at the 12-month horizon when using excess returns. In addition, unlike some previous studies on conventional mutual funds (e.g.: Brown and Goetzmann, 1995; Malkiel, 1995; Fletcher and Forbes, 2002), we do not find evidence that persistence can be clustered in time, since we haven't observed any clear persistence patterns in our case.

To evaluate if our results hold for longer periods, we also assess performance persistence at 36-month horizons, first using excess returns and, afterwards, using alphas from several performance evaluation models. Table 5.7 reports our results using 36-month excess returns.

Table 5.7 – Performance Persistence: Contingency Tables Based on 36-Month Returns

This table reports the results of the repeat winner tests estimated over consecutive 36-month periods between January 2000 and December 2008. Winners (losers) are defined as funds with a 36-month excess return higher (lower) than the median of the excess returns of all funds in their category (SRI or conventional). Columns 2 to 5 indicate the number of funds in the winner/winner (WW), winner/loser (WL), loser/winner (LW) and loser/loser (LL) categories. Columns 6 and 7 report the cross-product ratio (CP) and the Z-statistic (Z), respectively. Columns 8 and 9 report the percentage of repeat winners (PRW) and the chi-squared statistic (CHI), respectively. The cases in which CP or PRW are statistically significant at the 5% level are reported in bold. Panel A presents the results for SRI funds, while Panel B refers to the characteristics-matched conventional funds.

Panel A: SRI Funds								
Years	**WW**	**WL**	**LW**	**LL**	**CP**	**Z**	**PRW**	**CHI**
2000/2002 - 2003/2005	4	2	2	4	4.00	1.13	0.67	1.33
2003/2005 - 2005/2008	9	3	3	9	**9.00**	**2.33**	**0.75**	**6.00**
All	13	5	5	13	**6.76**	**2.57**	**0.72**	**7.11**
Panel B: Conventional Funds								
Years	**WW**	**WL**	**LW**	**LL**	**CP**	**Z**	**PRW**	**CHI**
2000/2002 - 2003/2005	8	7	7	8	1.31	0.36	0.53	0.13
2003/2005 - 2005/2008	12	21	21	13	**0.35**	**-2.06**	**0.36**	**4.34**
All	20	28	28	21	0.54	-1.52	0.41	2.34

In clear contrast with our previous results, which have shown that performance persistence is not significant for SRI funds but is significant for their conventional counterparts, the 36-month horizon reverses the results. For the overall period, both persistence tests show evidence of significant performance persistence for SRI funds (with PRW reaching 72%), but not for their conventional peers. If we look at the first two 3-year periods in our sample, we find no significant persistence for both SRI and conventional funds. In fact, our overall results are mostly driven by the last two 3-year periods. Here, both Z-tests and chi-squared tests show significant positive persistence for SRI funds (with PRW reaching 75%) and significant reversals in performance for conventional funds (which exhibit a PRW of only 36%).

However, evidence of performance persistence using absolute returns can be a consequence of return differentials between high risk and low risk funds and might not reflect superior management skills. In this way, to evaluate the robustness of our results within the 36-month horizon, we also measure performance using alphas from the unconditional, partial conditional and full conditional 5-factor models. Table 5.8 presents the results of this analysis.

Table 5.8 – Performance Persistence: Contingency Tables Based on 36-Month Alphas

This table reports the results of the repeat winner tests estimated over consecutive 36-month periods between January 2000 and December 2008. Winners (losers) are defined as funds with a 36-month alpha higher (lower) than the median alpha of all funds in their category (SRI or conventional). Alphas are calculated using three model specifications: the unconditional 5-factor model of equation [5.1], the partial conditional 5-factor model of equation [5.2] and the full conditional 5-factor model of equation [5.3]. In each case, we report the number of funds in the winner/winner (WW), winner/loser (WL), loser/winner (LW) and loser/loser (LL) categories, as well as the cross-product ratios (CP), the Z-statistics (Z), the percentage of repeat winners (PRW) and the chi-squared statistics (CHI). The cases in which CP or PRW are statistically significant at the 5% level are reported in bold. Panel A presents the results for SRI funds, while Panel B refers to the characteristics-matched conventional funds.

Panel A: SRI Funds																								
	Unconditional 5-Factor Alphas								**Partial Conditional 5-Factor Alphas**								**Full Conditional 5-Factor Alphas**							
Years	**WW**	**WL**	**LW**	**LL**	**CP**	**Z**	**PRW**	**CHI**	**WW**	**WL**	**LW**	**LL**	**CP**	**Z**	**PRW**	**CHI**	**WW**	**WL**	**LW**	**LL**	**CP**	**Z**	**PRW**	**CHI**
2000/2002 - 2003/2005	4	2	2	4	4.00	1.13	0.67	1.33	4	2	2	4	4.00	1.13	0.67	1.33	2	4	4	2	0.25	-1.13	0.33	1.33
2003/2005 - 2005/2008	7	5	5	7	1.96	0.81	0.58	0.67	7	5	5	7	1.96	0.81	0.58	0.67	8	4	4	8	4.00	1.60	0.67	2.67
All	11	7	7	11	2.47	1.32	0.61	1.78	11	7	7	11	2.47	1.32	0.61	1.78	10	8	8	10	1.56	0.67	0.56	0.44
Panel B: Conventional Funds																								
	Unconditional 5-Factor Alphas								**Partial Conditional 5-Factor Alphas**								**Full Conditional 5-Factor Alphas**							
Years	**WW**	**WL**	**LW**	**LL**	**CP**	**Z**	**PRW**	**CHI**	**WW**	**WL**	**LW**	**LL**	**CP**	**Z**	**PRW**	**CHI**	**WW**	**WL**	**LW**	**LL**	**CP**	**Z**	**PRW**	**CHI**
2000/2002 - 2003/2005	7	8	8	7	0.77	-0.36	0.47	0.13	8	7	7	8	1.31	0.36	0.53	0.13	10	5	5	10	4.00	1.79	0.67	3.33
2003/2005 - 2005/2008	17	16	16	18	1.20	0.36	0.51	0.16	15	18	18	16	0.74	-0.61	0.45	0.40	15	18	18	16	0.74	-0.61	0.45	0.40
All	24	24	24	25	1.04	0.10	0.49	0.03	23	25	25	24	0.88	-0.31	0.47	0.11	25	23	23	26	1.23	0.51	0.52	0.28

For conventional funds, using different performance measures tends to have little impact on our previous inferences, since we find no evidence of significant performance persistence using both Z-tests and chi-squared tests. However, there are significant changes for SRI funds. While Table 5.7 shows evidence of significant persistence for SRI funds using excess returns, in Table 5.8 we do not find significant persistence under any of our three performance models using both Z-tests and chi-squared tests. In addition, we do not find a single significant CP ratio or PRW for any of our consecutive 3-year periods. In this way, our results show no evidence of performance persistence at the 36-month horizon, for both SRI and conventional funds, when using risk-adjusted performance measures.

5.4.4.2 Performance-Ranked Portfolio Strategies

Besides contingency tables, we also use performance-ranked portfolios to investigate performance persistence within our SRI and conventional fund samples. We begin by ranking all funds in both categories in quartiles,[99] based on their previous 6, 12 and 36-month excess returns (selection period). Funds with the highest (lowest) previous period return go into a portfolio of winners (losers), while the remaining funds are put into the two middle portfolios. Then, we estimate the equally-weighted monthly excess returns for each portfolio over the subsequent 6, 12 and 36 months (evaluation period), i.e., we use symmetrical ranking and evaluation periods. This procedure is followed throughout our entire sample period, generating a time series of monthly excess returns on all four quartile portfolios.[100]

The performance of each quartile portfolio was then evaluated using unconditional alphas from our 5-factor model and also both partial and full conditional alphas based on the same model. We use conditional alphas to control for the possibility that performance persistence can also reflect the co-movement between expected returns and risk.[101] To assess persistence, we then measure the difference in performance between the top (Q_1) and bottom (Q_4) portfolios. Under the null hypothesis of no persistence in performance, the performance

99 Given the relatively low number of SRI funds in our sample, it would not be feasible to use deciles, as in Carhart (1997), Carpenter and Lynch (1999) or Otten and Bams (2002), among others. In addition, in one of the few studies that used both decile and quartile portfolios, Fletcher and Forbes (2002) reported very similar results between the two in terms of UK unit trust performance persistence.

100 The time series of monthly excess returns on the quartile portfolios are eight and a half years long (July 2000 to December 2008) with 6-month ranking and evaluation periods, eight years long (January 2001 to December 2008) with the 12-month period and six years long with the 36-month alternative (January 2002 to December 2008). Furthermore, it is worth to mention that the quartile portfolios include only funds with records available throughout the entire ranking and evaluation periods.

101 In addition, some mutual fund studies (e.g.: Christopherson *et al.*, 1998; Christopherson, Ferson and Turner, 1999; Otten and Bams, 2002) have shown that conditional measures are better able to detect performance persistence than unconditional ones.

of portfolio Q_1-Q_4 should equal zero. Our results for the 6-month horizon are presented in Table 5.9.

Table 5.9 – Performance Persistence: Quartile Portfolios Formed on Lagged 6-Month Returns

In this table all equally-weighted portfolios of SRI and conventional funds are ranked in quartiles on the basis of their previous 6-month excess returns. Funds with the highest previous 6-month return go into portfolio Q1 (winners), while funds with the lowest previous 6-month return go into portfolio Q4 (losers). The remaining funds are put into the two middle portfolios (Q2 and Q3). Columns 2 and 3 present some descriptive statistics for the quartile portfolios, specifically their monthly excess return (in relation to the risk-free rate, proxied by the 1-month Euribor) and standard deviation. Columns 4 and 5 present the results for the unconditional 5-factor model of equation [5.1], columns 6 and 7 the partial conditional 5-factor model of equation [5.2] and columns 8 and 9 the full conditional 5-factor model of equation [5.3] (alphas and average conditional alphas expressed in percentage). The bottom row of the table reports the results for a zero-cost portfolio (Q_1-Q_4) which is long in the top quartile portfolio and short in the bottom quartile portfolio of funds. R^2 *adj.* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for the SRI funds, while Panel B refers to the characteristics-matched conventional funds.

Panel A: SRI Funds								
	Monthly Excess Return	**Standard Deviation**	**Unconditional 5-Factor Model**		**Partial Conditional 5-Factor Model**		**Full Conditional 5-Factor Model**	
			α_p	R^2 *Adj.*	α_p	R^2 *Adj.*	α_{0p}	R^2 *Adj.*
Q1 (Winners)	-0.85%	5.06%	-0.2354 **	96.10%	-0.2194 **	96.61%	-0.1758 *	96.52%
Q2	-0.94%	5.19%	-0.3265 ***	96.34%	-0.3012 ***	96.39%	-0.2054 **	96.45%
Q3	-0.86%	5.43%	-0.1739 **	96.80%	-0.2514 **	97.24%	-0.1957 *	97.28%
Q4 (Losers)	-0.95%	5.55%	-0.2130 **	94.66%	-0.2312 **	95.06%	-0.1838 *	95.03%
Q1-Q4 spread	0.10%	1.30%	-0.0224	20.15%	0.0118	27.92%	0.0081	26.90%
Panel B: Conventional Funds								
	Monthly Excess Return	**Standard Deviation**	**Unconditional 5-Factor Model**		**Partial Conditional 5-Factor Model**		**Full Conditional 5-Factor Model**	
			α_p	R^2 *Adj.*	α_p	R^2 *Adj.*	α_{0p}	R^2 *Adj.*
Q1 (Winners)	-0.57%	4.95%	-0.0735	91.89%	0.0882	91.75%	0.0458	91.47%
Q2	-0.72%	4.99%	-0.1054	96.66%	-0.0832	96.96%	-0.0295	96.90%
Q3	-0.84%	5.26%	-0.1901 **	97.16%	-0.1516 *	97.31%	-0.1002	97.28%
Q4 (Losers)	-0.99%	5.45%	-0.3374 ***	94.55%	-0.3696 ***	94.77%	-0.3552 **	94.82%
Q1-Q4 spread	0.43%	1.83%	0.2639	12.89%	0.4578 **	19.39%	0.4010 **	18.73%

As we can see in column 2, there is a sizeable difference in mean excess returns from the Q_1 and Q_4 portfolios, which is considerably higher for conventional funds than for SRI funds. For conventional funds, the monthly excess returns of the quartile portfolios decrease monotonically along portfolio rankings and indicate a considerable annualized spread between upper and lower quartiles of approximately 5.16%. For SRI funds, mean excess returns do not decrease monotonically, with the third quartile presenting a higher return than the second quartile. The annualized spread between past winners and past losers is of only 1.2% approximately, i.e., more than four times smaller than that of the characteristics-matched conventional funds. The pattern in mean monthly excess returns is consistent with significant persistence for the conventional funds, as confirmed by our contingency table analysis. For SRI funds, although the portfolio of past winners (Q_1) has also a higher monthly excess return than the portfolio of past losers (Q_4), we do not find a similar pattern in returns.

To analyse the sensitivity of the persistence phenomenon to different levels of risk and also to the time variation of risk and performance measures, we applied the unconditional 5-factor model (columns 4 and 5), as well as both partial (columns 6 and 7) and full conditional (columns 8 and 9) versions of the same model to our quartile portfolios. The results of this analysis confirm our previous observations.

At the 6-month horizon, the spread between winners and losers (Q_1-Q_4) is relatively small and not statistically significant for SRI funds in all model specifications, meaning that they do not exhibit performance persistence. On the contrary, for a 5% level, we find a significantly positive spread between the upper and lower quartiles for conventional funds in the two conditional models, which is evidence of performance persistence. This spread is considerably high, reaching values of more than 0.40% per month. Furthermore, these results are robust to the use of several alternative performance evaluation models, such as unconditional and (both partial and full) conditional versions of the Jensen (1968) measure, the Fama and French (1993, 1996) 3-factor model and the Carhart (1997) 4-factor model, as we can confirm in Table 5.10. In fact, this table shows that the difference between top and bottom quartiles is never statistically significant for SRI funds under all nine alternative performance evaluation models. On the other hand, for conventional funds, the spread between the portfolio of winners and the portfolio of losers is significant, at the usual levels, for 8 of the 9 alternative models (the only exception is the unconditional 4-factor model). In this way, we do not find evidence of performance persistence for our SRI fund sample, but the persistence phenomenon clearly characterizes our characteristics-matched sample.

Table 5.10 – Performance Persistence: Quartile Portfolios Formed on Lagged 6-Month Returns with Alternative Evaluation Models

This table presents the results for the zero-cost portfolios (Q_1-Q_4), which are long in the top quartile portfolio and short in the bottom quartile portfolio (alphas and average conditional alphas expressed in percentage), using alternative performance evaluation models. Specifically, we use unconditional, partial conditional and full conditional versions of the Jensen (1968) measure, the Fama and French (1993, 1996) 3-factor model and the Carhart (1997) 4-factor model. Funds were ranked in quartiles on the basis of their previous 6-month excess returns. R^2 *adj.* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for the SRI funds and Panel B for the characteristics-matched conventional funds.[102]

Panel A: SRI Funds						
	Unconditional 4-Factor Model		**Unconditional 3-Factor Model**		**Unconditional 1-Factor Model**	
	α_p	R^2 *Adj.*	α_p	R^2 *Adj.*	α_p	R^2 *Adj.*
Q1-Q4 spread	-0.0287	20.41%	0.0213	11.10%	0.0411	9.15%
	Partial Conditional 4-Factor Model		**Partial Conditional 3-Factor Model**		**Partial Conditional 1-Factor Model**	
	α_p	R^2 *Adj.*	α_p	R^2 *Adj.*	α_p	R^2 *Adj.*
Q1-Q4 spread	-0.0200	26.70%	-0.0257	23.39%	-0.0552	16.08%
	Full Conditional 4-Factor Model		**Full Conditional 3-Factor Model**		**Full Conditional 1-Factor Model**	
	α_{0p}	R^2 *Adj.*	α_{0p}	R^2 *Adj.*	α_{0p}	R^2 *Adj.*
Q1-Q4 spread	-0.0104	26.05%	-0.0280	23.06%	-0.0747	15.58%
Panel B: Conventional Funds						
	Unconditional 4-Factor Model		**Unconditional 3-Factor Model**		**Unconditional 1-Factor Model**	
	α_p	R^2 *Adj.*	α_p	R^2 *Adj.*	α_p	R^2 *Adj.*
Q1-Q4 spread	0.2589	13.61%	0.3069 *	9.78%	0.3486 **	8.38%
	Partial Conditional 4-Factor Model		**Partial Conditional 3-Factor Model**		**Partial Conditional 1-Factor Model**	
	α_p	R^2 *Adj.*	α_p	R^2 *Adj.*	α_p	R^2 *Adj.*
Q1-Q4 spread	0.4305 **	18.41%	0.4442 **	15.32%	0.4157 ***	15.86%
	Full Conditional 4-Factor Model		**Full Conditional 3-Factor Model**		**Full Conditional 1-Factor Model**	
	α_{0p}	R^2 *Adj.*	α_{0p}	R^2 *Adj.*	α_{0p}	R^2 *Adj.*
Q1-Q4 spread	0.3624 **	18.34%	0.4326 **	14.65%	0.3767 ***	16.72%

Another interesting result from Table 5.9 is that all quartile portfolios of SRI funds exhibit significantly negative alphas (at the usual levels) with all 5-factor models. As with mean excess returns, there is not a clear pattern in these alphas. With the conditional models, the portfolios of winners outperform the portfolios of losers, but with the unconditional model it's exactly the opposite, with evidence of reversals in performance. However, none of the spreads between top and bottom portfolios are statistically significant.

For conventional funds, the alphas of the quartile portfolios exhibit the same monotonic pattern as observed with mean excess returns, with evidence of significant

[102] It is important to mention that none of the *F*-tests for all these regressions failed to be significant at conventional levels.

underperformance, at the 5% level, being observed for the two bottom quartiles with the unconditional model or just the bottom quartile with both conditional models. However, no matter what performance evaluation model we use, none of the quartile portfolios presents significantly positive alphas. This means that the performance of the winners-losers portfolio is due to the underperformance of the bottom quartile portfolio and suggests that performance persistence does not reflect superior manager ability. In this way, we do not find evidence of "hot hands" (i.e., persistently out-performing funds). Instead, the persistence in the performance of our conventional fund sample is mostly a consequence of "icy hands", i.e., funds that underperform significantly in one period are most likely to continue to present significantly negative alphas in the following period.

To explain performance persistence in our sample of conventional funds, Table 5.11 presents the detailed performance and risk estimates for our quartile portfolios using our more robust specification, the full conditional 5-factor model. At the 5% level, the results of the Wald tests clearly confirm the existence of time-varying betas for all quartile portfolios. In addition, none of these rejects the joint time-variation of alphas and betas. Although only one quartile portfolio exhibits time-varying alphas (for a 5% level), we use the full conditional version because if we estimate the model without the time-varying alpha term, conditional betas may be biased, as shown by Ferson *et al.* (2008).[103]

Estimates from the 5-factor model show that the top quartile portfolio of conventional funds has significant positive exposures to the size, book-to-market and local factors, while the bottom quartile portfolio has significant positive exposures to the size and local factors and a significant negative exposure to the momentum factor. This means that both the top and bottom quartile portfolios are exposed to small caps and significantly invested in local securities, but differences are not statistically significant. However, the top quartile is significantly (although only at the 10% level) more exposed to value stocks than the bottom quartile. On the other hand, the bottom quartile is significantly (at the 5% level) more exposed to stocks with poor recent returns than the top quartile. Additionally, funds in the upper quartile have significantly (at the 5% level) lower market exposures than funds in the bottom quartile. Therefore, the spread between the performance of conventional fund portfolios of past winners and past losers is related to their sensitivities to the market, book-to-market and momentum factors.

[103] Anyway, we also present the results of our partial conditional model in Appendix 5.6, which are very similar to the ones reported in Table 5.11.

Table 5.11 – Performance and Risk Estimates of Quartile Portfolios Formed on Lagged 6-Month Returns

In this table all equally-weighted portfolios of SRI and conventional funds are ranked in quartiles on the basis of their previous 6-month excess returns. Funds with the highest previous 6-month return go into portfolio Q1 (winners), while funds with the lowest previous 6-month return go into portfolio Q4 (losers). The remaining funds are put into the two middle portfolios (Q2 and Q3). Columns 2 to 7 present estimates of performance (average conditional alphas expressed in percentage) and risk (average conditional betas) for each quartile using the full conditional 5-factor model of equation [5.3]. $r_{m,t}$ is the excess return of the MSCI AC Europe TR index. SMB_t, HML_t and MOM_t are factor-mimicking portfolios for the size, book-to-market and momentum factors, respectively. $r_{lm,t} - r_{m,t}$ is the return difference between the local (French) market index and the European market index used as benchmark. The predetermined information variables are the default spread (DS), the dividend yield (DY) and the slope of the term structure (TS). All these variables are demeaned, lagged 1-month and stochastically detrended by subtracting a trailing moving average of their own past values. The bottom row of the table reports the results for a zero-cost portfolio (Q_1-Q_4) which is long in the top quartile portfolio and short in the bottom quartile portfolio of funds. W_1, W_2 and W_3 correspond to the probability values of the χ-square statistic of the Newey and West (1987) Wald test on the existence of time-varying alphas, time-varying betas and the joint time-variation in alphas and betas, respectively. R^2 *adj.* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for the SRI funds, while Panel B refers to the characteristics-matched conventional funds.

Panel A: SRI Funds										
	α_{0p}	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HBIAS)	W_1	W_2	W_3	R^2 *Adj.*
Q1 (Winners)	-0.1758 *	0.9595 ***	0.0474	0.0929	-0.0055	0.3447 ***	0.7322	0.0000	0.0000	96.52%
Q2	-0.2054 **	0.9787 ***	0.0205	0.1388 *	0.0386	0.3970 ***	0.0176	0.0000	0.0000	96.45%
Q3	-0.1957 *	0.9699 ***	-0.0048	0.0825	-0.0322	0.5665 ***	0.1182	0.0000	0.0000	97.28%
Q4 (Losers)	-0.1838 *	0.9687 ***	0.1374	0.1185	-0.0379	0.4620 ***	0.5897	0.0462	0.0000	95.03%
Q1-Q4 spread	0.0081	-0.0091	-0.0900	-0.0256	0.0324	-0.1173	0.4586	0.0007	0.0000	26.90%
Panel B: Conventional Funds										
	α_{0p}	β_p (MKT)	β_{1p} (SMB)	β_{2p} (HML)	β_{3p} (MOM)	β_{4p} (HBIAS)	W_1	W_2	W_3	R^2 *Adj.*
Q1 (Winners)	0.0458	0.8817 ***	0.2149 ***	0.2190 ***	0.0499	0.5027 **	0.8298	0.0000	0.0000	91.47%
Q2	-0.0295	0.9220 ***	0.1544 **	0.0255	-0.0319	0.5197 ***	0.3601	0.0000	0.0000	96.90%
Q3	-0.1002	0.9643 ***	0.1231 **	0.0548	-0.0249	0.4954 ***	0.4996	0.0111	0.0000	97.28%
Q4 (Losers)	-0.3552 **	0.9768 ***	0.2367 ***	0.0630	-0.1579 *	0.3957 ***	0.3089	0.0012	0.0000	94.82%
Q1-Q4 spread	0.4010 **	-0.0951 **	-0.0218	0.1560 *	0.2078 **	0.1070	0.2503	0.0000	0.0000	18.73%

Since previous studies on performance persistence have shown that conclusions may differ depending on the evaluation horizon used, we have also analysed symmetrical ranking and evaluation periods of 12 and 36 months. Table 5.12 presents the results of our tests for the 12-month horizon.

Table 5.12 – Performance Persistence: Quartile Portfolios Formed on Lagged 12-Month Returns

In this table all equally-weighted portfolios of SRI and conventional funds are ranked in quartiles on the basis of their previous 12-month excess returns. Funds with the highest previous 12-month return go into portfolio Q1 (winners), while funds with the lowest previous 12-month return go into portfolio Q4 (losers). The remaining funds are put into the two middle portfolios (Q2 and Q3). Columns 2 and 3 present some descriptive statistics for the quartile portfolios, specifically their monthly excess return (in relation to the risk-free rate, proxied by the 1-month Euribor) and standard deviation. Columns 4 and 5 present the results for the unconditional 5-factor model of equation [5.1], columns 6 and 7 the partial conditional 5-factor model of equation [5.2] and columns 8 and 9 the full conditional 5-factor model of equation [5.3] (alphas and average conditional alphas expressed in percentage). The bottom row of the table reports the results for a zero-cost portfolio (Q_1-Q_4) which is long in the top quartile portfolio and short in the bottom quartile portfolio of funds. R^2 *adj.* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for the SRI funds, while Panel B refers to the characteristics-matched conventional funds.

Panel A: SRI Funds											
			Unconditional 5-Factor Model			**Partial Conditional 5-Factor Model**			**Full Conditional 5-Factor Model**		
	Monthly Excess Return	**Standard Deviation**	α_p		R^2 *Adj.*	α_p		R^2 *Adj.*	α_{0p}		R^2 *Adj.*
Q1 (Winners)	-0.86%	5.43%	-0.2794	**	94.49%	-0.2170	**	96.00%	-0.1631		95.91%
Q2	-0.84%	5.37%	-0.1826	**	97.61%	-0.2172	**	97.95%	-0.1922	**	97.88%
Q3	-0.77%	5.47%	-0.1342		96.80%	-0.1527		97.45%	-0.1331		97.42%
Q4 (Losers)	-0.96%	5.50%	-0.2689	***	96.11%	-0.3211	***	96.43%	-0.2782	***	96.38%
Q1-Q4 spread	0.10%	1.20%	-0.0106		26.26%	0.1041		48.46%	0.1151		46.60%
Panel B: Conventional Funds											
			Unconditional 5-Factor Model			**Partial Conditional 5-Factor Model**			**Full Conditional 5-Factor Model**		
	Monthly Excess Return	**Standard Deviation**	α_p		R^2 *Adj.*	α_p		R^2 *Adj.*	α_{0p}		R^2 *Adj.*
Q1 (Winners)	-0.53%	5.23%	0.0070		96.53%	0.0140		96.85%	0.0474		96.75%
Q2	-0.60%	5.30%	-0.0510		91.91%	0.0763		91.20%	0.0245		90.91%
Q3	-0.89%	5.41%	-0.2522	**	95.92%	-0.2488	**	96.08%	-0.1862	*	96.03%
Q4 (Losers)	-0.84%	5.15%	-0.2626	***	96.96%	-0.2285	**	97.29%	-0.2544	**	97.22%
Q1-Q4 spread	0.32%	1.06%	0.2696	***	7.07%	0.2425	***	22.76%	0.3019	***	21.57%

We can observe that the annualized spread between past winners and past losers in terms of mean excess returns is substantially higher for conventional funds than for SRI funds (approximately 3.84% for conventional funds and 1.2% for SRI funds). Although not as high as with the 6-month ranking and evaluation periods, this spread is still more than three times smaller for SRI funds than for the characteristics-matched conventional funds. Once again, only the conventional funds exhibit an almost monotonic decrease in mean monthly excess returns along the portfolio ranking.

At the 12-month horizon, we do not find evidence of performance persistence for SRI funds, with the spread between winners and losers (Q_1-Q_4) not being statistically significant in all cases. For conventional funds, our previous evidence of positive performance persistence is reinforced with the 12-month horizon. In fact, we find statistically significant positive spreads, at the 1% level, between the upper and lower quartiles in all three evaluation models, ranging from 0.24% to 0.30% per month, approximately. Besides, additional robustness tests showed that, in all of our nine alternative performance evaluation models, conventional funds exhibited a significant positive spread between the portfolio of winners and the portfolio of losers. Once again, the spread between winners and losers is driven by the underperformance of the bottom quartile portfolio.

The results of our performance persistence tests for the 36-month horizon are presented in Table 5.13.

Table 5.13 – Performance Persistence: Quartile Portfolios Formed on Lagged 36-Month Returns

In this table all equally-weighted portfolios of SRI and conventional funds are ranked in quartiles on the basis of their previous 36-month excess returns. Funds with the highest previous 36-month return go into portfolio Q1 (winners), while funds with the lowest previous 36-month return go into portfolio Q4 (losers). The remaining funds are put into the two middle portfolios (Q2 and Q3). Columns 2 and 3 present some descriptive statistics for the quartile portfolios, specifically their monthly excess return (in relation to the risk-free rate, proxied by the 1-month Euribor) and standard deviation. Columns 4 and 5 present the results for the unconditional 5-factor model of equation [5.1], columns 6 and 7 the partial conditional 5-factor model of equation [5.2] and columns 8 and 9 the full conditional 5-factor model of equation [5.3] (alphas and average conditional alphas expressed in percentage). The bottom row of the table reports the results for a zero-cost portfolio (Q_1-Q_4) which is long in the top quartile portfolio and short in the bottom quartile portfolio of funds. R^2 *adj.* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for the SRI funds, while Panel B refers to the characteristics-matched conventional funds.

Panel A: SRI Funds								
			Unconditional 5-Factor Model		**Partial Conditional 5-Factor Model**		**Full Conditional 5-Factor Model**	
	Monthly Excess Return	**Standard Deviation**	α_p	R^2 *Adj.*	α_p	R^2 *Adj.*	α_{0p}	R^2 *Adj.*
Q1 (Winners)	-0.06%	4.59%	-0.1053	94.73%	-0.0842	96.48%	-0.0193	96.67%
Q2	-0.10%	4.42%	-0.1007	95.88%	-0.1035	96.97%	-0.1021	97.11%
Q3	-0.20%	5.04%	-0.2635 *	95.17%	-0.4304 ***	96.51%	-0.3923 ***	96.33%
Q4 (Losers)	-0.21%	4.48%	-0.2347 **	94.52%	-0.1972	95.17%	-0.0753	95.10%
Q1-Q4 spread	0.15%	0.85%	0.1293	12.98%	0.1130	36.23%	0.0560	41.88%
Panel B: Conventional Funds								
			Unconditional 5-Factor Model		**Partial Conditional 5-Factor Model**		**Full Conditional 5-Factor Model**	
	Monthly Excess Return	**Standard Deviation**	α_p	R^2 *Adj.*	α_p	R^2 *Adj.*	α_{0p}	R^2 *Adj.*
Q1 (Winners)	0.05%	4.63%	-0.0331	96.42%	-0.0137	97.04%	-0.0057	96.87%
Q2	-0.11%	4.55%	-0.1612 *	95.78%	-0.1629	96.77%	-0.1278	96.94%
Q3	-0.07%	4.56%	-0.1094	96.83%	-0.1491	97.21%	-0.1397 *	97.30%
Q4 (Losers)	-0.13%	4.44%	-0.1686 *	96.84%	-0.2003 **	97.35%	-0.1408	97.47%
Q1-Q4 spread	0.18%	0.77%	0.1355 *	42.49%	0.1866 **	47.02%	0.1352	51.49%

In terms of means excess returns, there is an interesting finding: now, it is the SRI funds that exhibit a monotonic decrease in mean monthly excess returns, while conventional funds exhibit an almost monotonic pattern. Nevertheless, for both fund categories, portfolio 1 outperforms portfolio 4. Furthermore, the annualized spread between past winners and past losers is much smaller and very similar between SRI and conventional funds (approximately 1.8% and 2.16%, respectively).

Once again, we do not find any significant spreads between the upper and lower quartiles for SRI funds. For conventional funds, our previous evidence of positive performance persistence is substantially weakened with the 36-month horizon. At the 5% level, only the partial conditional model produces a statistically significant positive spread between top and bottom quartile portfolios. In addition, only three of our nine alternative performance evaluation models (all partial conditional models) continued to exhibit significant positive spreads (at the 5% level) between conventional fund portfolios of past winners and past losers, meaning that none of the spreads obtained with the unconditional or, especially, the full conditional models were statistically significant.

Differences in performance between upper and lower quartiles are now much more similar for SRI and conventional funds. Therefore, expanding the ranking and evaluation periods to 36 months reduces the evidence of significant performance persistence. In line with the findings of Hendricks *et al.* (1993) and Brown and Goetzmann (1995), among others, it looks like persistence is short-lived and tends to fade at longer horizons.

Nevertheless, our previous persistence tests have all been focused on quartile portfolios formed on lagged excess returns. Following Carhart (1997) and Gregory and Whittaker (2007), among others, we also assess performance persistence on the basis of alpha-sorted portfolios. Since the number of observations in each 6 or 12 month time period does not allow a robust estimation of alphas, even with an unconditional 1-factor model,[104] we restrict this analysis to the 36-month horizon, as in Carhart (1997). In these tests, we use the same model to rank and estimate performance. Our results are presented in Table 5.14.

[104] In fact, even using unconditional Jensen's (1968) alphas and 12-month time periods, many of the *F*-tests for the individual fund regressions failed to be significant at conventional levels.

Table 5.14 – Performance Persistence: Quartile Portfolios Formed on Lagged 36-Month Alphas

In this table all equally-weighted portfolios of SRI and conventional funds are ranked in quartiles on the basis of their previous 36-month alpha. Funds are ranked and evaluated on the basis of the same performance evaluation model. Funds with the highest previous 36-month alpha go into portfolio Q1 (winners), while funds with the lowest previous 36-month alpha go into portfolio Q4 (losers). The remaining funds are put into the two middle portfolios (Q2 and Q3). Columns 2 and 3 present some descriptive statistics for these quartile portfolios, specifically their monthly excess return (in relation to the risk-free rate, proxied by the 1-month Euribor) and standard deviation. Columns 4 and 5 present the results for the unconditional 5-factor model of equation [5.1], columns 6 and 7 the partial conditional 5-factor model of equation [5.2] and columns 8 and 9 the full conditional 5-factor model of equation [5.3] (alphas and average conditional alphas expressed in percentage). The bottom row of the table reports the results for a zero-cost portfolio (Q_1-Q_4) which is long in the top quartile portfolio and short in the bottom quartile portfolio of funds. *R^2 adj.* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for the SRI funds, while Panel B refers to the characteristics-matched conventional funds.

Panel A: SRI Funds									
	Unconditional 5-Factor Model			**Partial Conditional 5-Factor Model**			**Full Conditional 5-Factor Model**		
	α_p		*R^2 Adj.*	α_p		*R^2 Adj.*	α_{0P}		*R^2 Adj.*
Q1 (Winners)	-0.1058		96.41%	-0.1697	*	96.80%	-0.0841		96.11%
Q2	-0.1148		97.09%	-0.0674		98.44%	-0.1760		96.56%
Q3	-0.1665		94.75%	-0.2499	**	96.26%	-0.1933	**	97.32%
Q4 (Losers)	-0.3171	**	92.42%	-0.3282	*	94.64%	-0.1356		96.25%
Q1-Q4 spread	0.2113	**	11.78%	0.1585		19.09%	0.0515		53.80%
Panel B: Conventional Funds									
	Unconditional 5-Factor Model			**Partial Conditional 5-Factor Model**			**Full Conditional 5-Factor Model**		
	α_p		*R^2 Adj.*	α_p		*R^2 Adj.*	α_{0P}		*R^2 Adj.*
Q1 (Winners)	-0.0831		96.54%	-0.0974		96.52%	-0.0934		96.50%
Q2	-0.0427		97.60%	-0.1494	*	98.28%	-0.0780		97.60%
Q3	-0.1675	*	96.23%	-0.1161		97.52%	-0.0659		98.21%
Q4 (Losers)	-0.1831	*	95.94%	-0.1682		96.67%	-0.1694		97.03%
Q1-Q4 spread	0.1000		9.76%	0.0708		39.82%	0.0760		27.35%

If we compare the results above with those from Table 5.13, we can see two major differences. First, there is no evidence of positive performance persistence for SRI funds under both conditional models, in line with our previous findings. However, when funds are ranked and evaluated with the unconditional 5-factor model, there is a significantly positive spread between upper and lower quartile portfolios of SRI funds. Second, there is no evidence of positive performance persistence for conventional funds, no matter what model is used to sort and evaluate performance. In this way, at the same 36-month horizon, previous evidence of positive performance persistence for conventional funds, obtained when quartile portfolios are formed on the basis of lagged excess returns, disappears when we use lagged risk-adjusted measures of performance instead.

Although we find evidence of significant persistence for SRI funds when using the unconditional 5-factor model, this result can be a consequence of using the same measure to sort and, subsequently, evaluate performance. As Carhart (1997) puts it, "*using the same asset pricing model to sort and estimate performance will also pick up the model bias that appears between ranking and formation periods*" (Carhart, 1997, p. 76). To find out if our inferences remain valid when different models are used to sort and evaluate performance, we perform an additional robustness check. In this test, presented in Appendix 5.7, we evaluate the performance of the quartile portfolios, sorted on the basis of their previous 36-month unconditional 5-factor alphas, using all three model specifications (i.e., the unconditional and both conditional models). Our results not only showed a clear superiority of the conditional specifications, as confirmed by the results of the Wald tests, but also that the persistence of SRI funds only holds when they are ranked and evaluated with the same (unconditional 5-factor) model. In fact, when the quartile portfolios are evaluated using conditional models, we find no evidence of significant spreads between upper and lower quartile portfolios.

5.5 Conclusions

In this chapter we have examined the performance and performance persistence of French SRI funds investing in European equities, in comparison with characteristics-matched samples of conventional funds. Our concluding comments can be divided into those concerning overall performance, investment styles, timing abilities and performance persistence.

In terms of overall performance, we find little evidence of statistically significant differences between French SRI and conventional funds for the period of January 2000 to December 2008. Although SRI funds perform slightly worse than their matched-portfolios according to all of our model specifications, differences in alphas are only significant with the partial conditional model and only at the 10% level. According to our remaining model specifications, including the more robust full conditional multi-factor model, we find no significant differences in performance.

However, there are some significant differences in the investment styles of SRI and conventional funds. First, French SRI funds present significantly higher market exposures than their conventional peers. Besides, in line with the findings of Bauer *et al.* (2005), Bauer *et al.* (2007) and Cortez *et al.* (2009, *forthcoming*), we find that conventional benchmarks have a higher explaining power of French SRI fund returns than SRI benchmarks. Second, we find that French SRI funds are significantly less exposed to small caps than their matched-portfolios. This is a surprising finding, since the vast majority of previous SRI fund studies on international markets show that SRI funds are more tilted towards small caps than their conventional peers (e.g.: Gregory *et al.*, 1997; Bauer *et al.*, 2006; Gregory and Whittaker, 2007). We do not find significant differences between both fund groups in terms of their exposures to the book-to-market, momentum and local factors, although both exhibit significant home biases. A possible explanation for the absence of significant differences in these factor loadings may be the use of the “best-in-class” screens, the more common screening approach in the French fund market.

When we analyse if fund performance is related to market states, we find no statistically significant evidence of such a pattern. However, our results show that the performance of SRI funds improves considerably more than the performance of conventional funds during recessions. On the other hand, we find several significant shifts in investment styles between expansion and recession periods, but only for SRI funds. In fact, while SRI funds have significantly lower market betas, significantly higher exposure to small caps and significantly lower exposure to momentum strategies during recessions than during expansions, differences for conventional funds are not statistically significant in all cases.

If we decompose overall performance, we find that French SRI funds perform significantly better than conventional funds in terms of market timing and significantly worse in terms of selectivity. Since significant differences between the overall performance of both fund groups are scarce, these results seem to indicate that the selectivity and timing components tend to offset each other. Consistent with the results of Girard *et al.* (2007), but in contrast with Kreander *et al.* (2002, 2005), our results suggest that any weak performance from SRI funds seems to be a result of poor stock selection abilities rather than poor market timing abilities. In addition, we find very little evidence of style timing abilities for both SRI and conventional funds and no significant differences between the two groups in respect to their abilities to time the size, book-to-market, momentum and local factors.

In terms of performance persistence, the results of our contingency table analysis show evidence of significant positive persistence in absolute (excess) returns for conventional funds, but not for their SRI counterparts, at the 6 and 12-month horizons, with SRI funds presenting significantly lower percentages of repeat winners than conventional funds. At the 36-month horizon, these results are reversed: it is the SRI funds (and not the conventional funds) that show evidence of significantly positive persistence in excess returns and that present significantly higher percentages of repeat winners than their peers. However, using alphas as performance measures, instead of excess returns, removes any evidence of persistence for both fund groups.

In line with the results of the contingency tables, performance-ranked portfolios formed on lagged excess returns show evidence of significant positive persistence at the 6 and 12-month horizons for conventional funds, but not for SRI funds. This evidence is robust to the use of several performance evaluation models, with differences in performance between upper and lower quartile portfolios being significantly lower for SRI funds than for conventional funds in practically all situations. The significant spread found between the performance of conventional fund portfolios' of past winners and past losers is related to their sensitivities to the market, book-to-market and momentum factors. In relation to the bottom quartile, the top quartile is significantly (at the 10% level) more exposed to value stocks, significantly (at the 5% level) more exposed to momentum strategies and significantly (at the 5% level) less exposed to the market. At the 36-month horizon, evidence of performance persistence is weakened, but we still find significant positive differences between upper and lower quartiles for conventional funds when using return-sorted portfolios. At this longer-term horizon, differences in performance between upper and lower quartile portfolios are much more similar between SRI and conventional funds. However, when we use alpha-sorted portfolios, practically all previous evidence of performance persistence is removed.

As in Gregory and Whittaker (2007), we also find significant differences between the persistence of SRI and conventional funds, but in the opposite direction of their findings. In fact, when using return-sorted portfolios, the difference between funds with good past performance and bad past performance is, in practically all situations, significantly higher for conventional funds than for SRI funds, especially at the shorter-term horizons.

Overall, our results suggest that the performance of French SRI funds is comparable to that of their conventional peers. Hence, French socially responsible investors do not need to sacrifice financial performance in order to satisfy their environmental, social and ethical concerns. Nevertheless, we find evidence of significant differences in the performance persistence, investment styles and timing abilities of French SRI and conventional funds.

APPENDICES

Appendix 5.1 – Mutual Funds in the Sample

This appendix describes our sample of French SRI funds and the characteristics-matched sample of conventional funds. For each fund we present the following characteristics: fund name, Morningstar category, fund type (SRI or conventional), start date and International Securities Identification Number (ISIN).

Fund Name	Morningstar Category	Fund Type	Start Date	ISIN
SGAM Invest Europe Développement Durable (C)	Europe Large-Cap Value Equity	SRI	15-05-2000	FR0000444275
CAAM Actions Europe P (C)	Europe Large-Cap Value Equity	Conventional	13-06-2000	FR0010013763
Europe Value (C)	Europe Large-Cap Value Equity	Conventional	15-06-2000	FR0007046578
NOAM Europe Value C (C)	Europe Large-Cap Value Equity	Conventional	04-07-2000	FR0010069195
SSgA Europe SRI Alpha Equity P (C)	Europe Large-Cap Value Equity	SRI	28-04-2006	FR0010316802
Elan Europe Alpha C/D	Europe Large-Cap Value Equity	Conventional	21-07-2006	FR0010352146
Garance (C)	Europe Large-Cap Value Equity	Conventional	18-04-2006	FR0010291203
Ofi Nemo A (C)	Europe Large-Cap Value Equity	Conventional	30-12-2005	FR0010273391
BNP Paribas Etheis (D)	Europe Large-Cap Blend Equity	SRI	15-05-2002	FR0010028969
Actimaaf Europe (C)	Europe Large-Cap Blend Equity	Conventional	05-07-2002	FR0000985368
Label Europe Actions C/D	Europe Large-Cap Blend Equity	Conventional	24-07-2002	FR0007073713
Médicis (C)	Europe Large-Cap Blend Equity	Conventional	16-11-2001	FR0000979171
CM-CIC Valeurs Ethiques (C)	Europe Large-Cap Blend Equity	SRI	16-06-2000	FR0000444366
CAAM Sélect Europe P (D)	Europe Large-Cap Blend Equity	Conventional	26-08-1999	FR0000289902
CPR Active Europe P (D)	Europe Large-Cap Blend Equity	Conventional	01-01-2000	FR0010619916
LBPAM Actions Europe R (D)	Europe Large-Cap Blend Equity	Conventional	08-03-2000	FR0000441586
Atout Valeurs Durables C/D	Europe Large-Cap Blend Equity	SRI	24-02-2003	FR0000991424
Aviva Horizon 2011 (C)	Europe Large-Cap Blend Equity	Conventional	04-12-2002	FR0000990012
Etoile Multi Gestion Europe (C)	Europe Large-Cap Blend Equity	Conventional	17-04-2003	FR0010540856
Ambiose (C)	Europe Large-Cap Blend Equity	Conventional	16-12-2003	FR0010250142
CAAM Activaleurs Durables C/D	Europe Large-Cap Blend Equity	SRI	01-09-2000	FR0000446684
SG Prive 3 (D)	Europe Large-Cap Blend Equity	Conventional	11-05-2001	FR0007057427
Fructi Europe Croissance (C)	Europe Large-Cap Blend Equity	Conventional	07-08-2001	FR0000977530
Fructi Europe Cycliques (C)	Europe Large-Cap Blend Equity	Conventional	07-08-2001	FR0000977522
Regard Actions Developpement Durable (C)	Europe Large-Cap Blend Equity	SRI	25-06-2003	FR0007083357
Cogéfi Europe P (C)	Europe Large-Cap Blend Equity	Conventional	20-12-2002	FR0007079132
Pioneer Europe Actions (C)	Europe Large-Cap Blend Equity	Conventional	15-12-2003	FR0010029645
Hocheurope (C)	Europe Large-Cap Blend Equity	Conventional	01-08-2003	FR0010000653

Appendix 5.1 – Mutual Funds in the Sample (continued)

Fund Name	Morningstar Category	Fund Type	Start Date	ISIN
Europe Gouvernance (C)	Europe Large-Cap Blend Equity	SRI	13-01-1998	FR0000285702
Iéna Actions Européennes (C)	Europe Large-Cap Blend Equity	Conventional	22-08-1997	FR0010541003
NOAM Europe Opportunités C/D	Europe Large-Cap Blend Equity	Conventional	27-03-1998	FR0010363846
Finex Europe C/D	Europe Large-Cap Blend Equity	Conventional	05-06-1998	FR0000428369
CAAM Actions Durables C/D	Europe Large-Cap Blend Equity	SRI	24-02-2003	FR0000991432
ICG Actions Rendement (C)	Europe Large-Cap Blend Equity	Conventional	04-04-2003	FR0000992893
Métropole Sélection (C)	Europe Large-Cap Blend Equity	Conventional	29-11-2002	FR0007078811
Rouvier Europe (C)	Europe Large-Cap Blend Equity	Conventional	21-05-2003	FR0007084066
Ethique et Partage - CCFD (D)	Europe Large-Cap Blend Equity	SRI	20-12-2000	FR0000970899
Fructi Europe Défensive (C)	Europe Large-Cap Blend Equity	Conventional	29-08-2001	FR0000977548
JPM Europe (C)	Europe Large-Cap Blend Equity	Conventional	01-06-2001	FR0000975138
Fidelity SICAV - Fidelity Europe (C)	Europe Large-Cap Blend Equity	Conventional	07-12-2001	FR0000008674
Groupama Euro Capital Durable Retraite (C)	Eurozone Large-Cap Equity	SRI	22-06-2004	FR0010086496
ABP Actions C/D	Eurozone Large-Cap Equity	Conventional	18-05-2004	FR0010074690
Audiens A1 (C)	Eurozone Large-Cap Equity	Conventional	04-06-2004	FR0010072439
K Invest Europe (C)	Eurozone Large-Cap Equity	Conventional	02-04-2004	FR0010057364
AG2R Actions ISR (C)	Eurozone Large-Cap Equity	SRI	31-05-2002	FR0000984346
CD Euro Capital (C)	Eurozone Large-Cap Equity	Conventional	21-06-2002	FR0010250084
CIC Actions 60 (D)	Eurozone Large-Cap Equity	Conventional	28-06-2002	FR0000985731
Sycomore Twenty A (C)	Eurozone Large-Cap Equity	Conventional	24-06-2002	FR0007073119
Etoile Partenaires (C)	Eurozone Large-Cap Equity	SRI	05-09-2001	FR0010502096
AR2I (C)	Eurozone Large-Cap Equity	Conventional	05-04-2002	FR0007070883
Bâti Valeurs Europe C/D	Eurozone Large-Cap Equity	Conventional	23-05-2002	FR0007071642
Cardif Actions Rendement C/D	Eurozone Large-Cap Equity	Conventional	24-06-2002	FR0007074208
LBPAM Actions Développement Dur. R (C)	Eurozone Large-Cap Equity	SRI	05-11-2001	FR0000008963
Equi-Selection (D)	Eurozone Large-Cap Equity	Conventional	29-10-2002	FR0000989022
Indosuez Europe Patrimoine (D)	Eurozone Large-Cap Equity	Conventional	30-09-2002	FR0007076641
Union Europe (C)	Eurozone Large-Cap Equity	Conventional	19-07-2002	FR0000986655
Macif Croissance Durable Europe (C)	Eurozone Large-Cap Equity	SRI	09-01-2001	FR0000971160
AGF Actions Euro Value (C)	Eurozone Large-Cap Equity	Conventional	04-10-2000	FR0000449431
KBL Richelieu Europe (C)	Eurozone Large-Cap Equity	Conventional	23-10-2000	FR0000989410
Barclays Euro Opportunité Acc	Eurozone Large-Cap Equity	Conventional	20-02-2001	FR0000971996

Appendix 5.1 – Mutual Funds in the Sample (continued)

Fund Name	Morningstar Category	Fund Type	Start Date	ISIN
Objectif Ethique Socialement Responsable C/D	Eurozone Large-Cap Equity	SRI	01-06-2001	FR0000003998
AGF Aequitas C/D	Eurozone Large-Cap Equity	Conventional	05-06-2001	FR0000975880
Finance Europe C/D	Eurozone Large-Cap Equity	Conventional	09-11-2001	FR0007066246
Etoile Actions Styles (C)	Eurozone Large-Cap Equity	Conventional	20-09-2001	FR0010194464
HSBC Développement Durable A C/D	Eurozone Large-Cap Equity	SRI	29-12-1995	FR0000437113
AXA Europe du Sud (C)	Eurozone Large-Cap Equity	Conventional	28-06-1996	FR0000990608
CS Actions Euro (C)	Eurozone Large-Cap Equity	Conventional	14-06-1996	FR0000985442
MW Actions Europe (C)	Eurozone Large-Cap Equity	Conventional	01-01-1995	FR0007437603
Epargne Ethique Actions C/D	Eurozone Large-Cap Equity	SRI	20-01-2000	FR0000004970
Invesco Euro Equity E (C)	Eurozone Large-Cap Equity	Conventional	07-05-1999	FR0000288557
Aviva Investors Actions Euro C/D	Eurozone Large-Cap Equity	Conventional	28-04-2000	FR0007045604
Sinopia Euro Equities (C)	Eurozone Large-Cap Equity	Conventional	19-04-1999	FR0000435406
Ethis Vitalité (C)	Eurozone Large-Cap Equity	SRI	28-06-2000	FR0007046073
Meyerbeer Actions Europe (C)	Eurozone Large-Cap Equity	Conventional	18-06-1999	FR0010460931
CPR Active Euroland P C/D	Eurozone Large-Cap Equity	Conventional	22-05-1999	FR0000446098
Vendôme Europe (C)	Eurozone Large-Cap Equity	Conventional	27-09-1999	FR0007371703
Fédéris ISR Euro C/D	Eurozone Large-Cap Equity	SRI	16-06-2000	FR0007045950
AXA Valeurs Euro (C)	Eurozone Large-Cap Equity	Conventional	18-06-1999	FR0000170292
CAAM Euroland (C)	Eurozone Large-Cap Equity	Conventional	26-11-1999	FR0007038054
CAAM Sélect Euro (D)	Eurozone Large-Cap Equity	Conventional	08-11-1999	FR0010315424
Génération Ethique (C)	Eurozone Large-Cap Equity	SRI	23-11-2000	FR0010377549
Prévoir Gestion Actions (C)	Eurozone Large-Cap Equity	Conventional	07-01-2000	FR0007035159
UFF Multitalents LT A (D)	Eurozone Large-Cap Equity	Conventional	29-11-1999	FR0010180786
VP Gestion Dynamique (D)	Eurozone Large-Cap Equity	Conventional	01-10-1999	FR0010019315
Insertion-Emplois (D)	Eurozone Large-Cap Equity	SRI	11-05-1994	FR0000970873
Acer Actions (C)	Eurozone Large-Cap Equity	Conventional	16-06-1994	FR0007480652
Brongniart Rendement (C)	Eurozone Large-Cap Equity	Conventional	10-12-1993	FR0010135434
France Actions Expansion (C)	Eurozone Large-Cap Equity	Conventional	04-02-1994	FR0007476387
AGF Valeurs Durables R (C)	Eurozone Large-Cap Equity	SRI	15-10-1991	FR0000017329
Etoile Euro Opportunités (C)	Eurozone Large-Cap Equity	Conventional	06-09-1991	FR0000987273
Oddo Cibles and Leaders A C/D	Eurozone Large-Cap Equity	Conventional	27-12-1991	FR0000980922
SSgA EMU Alpha Equity Fund (C)	Eurozone Large-Cap Equity	Conventional	03-10-1991	FR0000026585

Appendix 5.1 – Mutual Funds in the Sample (continued)

Fund Name	Morningstar Category	Fund Type	Start Date	ISIN
AGF Euro Actions (C)	Eurozone Large-Cap Equity	SRI	26-06-1998	FR0010004663
Centrale Actions Euro (C)	Eurozone Large-Cap Equity	Conventional	29-12-1997	FR0000285587
Elan Euro Dynamique C/D	Eurozone Large-Cap Equity	Conventional	06-03-1998	FR0000285850
Saint-Honoré Euro Opportunités A C/D	Eurozone Large-Cap Equity	Conventional	18-07-1997	FR0010505537
MAM Actions Ethique (C)	Eurozone Large-Cap Equity	SRI	02-07-1998	FR0000448987
BMM Euro Croissance (C)	Eurozone Large-Cap Equity	Conventional	09-04-1998	FR0007019377
Gan Eurostratégie (D)	Eurozone Large-Cap Equity	Conventional	23-04-1998	FR0007020003
SLF (F) Equity Europe (C)	Eurozone Large-Cap Equity	Conventional	20-04-1998	FR0010074914
Orsay Croissance Responsable (C)	Eurozone Large-Cap Equity	SRI	03-09-1997	FR0000431918
MAM Sélection Actions (C)	Eurozone Large-Cap Equity	Conventional	08-08-1997	FR0000978090
Ecureuil Profil 90 (D)	Eurozone Large-Cap Equity	Conventional	17-10-1997	FR0010075796
Bâti Action Euro C/D	Eurozone Large-Cap Equity	Conventional	30-04-1998	FR0007019898
EuroSociétale (C)	Eurozone Large-Cap Equity	SRI	16-04-1999	FR0010458745
MV Euro Flex A (C)	Eurozone Large-Cap Equity	Conventional	06-05-1998	FR0000286072
Aviva Actions Euro C/D	Eurozone Large-Cap Equity	Conventional	07-05-1998	FR0007022108
Baring Grand´Europe (C)	Eurozone Large-Cap Equity	Conventional	10-07-1998	FR0000444192
Macif Croissance Durable (C)	Eurozone Large-Cap Equity	SRI	18-06-1999	FR0000435331
Groupama Evolution Dynamique (C)	Eurozone Large-Cap Equity	Conventional	20-07-1998	FR0007024716
Afer-Eurosfer A C/D	Eurozone Large-Cap Equity	Conventional	30-07-1998	FR0007024393
CM-CIC Euro Actions (C)	Eurozone Large-Cap Equity	Conventional	02-10-1998	FR0010359331
Ecureuil Bénéfices Responsable (D)	Eurozone Large-Cap Equity	SRI	21-09-1999	FR0010091116
Médi Actions (D)	Eurozone Large-Cap Equity	Conventional	22-10-1998	FR0000284648
MMA Euro-Actions C/D	Eurozone Large-Cap Equity	Conventional	17-12-1998	FR0000441636
Optimum Actions (C)	Eurozone Large-Cap Equity	Conventional	15-01-1999	FR0007019237
Natixis Impact Actions Euro R (C)	Eurozone Large-Cap Equity	SRI	20-12-1999	FR0000970840
Atout Quanteuroland (D)	Eurozone Large-Cap Equity	Conventional	22-01-1999	FR0000287815
Gérer Multi-Factoriel Euro (C)	Eurozone Large-Cap Equity	Conventional	01-02-1999	FR0000990921
HSBC Euro Actions (C)	Eurozone Large-Cap Equity	Conventional	12-02-1999	FR0000971319
AXA Euro Valeurs Responsables (C)	Eurozone Large-Cap Equity	SRI	25-07-1996	FR0000982761
Federal Euro Dynamique P C/D	Eurozone Large-Cap Equity	Conventional	31-10-1996	FR0000994378
Indosuez Europe Secteurs (C)	Eurozone Large-Cap Equity	Conventional	08-04-1997	FR0000432387
Sinopia Actions Euro G (C)	Eurozone Large-Cap Equity	Conventional	10-03-1997	FR0000421083

Appendix 5.1 – Mutual Funds in the Sample (continued)

Fund Name	Morningstar Category	Fund Type	Start Date	ISIN
LCL Actions Dev Durable Euro (C)	Eurozone Large-Cap Equity	SRI	23-10-2002	FR0000989006
AG2R Actions C (C)	Eurozone Large-Cap Equity	Conventional	17-04-2003	FR0007082466
Etoile Actions Rendement (D)	Eurozone Large-Cap Equity	Conventional	16-07-2003	FR0010501676
MMGI Euromix Actions (C)	Eurozone Large-Cap Equity	Conventional	11-07-2003	FR0007085063
Macif Croissance Durable and Solidaire (C)	Eurozone Large-Cap Equity	SRI	26-04-2002	FR0000983819
Best Business Models (C)	Eurozone Large-Cap Equity	Conventional	10-04-2002	FR0000994451
Métropole Euro (C)	Eurozone Large-Cap Equity	Conventional	28-11-2002	FR0007078753
SGAM Invest Euro Value (C)	Eurozone Large-Cap Equity	Conventional	17-12-2002	FR0007079199

Appendix 5.2 – Summary Statistics for the Excess Returns of the French Fund Portfolios

This appendix presents summary statistics for the monthly excess returns of two equally-weighted portfolios of French funds for the period of January 2000 to December 2008. Column 2 presents the results for the socially responsible (SRI) funds, while Column 3 refers to the matched-portfolios of conventional funds. The risk-free rate was proxied by the 1-month Euribor. *p-val* (JB) is the probability that the Jarque-Bera statistic exceeds (in absolute value) the observed value under the null hypothesis of a normal distribution.

	SRI Funds	**Matched-portfolios**
Mean	-0.0082	-0.0069
Median	0.0015	0.0026
Maximum	0.1079	0.1037
Minimum	-0.1715	-0.1625
Std. Deviation	0.0520	0.0502
Skewness	-0.9343	-0.9829
Kurtosis	4.1776	4.1910
Jarque-Bera (JB)	21.7486	23.5525
***p-val* (JB)**	0.0000	0.0000
Number of Funds	33	99

Appendix 5.3 – Summary Statistics for the Risk Factors

This appendix presents summary statistics for the five risk factors (denominated in Euros) during the period of January 2000 to December 2008. MKT is the monthly excess returns of the MSCI AC Europe TR index (the risk-free rate was proxied by the 1-month Euribor). SMB is the difference in monthly returns between the MSCI AC Europe Small Cap TR and the MSCI AC Europe Large Cap TR indices, HML is the difference in monthly returns between the MSCI AC Europe Value TR and the MSCI AC Europe Growth TR indices and MOM is the difference between the monthly returns of the top and bottom six sectors from the 18 Dow Jones Stoxx 600 Supersector indices. HBIAS is the return difference between the MSCI France TR index and the MSCI AC Europe TR index. *p-val* (JB) is the probability that the Jarque-Bera statistic exceeds (in absolute value) the observed value under the null hypothesis of a normal distribution. Table **A** presents some descriptive statistics for the risk factors, while Table **B** presents their correlation matrix.

Table A – Descriptive Statistics

	MKT	**SMB**	**HML**	**MOM**	**HBIAS**
Mean	-0.0061	0.0012	0.0038	0.0043	0.0005
Median	0.0071	0.0050	0.0035	0.0032	-0.0006
Maximum	0.1040	0.0448	0.0744	0.1047	0.0358
Minimum	-0.1502	-0.0954	-0.0752	-0.1276	-0.0267
Std. Deviation	0.0491	0.0258	0.0210	0.0416	0.0138
Skewness	-0.8908	-0.9821	-0.2723	-0.1031	0.3264
Kurtosis	3.7348	4.3206	5.1764	3.3593	2.7779
Jarque-Bera (JB)	16.5590	24.9761	22.4402	0.7649	2.1198
***p-val* (JB)**	0.0003	0.0000	0.0000	0.6822	0.3465

Table B – Correlation Matrix

	MKT	**SMB**	**HML**	**MOM**	**HBIAS**
MKT	1.0000				
SMB	0.1651	1.0000			
HML	0.2772	0.0925	1.0000		
MOM	-0.4101	0.1704	-0.3865	1.0000	
HBIAS	0.2451	-0.1719	0.0353	-0.2468	1.0000

Appendix 5.4 – Summary Statistics for the Information Variables

This appendix presents summary statistics for the three Global lagged information variables during the period of January 2000 to December 2008: default spread (DS), dividend yield (DY) and slope of the term structure (TS). The instruments were all stochastically detrended by subtracting a trailing moving average of their own past values. Table **A** presents several statistics for these variables (annual, demeaned and expressed in percentage) as well as their first-order autocorrelation coefficients (AC1). Table **B** presents the correlation matrix among the instruments.

Table A – Descriptive Statistics and Autocorrelations

	DS	DY	TS
Mean	0.0000	0.0000	0.0000
Median	-0.0366	-0.0387	-0.1712
Maximum	1.4301	0.8967	1.9029
Minimum	-0.2332	-0.2515	-1.3359
Std. Deviation	0.2152	0.1800	0.8894
Skewness	4.4558	2.4834	0.4032
Kurtosis	27.9430	12.4318	2.0365
AC1	0.2200	0.4970	0.8990

Table B – Correlation Matrix

	DS	DY	TS
DS	1.0000		
DY	0.6716	1.0000	
TS	0.2758	0.2905	1.0000

Appendix 5.5 – SRI Fund Performance: SRI vs. Conventional Benchmarks

This appendix presents estimates of performance (alphas and average conditional alphas expressed in percentage) and risk (betas and average conditional betas of the market factor) for the equally-weighted portfolio of French SRI funds, using both SRI and conventional benchmarks. The conventional benchmark is proxied by the MSCI AC Europe TR index, whereas the SRI benchmark is the FTSE4GOOD Europe TR index. The performance evaluation models used are the unconditional 5-factor model of equation [5.1], the partial conditional 5-factor model of equation [5.2] and the full conditional 5-factor model of equation [5.3]. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987).

	MSCI AC Europe			FTSE4GOOD Europe		
	α_p / α_{0p}	β_p / β_{0p}	R^2 *adj.*	α_p / α_{0p}	β_p / β_{0p}	R^2 *adj.*
Unconditional 5-Factor Model	-0.2488 ***	0.9687 ***	96.67%	-0.1686 *	0.9573 ***	96.01%
Partial Conditional 5-Factor Model	-0.2367 ***	0.9680 ***	96.73%	-0.1773	0.9617 ***	96.08%
Full Conditional 5-Factor Model	-0.1347	0.9795 ***	96.85%	-0.0769	0.9760 ***	96.17%

Appendix 5.6 – Performance and Risk Estimates of Quartile Portfolios Formed on Lagged 6-Month Returns with an Alternative Conditional Evaluation Model

In this table all equally-weighted portfolios of SRI and conventional funds are ranked in quartiles on the basis of their previous 6-month excess returns. Funds with the highest previous 6-month return go into portfolio Q1 (winners), while funds with the lowest previous 6-month return go into portfolio Q4 (losers). The remaining funds are put into the two middle portfolios (Q2 and Q3). Columns 2 to 7 present estimates of performance (average conditional alphas expressed in percentage) and risk (average conditional betas) for each quartile using the partial conditional 5-factor model of equation [5.2]. $r_{m,t}$ is the excess return of the MSCI AC Europe TR index. SMB_t, HML_t and MOM_t are factor-mimicking portfolios for the size, book-to-market and momentum factors, respectively. $r_{lm,t} - r_{m,t}$ is the return difference between the local (French) market index and the European market index used as benchmark. The predetermined information variables are the default spread (DS), the dividend yield (DY) and the slope of the term structure (TS). All these variables are demeaned, lagged 1-month and stochastically detrended by subtracting a trailing moving average of their own past values. The bottom row of the table reports the results for a zero-cost portfolio (Q_1-Q_4) which is long in the top quartile portfolio and short in the bottom quartile portfolio of funds. *Wald* corresponds to the probability values of the χ-square statistic of the Newey and West (1987) Wald test on the existence of time-varying betas. R^2 *adj.* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for the SRI funds, while Panel B refers to the characteristics-matched conventional funds.

Panel A: SRI Funds														
	α_p		β_p (MKT)		β_{1p} (SMB)		β_{2p} (HML)		β_{3p} (MOM)		β_{4p} (HBIAS)		*Wald*	R^2 *Adj.*
Q1 (Winners)	-0.2194	**	0.9540	***	0.0409		0.1166	*	0.0028		0.3596	***	0.0000	96.61%
Q2	-0.3012	***	0.9653	***	0.0209		0.1890	**	0.0652		0.4370	***	0.0000	96.39%
Q3	-0.2514	**	0.9694	***	0.0241		0.1215	*	-0.0192		0.5833	***	0.0000	97.24%
Q4 (Losers)	-0.2312	**	0.9546	***	0.1075		0.1336		-0.0228		0.4879	***	0.0000	95.06%
Q1-Q4 spread	0.0118		-0.0006		-0.0666		-0.0170		0.0256		-0.1283		0.0000	27.92%
Panel B: Conventional Funds														
	α_p		β_p (MKT)		β_{1p} (SMB)		β_{2p} (HML)		β_{3p} (MOM)		β_{4p} (HBIAS)		*Wald*	R^2 *Adj.*
Q1 (Winners)	0.0882		0.8857	***	0.2192	***	0.1942	***	0.0436		0.4904	**	0.0000	91.75%
Q2	-0.0832		0.9152	***	0.1513	**	0.0546		-0.0197		0.5396	***	0.0000	96.96%
Q3	-0.1516	*	0.9569	***	0.1278	***	0.0816		-0.0087		0.5185	***	0.0000	97.31%
Q4 (Losers)	-0.3696	***	0.9625	***	0.2335	***	0.0546		-0.1326	*	0.4255	***	0.0000	94.77%
Q1-Q4 spread	0.4578	**	-0.0769	*	-0.0143		0.1396	*	0.1761	**	0.0649		0.0000	19.39%

Appendix 5.7 – Performance Persistence: Quartile Portfolios Formed on Lagged 36-Month Unconditional 5-Factor Alphas

This appendix presents the results for the zero-cost portfolios (Q_1-Q_4), which are long in the top quartile portfolio and short in the bottom quartile portfolio (alphas and average conditional alphas expressed in percentage), when funds are sorted on the basis of their previous 36-month unconditional 5-factor alpha. The performance evaluation of these portfolios is, subsequently, conducted using three alternative models: the unconditional 5-factor model of equation [5.1], the partial conditional 5-factor model of equation [5.2] and the full conditional 5-factor model of equation [5.3]. *Wald* corresponds to the probability values of the χ-square statistic of the Newey and West (1987) Wald test on the existence of time-varying betas (Column 6) or time-varying alphas and betas (Column 9), respectively. R^2 *adj.* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for the SRI funds, while Panel B refers to the characteristics-matched conventional funds.

Panel A: SRI Funds								
	Unconditional 5-Factor Model		**Partial Conditional 5-Factor Model**			**Full Conditional 5-Factor Model**		
	α_p	R^2 *Adj.*	α_p	R^2 *Adj.*	*Wald*	α_{0p}	R^2 *Adj.*	*Wald*
Q1-Q4 spread	0.2113 **	11.78%	0.0679	29.77%	0.0000	0.0175	31.55%	0.0000
Panel B: Conventional Funds								
	Unconditional 5-Factor Model		**Partial Conditional 5-Factor Model**			**Full Conditional 5-Factor Model**		
	α_p	R^2 *Adj.*	α_p	R^2 *Adj.*	*Wald*	α_{0p}	R^2 *Adj.*	*Wald*
Q1-Q4 spread	0.1000	9.76%	0.0939	21.23%	0.0000	0.0123	25.54%	0.0000

CHAPTER 6

THE PERFORMANCE OF EUROPEAN SOCIALLY RESPONSIBLE FIXED-INCOME FUNDS

6.1 Introduction

The considerable size of the European bond market, combined with an increasing interest in SRI, has led to a substantial development of SRI bond funds, especially in the Continental European markets, which are traditionally more focused on fixed-income investments. At the end of 2009, bond funds accounted for 20% of the assets invested in all US mutual funds (ICI, 2010), while European bond funds accounted for an even higher 23% of the total net assets in the UCITS market (EFAMA, 2010a).[105] In the SRI segment, the relative weight of bond funds on European SRI assets under management has increased from 20% in 2007 to 38% in 2010 (Vigeo, 2010). Furthermore, by June 2010, the weight of SRI bond funds was already very significant in some European SRI markets, especially in Austria (76%) and France (61%), where bond funds have already surpassed equity funds. Hence, evaluating the performance of European SRI fixed-income funds can bring new insights to this field and help to develop this segment in other European markets.

Investigating the performance of SRI fixed-income funds is also important because it allows a better understanding of SRI for other asset classes besides equity, thus improving asset allocation decisions. Bonds are often seen as a homogeneous assets class, whose returns depend mainly on the variation of a few non-diversifiable risk factors. However, Derwall and Koedijk (2009) call attention to the fact that a significant proportion of the risk of corporate bonds may be firm-specific and, therefore, significantly reduced through diversification or exploited by active management. In this context, SRI strategies can have a significant impact on corporate bond fund performance. In fact, active managers conduct credit analysis to be able to select corporate bonds that are likely to suffer future changes in their credit quality, in order to invest in bonds that will yield higher premiums those suggested by their risk or credit ratings (Derwall and Koedijk, 2009).

Another interesting aspect is that SRI principles have also been brought to the context of sovereign bond markets, which represent the most significant proportion of the overall European bond market. In this case, as pointed out by Derwall and Koedijk (2009), the incorporation of social, environmental and governance indicators in asset management decisions is justified by the influence that these indicators have in a countries' long-term economic development and political stability, which can have an impact in default rates. In

[105] It should be noted that these figures were computed excluding Ireland and the Netherlands, countries for which no asset breakdown by type of fund was available. According to EFAMA (2010a), the total assets in the UCITS market at the end of 2009 were of €5.299 billion.

fact, some empirical studies that examined the determinants of sovereign credit ratings found that these are significantly conditioned by social, political and economic factors (e.g.: Cantor and Packer, 1996; Mellios and Paget-Blanc, 2006).[106] Moreover, the current context of financial turmoil that has affected the European sovereign debt market clearly demonstrates the importance of considering governance indicators when managing sovereign bond portfolios.

In addition, in a recent investigation about the impact of socially responsible indicators (more precisely, the Vigeo sustainability country ratings) on the efficient frontier of sovereign bond portfolios, Drut (2010) found that socially-screened sovereign bond portfolios can be built without a significant loss of mean-variance efficiency. Therefore, asset managers can create sovereign bond portfolios with a higher than average socially responsible rating without significantly losing diversification possibilities. Nevertheless, further research is needed to determine if SRI fixed-income portfolios do allow investors to satisfy social, environmental and governance concerns without sacrificing financial returns.

In fact, since the vast majority of empirical studies are focused on SRI equity funds, the performance of SRI fixed-income funds has received very little attention in the finance literature. To the best of our knowledge, there are only two studies that address the performance of SRI bond funds, both conducted in the US market and with dissimilar results. Goldreyer *et al.* (1999) presented evidence suggesting that SRI fixed-income funds significantly underperformed conventional funds, whereas the more recent and considerably more robust study of Derwall and Koedijk (2009) found that US SRI fixed-income funds performed as well as (in the case of pure SRI bond funds) or significantly better (in the case of SRI balanced funds) than their conventional peers.[107] For the European market, we are not aware of any investigation on the performance of SRI bond funds.[108] Hence, the main objective of this chapter is to fill this gap.

We contribute to the SRI mutual fund performance literature by conducting the first comprehensive investigation on the performance of European SRI fixed-income funds, which is measured against characteristics-matched portfolios of conventional funds, according to

[106] For example, Mellios and Paget-Blanc (2006) found that both corruption and the quality of governance of a country have a strong influence on ratings.

[107] Nevertheless, it is important to mention that Derwall and Koedijk (2009) use a sample of just 15 SRI bond funds and 9 SRI balanced funds.

[108] However, it is worth to mention that a couple of recent investigations on SRI fund performance (e.g.: Fernandez-Izquierdo and Matallin-Saez, 2008; Cortez *et al.*, 2009) include some types of European SRI balanced funds. These empirical studies show that European SRI balanced funds present neutral performance (e.g.: Cortez *et al.*, 2009), which is not significantly different than that of conventional funds (e.g.: Fernandez-Izquierdo and Matallin-Saez, 2008). However, they both have important limitations. On the one hand, Fernandez-Izquierdo and Matallin-Saez (2008) only study the Spanish market, use a sample period of just three years and, although they compare the performance of SRI funds with that of conventional funds, these are not characteristics-matched. On the other hand, Cortez *et al.* (2009) make no comparisons between SRI and conventional funds and evaluate fund performance only with (unconditional and conditional) single-factor models.

specific fund characteristics. Our sample includes 38 SRI fixed-income funds, domiciled in eight European markets, and covers the period of January 2000 to December 2009. To evaluate performance we use robust conditional multi-factor models, with both time-varying alphas and betas, which also control for spurious regression biases. Furthermore, we also evaluate how European SRI fixed-income funds perform over different market regimes, i.e., during recession and expansion periods, in order to analyse if the more long-term perspective of SRI funds results in them providing an additional protection against market downturns than their conventional peers. As far as we are aware of, this is the first investigation worldwide to address this research topic in the context of SRI fixed-income funds. Lastly, we also investigate if SRI benchmarks are as powerful as conventional benchmarks in explaining SRI fixed-income fund returns, an issue that has not yet been assessed in the context of SRI bond indices.

This chapter is organized as follows: Section 2 presents the performance evaluation models used. Section 3 describes the data. Section 4 presents and discusses our empirical findings. Finally, section 5 summarises our main results and presents some concluding remarks.

6.2 Fund Performance Evaluation Models

To try to account for the fact that fixed-income funds in our sample can diverge in terms of their investment style, we evaluate fund performance using multi-factor models that include both bond and stock indices, in the spirit of Blake *et al.* (1993) and Elton *et al.* (1995). Our base model is a three-factor model, which incorporates a bond market variable, a default spread variable and a stock market variable. The first variable intends to capture fund's exposures to investment-grade bonds (corporate or corporate and government), while the second variable is included to account for a fund's exposure to high-yield instruments and capture default risk compensation. The third variable is included to allow for the possibility that bond fund performance can, at least partially, be explained by variation in equity returns and also because bond funds may hold convertible debt. In addition, since almost half of our sample is composed by balanced funds, these have certainly significant exposures to the stock markets. Thus, this model can be written as:

$$r_{p,t} = \alpha_p + \beta_p \, Bond_t + \beta_{1p} \, Default_t + \beta_{2p} \, Equity_t + \varepsilon_{p,t} \qquad [6.1]$$

where $r_{p,t}$ represents the excess returns of portfolio *p* over period *t*, $Bond_t$ and $Equity_t$ represent the excess returns of the relevant bond and stock market indices, respectively, $Default_t$ is a return spread between a high-yield bond index and a government bond index and $\varepsilon_{p,t}$ is a residual term. A statistically significant positive alpha indicates superior performance, whereas significantly negative alphas are a sign of inferior performance. This unconditional three-factor model is similar to the index-4 model developed by Elton *et al.* (1995), which is the main model used by Derwall and Koedijk (2009), but with no option variable, due to the unavailability of a European Mortgage-Backed Securities (MBS) index.[109]

However, an unconditional model may not be appropriate to measure fixed-income fund performance, since the assumption that bond fund returns and risk are stationary over time is likely to be violated. In fact, it is well known that, when fund managers exhibit market timing abilities or follow dynamic investment strategies, unconditional models may generate biased estimates of performance (e.g.: Jensen, 1972; Dybvig and Ross, 1985; Grinblatt and Titman, 1989). This concern is even more pertinent for bond than for equity funds. On the one hand, bond fund managers tend to be more market timers than security pickers, because their performance relies mostly on the ability to predict future interest rates and adjust the fund's duration accordingly. On the other hand, a lot of bond fund managers invest in derivative securities with time-varying betas, as mentioned by Ayadi and Kryzanowski (2011).

Hence, the performance of our samples of bond and balanced funds is evaluated using a multi-factor model that incorporates conditioning information. To avoid obtaining biased estimates of conditional betas, the model will be estimated with both time-varying alphas and betas, as suggested by Ferson *et al.* (2008). In our conditional model, both alphas and betas are allowed to vary over time as linear functions of a vector of predetermined information variables, Z_{t-1}, which includes the public information available at time *t-1* relevant for predicting returns at time *t*, as suggested by Ferson and Schadt (1996) and Christopherson *et al.* (1998). Therefore, our conditional multi-factor model can be expressed as:

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[109] Although we could not compute an option factor for the Euro-Area funds, we did use an option factor for "Sterling Corporate Bond" funds, measured by the difference in returns between the iBoxx £ Collateralized MBS TR index and the iBoxx £ Gilts TR index, similarly to the approach of Elton *et al.* (1995) and Derwall and Koedijk (2009). However, our subsequent empirical tests showed that this factor was not statistically significant (at conventional levels) for any of the UK SRI funds or their matched-portfolios. Hence, we chose to use our 3-factor model for all fixed-income fund categories.

$$r_{p,t} = \alpha_{0p} + A'_p z_{t-1} + \beta_{0p} Bond_t + \beta'_p (z_{t-1} Bond_t) + \beta_{1p} Default_t + \beta'_{1p} (z_{t-1} Default_t) +$$
$$+ \beta_{2p} Equity_t + \beta'_{2p} (z_{t-1} Equity_t) + \varepsilon_{p,t} \quad [6.2]$$

where z_{t-1} is a vector of the deviations of Z_{t-1} from the (unconditional) average values, β_{0p}, β_{1p} and β_{2p} are average betas (which represent the unconditional mean of the conditional betas), β'_p, β'_{1p} and β'_{2p} are vectors that measure the relationship between conditional betas and the information variables, A'_p is a vector that measures the relationship between conditional alphas and the information variables and α_{0p} is the average (conditional) alpha.

6.3 Data

6.3.1 Fund Samples

To identify existing European SRI fixed-income funds we used the “SRI funds service” provided by Vigeo and Morningstar Europe,[110] which classifies funds according to Morningstar categories, thus providing a higher homogeneity when dealing with funds from different countries. Given that the screening of fixed-income securities is a recent research topic and that most SRI fixed-income funds have started in the 2000s, our sample period goes from January 2000 to December 2009.

Since our main objective is to investigate the differences in performance between SRI and conventional fixed-income funds in the main European markets, our analysis is focused on retail funds domiciled in the Euro-Area countries and in the UK. Since Luxembourg is mainly a distribution centre for European funds (e.g.: Khorana *et al.*, 2005), we have not considered funds domiciled in this country. To be included in our sample, funds have to have records available on Datastream and at least 24 monthly observations across the studied period.

[110] The free service of the “SRI funds service” can be accessed at http://customer.morningstareurope.com/it/avanzi/fundselect/index_free.aspx, accessed in January 2010.

Our overall sample can be further divided into two sub-samples: SRI funds that invest in bonds (SRI bond funds) and SRI funds that invest both in socially responsible bonds and stocks (SRI balanced funds). SRI bond funds were selected from the following three Morningstar categories, which are clearly the most representative ones: “Euro Corporate Bond”, “Sterling Corporate Bond” and “Euro Diversified Bond”. “Euro Corporate Bond” funds invest primarily in Euro-denominated corporate bonds, while “Sterling Corporate Bond” funds invest mainly in corporate-issued securities denominated in UK pounds. According to Morningstar (2009), funds classified as “Euro Diversified Bond” have a more generalist mandate and do not exhibit significant risk concentrations. However, after carefully examining these funds’ prospectuses, we were able to conclude that they invest in both corporate and government Euro-denominated bonds, usually in similar proportions. In addition, since Morningstar has specific categories for fund investing in short-term (“Euro Short Bond” – average maturity lower than 3 years) and long-term debt (“Euro Long Bond” – average maturity greater than 10 years), all the above mentioned categories should be mainly composed by intermediate-term debt, with an average maturity greater than 3 years and lower than 10 years.[111]

In relation to balanced funds, which have a mandate to balance equity and bond investments for a Euro-based investor, we selected funds from the “Euro Cautious Balanced” and “Euro Moderate Balanced” categories. According to Morningstar (2009), in the “Euro Cautious Balanced” category the equity component does not exceed 35% in the normal running of the fund, while in the “Euro Moderate Balanced” category the proportion of equity and bond investments is almost evenly distributed. Therefore, our sample of balanced funds only incorporates funds that invest mainly in bonds or in similar proportions of bonds and equities. In a similar way to our equity fund sample, we have also confirmed that no funds of funds, index funds, institutional funds or different parts of the same fund were included in our fixed-income fund sample. Then, for each SRI fund, we collected the inception date[112] and International Securities Identification Number (ISIN) from the “SRI funds service”.

To act as our reference groups, we have identified all fixed-income conventional funds available to investors in each country and investment category, using the local Morningstar international websites, and collected their inception dates and ISIN. Each SRI fund was, then,

[111] It should be mentioned that the “SRI funds service” also identified some SRI bond funds from other Morningstar categories (e.g.: “Euro Government Bond”, “Euro Short Bond”, “Sterling Diversified Bond”) but, altogether, these included no more than a couple of funds with at least 24 monthly observations available on Datastream. In addition, by the end of our sample period, there were no SRI bond funds in the “Euro Long Bond” or the “Euro High Yield” categories.

[112] Therefore, we assume that the inception date provided by the “SRI funds service” corresponds to the moment when each fund began pursuing an SRI investment policy.

matched against an equally-weighted portfolio of conventional funds according to the following criteria: domicile country, investment category and fund age.[113] In this way, we control for the possible influence of these specific fund characteristics on fixed-income fund performance. We did not match on size, because we were not able to obtain the funds' Total Net Assets for all countries involved and also because that would have involved a trade-off with the other criteria. However, both Derwall and Koedijk (2009), for US SRI fixed-income funds, and Dietze *et al.* (2009), for conventional European corporate bond funds, have not found a statistically significant relationship between size and fixed-income fund performance. On the other hand, Dietze *et al.* (2009) found a significant positive relation between fund age and performance, which means that older European bond funds tend to have higher performance than newly established ones, probably due to better cost structures (i.e., a greater operating efficiency).

Consequently, for each SRI fund we selected a portfolio of conventional funds from the same country and the same Morningstar category, with inception dates that had to be within 18 months of that of the SRI fund with which they were matched. In most cases (more than 70% of our sample) we were able to create portfolios of 3 conventional funds for each SRI, but in some of the countries involved, especially Belgium, Italy and the Netherlands, we could only fulfil the matching requirements with 2 conventional funds for each SRI. In a handful of occasions, when even this became problematic, we selected the two conventional funds with the closest inception dates as long as the mean age of the matched-portfolio was no more than 18 months apart from that of the SRI fund.[114]

Our final sample, described in detail in Appendix 6.1, consists of 38 SRI fixed-income funds (20 SRI bond funds and 18 SRI balanced funds) and 103 characteristics-matched conventional funds (55 bond funds and 48 balanced funds) domiciled in eight European markets: Austria, Belgium, France, Germany, Italy, the Netherlands, Spain and the UK.[115] Table 6.1 provides a decomposition of our SRI fixed-income fund sample per country and investment category.[116]

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113 Derwall and Koedijk (2009) use similar matching criteria, although they also match on fund size.

114 Excluding these few funds brings no material changes to any of our results. In addition, and despite our efforts, we could not create matched-portfolios for 3 SRI bond funds and 6 SRI balanced funds, so we had to exclude them from our final sample.

115 It is worth to mention that, by June 2010, just six months after the end of our sample period, these markets accounted for 80.0% of the European SRI fund industry in terms of assets under management (Vigeo, 2010).

116 In a similar way to our equity fund samples, we were not able to identify non-surviving SRI fixed-income funds. Consequently, we have to recognise that both our SRI and conventional fixed-income fund samples can suffer from survivorship bias. However, since we also match on fund age, both types of funds will have identical life spans. As a result, we believe this shortcoming won't significantly distort our matched-pairs analysis. In addition, studies on conventional funds seem to indicate that survivorship bias has less impact in fixed-income than in equity funds, since the former have a greater stability in their performance than the latter.

Table 6.1 – Number of SRI Fixed-Income Funds per Country and Investment Category

	Austria	Belgium	France	Germany	Italy	Netherlands	Spain	UK	TOTAL
Euro Corporate Bond	-	1	1	-	1	1	-	-	4
Euro Diversified Bond	2	-	5	2	1	-	-	-	10
Sterling Corporate Bond	-	-	-	-	-	-	-	6	6
All SRI Bond Funds	**2**	**1**	**6**	**2**	**2**	**1**	**-**	**6**	**20**
Euro Cautious Balanced	1	-	3	3	3	-	2	-	12
Euro Moderate Balanced	-	2	1	2	1	-	-	-	6
All SRI Balanced Funds	**1**	**2**	**4**	**5**	**4**	**-**	**2**	**-**	**18**
All SRI Fixed-Income Funds	**3**	**3**	**10**	**7**	**6**	**1**	**2**	**6**	**38**

6.3.2 Fund Returns and Benchmark Data

For each fund in our sample, we began by collecting the end of month total return index from Datastream. Then, all fund returns, net of operating expenses but gross of any sales charge, were continuously compounded, including reinvestment of dividends and income distributions. These returns were all denoted in local currency, i.e., Euros for the EMU countries and UK Pounds for the UK funds, with the risk-free rate being proxied by the 1-month Euribor, in the first case, and the 1-month Libor, in the second. Appendix 6.2 presents some summary statistics for the excess returns of the fixed-income SRI funds and their respective matched-portfolios. We can observe that while most SRI bond funds have higher monthly excess returns than their matched-portfolios, for the balanced funds it's exactly the opposite. However, for a 5% significance level, we cannot reject the hypothesis of equal means (or equal medians) between any SRI fund (bond or balanced) and the respective matched-portfolio, as confirmed by (unreported) *t*-tests (or Mann-Whitney tests). In addition, most SRI fixed-income funds have a higher overall volatility than their conventional peers, but differences are only statistically significant, at the 5% level, in 7 cases, according to (unreported) Brown-Forsythe tests.[117]

Our main set of benchmark indices corresponds to the iBoxx Total Return (TR) bond index family, developed by International Index Company Ltd. These indices are appropriate for representing the euro-denominated and the sterling-denominated investment grade corporate bond markets, as confirmed by the fact that banks are starting to offer exchange-

[117] It is also important to mention that, in two cases, SRI fixed-income funds exhibit a significantly lower overall volatility than their matched-portfolios.

traded funds based on iBoxx indices (Dietze *et al.*, 2009).[118] As bond indices we use the iBoxx € Corporate index for the "Euro Corporate Bond" funds, the iBoxx £ Non-Gilts index for the "Sterling Corporate Bond" funds[119] and the iBoxx € Overall index for the "Euro Diversified Bond" funds and also for both categories of balanced funds. Excess returns were computed using the 1-month Euribor as the risk-free rate for the Euro-denominated indices and the 1-month Libor for the Sterling-denominated indices.

Since the iBoxx € High Yield index does not cover our entire sample period,[120] the Euro-Area default spread was computed as the difference in returns between the Merrill Lynch € High-Yield TR index and the iBoxx € Sovereign TR index. In a similar way, the UK default spread corresponds to the return difference between the Merrill Lynch £ High-Yield TR index and the iBoxx £ Gilts TR index.[121]

The stock market variable is measured by the excess returns of the FSTE AW Europe TR index for the Euro-Area fund categories and the excess returns of the FTSE 100 TR index for the UK funds.[122] Data on all benchmark indices was collected from Datastream (in Euros and UK pounds).

Appendix 6.3 presents some summary statistics for the risk factors, as well as their correlation matrixes, for our sample period. The results show that monthly excess returns of the bond indices are, on average, positive for the sample period, whereas for the stock indices these are, on average, negative. For a 5% significance level, the hypothesis of normality is rejected for almost all factors, with the only exception being the iBoxx € Overall index. In addition, since correlations between the variables are relatively low (ranging from -0.2362 to 0.68 for the Euro-Area countries and from 0.0623 to 0.5452 for the UK funds), multicollinearity will not significantly affect our results.

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[118] The iBoxx indices are capitalization-weighted indices that are rebalanced monthly. For the TR indices, the monthly adjustment involves the reinvestment of coupon payments at the beginning of the month. Further details on the iBoxx Index construction methodology, including the specific criteria for inclusion in the indices, are available in IIC (2010) for the Euro-denominated indices and IIC (2011) for the Sterling-denominated indices.

[119] We could also have used the iBoxx £ Corporate TR index for "Sterling Corporate Bond" funds, but our empirical tests (available in Section 6.4.1) showed that the iBoxx £ Non-Gilts index was more appropriate to evaluate the performance of these funds. This index includes all investment-grade bonds that do not qualify for the iBoxx £ Gilts index, including corporate bonds, asset-backed bonds and sub-sovereigns (for example, bonds issued by local governments or supranational entities).

[120] This index, which represents the sub-investment grade fixed-income market for Euro denominated corporate bonds, is only available from 31 December 2002.

[121] The use of alternative default spreads, such as those corresponding to the return difference between the iBoxx (€ or £) Corporate BBB-rated and the iBoxx (€ or £) Corporate AAA-rated TR indices, leads to similar inferences.

[122] We have also used similar indices provided by MSCI (i.e., the MSCI AC Europe and the MSCI UK TR indices, respectively) and the results were practically the same. In fact, correlations between the FSTE and the MSCI indices for our sample period were very close to 1.

6.3.3 Information Variables

The conditional models we employ make use of a set of four 1-month lagged instruments that several studies in the finance literature have shown useful in predicting bond returns. These include a term spread / slope of the term structure (e.g.: Fama and French, 1989; Ilmanen, 1995; Silva *et al.*, 2003; Gebhardt, Hvidkjaer and Swaminathan, 2005; Ayadi and Kryzanowski, 2011), the inverse relative wealth (e.g.: Ilmanen, 1995; Silva *et al.*, 2003; Ayadi and Kryzanowski, 2011), a real bond yield (e.g.: Ilmanen, 1995; Silva *et al.*, 2003; Ayadi and Kryzanowski, 2011) and a dummy variable for the month of January (e.g.: Keim and Stambaugh, 1986; Silva *et al.*, 2003). We chose to use the same instrumental variables as Silva *et al.* (2003) because this is the only study we are aware of that focuses on the predictability of European bond returns.[123]

Since our samples contain funds from the Euro-Area countries and also funds from the UK, we used both Euro-Area variables and UK variables. Another alternative would be to use Global information variables, in line with Barr and Priestley (2004), who found that three quarters, approximately, of the total expected excess returns on government bonds was related to world bond market risk, whereas the remainder was due to local market risk. However, recent studies on the European bond market have provided evidence that these might not be appropriate. In fact, after comparing the differences in the relative importance of world and Eurozone systemic risk on Government bond returns, over the period of January 1999 to June 2008, Abad, Chuliá and Gómez-Puig (2010) found that Eurozone bond markets were less vulnerable to the influence of world risk factors and more vulnerable to EMU risk factors. In addition, in an investigation focused on volatility spillovers in European bond markets, Christiansen (2007) has also found that, for EMU countries, regional effects have become dominant over both own country and global effects, with these last being almost inconsequential. On the other hand, for non-EMU countries their own country effects were stronger.

Hence, for Euro-Area funds (which include the “Euro Corporate Bond”, “Euro Diversified Bond”, “Euro Cautious Balanced” and “Euro Moderate Balanced” fund categories) the term spread variable was measured by the annualized yield spread between a 10-year Euro-Area Government bond yield and the 3-month Euribor rate. For UK funds (i.e., funds from the “Sterling Corporate Bond” fund category) the same variable corresponds to the

[123] It should be mentioned, however, that Ilmanen (1995) also analysed predictability in three European bond markets (France, Germany and the UK) besides the US, Canada and Japan. The remaining studies are all focused on the US or the Canadian bond markets.

annualized yield spread between 10-year UK Government bonds and 3-month UK Treasury bills.[124]

The inverse relative wealth variable, which is used as a proxy for time-varying risk aversion, corresponds to the ratio of past to current real wealth. The past real wealth for the Euro-Area was estimated by an exponentially weighted average of past levels of the FTSE AW Europe index deflated by the Euro-Area Consumer Price Index (CPI). For the UK, we used the exponentially weighted average of past levels of the FTSE 100 index deflated by the UK CPI. Therefore, the inverse relative wealth variable is defined as:

$$IRW_t = ewa\, W_{t-1}/W_t = \left(W_{t-1} + coef \cdot W_{t-2} + coef^2 \cdot W_{t-3} + \ldots\right) \cdot (1 - coef)/W_t$$

where $ewa\ W_{t-1}$ is the exponentially weighted average of the real wealth level up to time $t-1$, W_t is real wealth level at time t and $coef$ is the smoothing coefficient. Although we used a smoothing parameter of 0.90 and a 36-month window, as in Ilmanen (1995), Silva *et al.* (2003) and Ayadi and Kryzanowski (2011), our results are robust to alternative weighting structures. In addition, it is important to mention that the CPI indicators are 1-month lagged, in order to take into account publication lags and, therefore, consider only publicly available information.

The real bond yield variables correspond to the difference between the annualized yield on a 10-year Euro-Area / UK government bond and the year-on-year Euro-Area / UK inflation rate lagged 1-month.[125] Data on all information variables was collected from Datastream. Additionally, to accommodate possible seasonality effects in returns and risk, we also use a January dummy variable, which takes a value of 1 if the next month is the month of January and 0 otherwise.

The statistical treatment of the information variables began with an assessment of their stationarity. Using the Augmented Dickey-Fuller (1979) test, we found that we could not reject the null hypothesis of a unit root for all series. Additionally, the variables exhibited high degrees of persistence, with first-order autocorrelation coefficients being higher than 0.90 in most cases. Hence, in order to avoid spurious regression biases, the information variables were stochastically detrended by subtracting a trailing moving average of their own past values, as in Campbell (1991) and Ferson *et al.* (2003a).

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[124] We have also used the 3-month LIBOR rate instead of the 3-month UK Treasury bill yield and the results were similar.
[125] Therefore, as in Silva *et al.* (2003), the inflation rate of January is used to compute the real bond yield for February and this will be used to predict bond returns in March, and so forth.

After investigating the sensitivity of each information variable to the use of different lags in the detrending procedure, each variable was stochastically detrended with the maximum number of lags that allowed us to obtain a stationary time series and, simultaneously, a first-order autocorrelation coefficient below 0.90. The objective of this procedure is to solve the persistence and non-stationarity problems without losing any long-term relationships that really exist between the variables.[126] Following Ferson and Schadt (1996) and Ayadi and Kryzanowski (2011), the information variables will also be demeaned in the conditional tests, to allow an easier interpretation of the estimated coefficients and reduce scale problems.

Appendices 6.4 and 6.5 present some summary statistics for these variables, as well as their correlation matrix. We can observe that the correlations between the instruments range from -0.2280 to 0.6215 for the Euro-Area variables and from -0.5388 to 0.2973 for the UK variables. In this way, we should avoid multicollinearity problems.

6.4 Empirical Results

6.4.1 Fund Performance

Table 6.2 presents the results of applying our conditional multi-factor model to each fixed-income SRI fund and to their respective matched-portfolios.

[126] As a result, we used a 12-month lag for both inverse relative wealth variables and for the UK real bond yield variable, an 8-month lag for the Euro-Area real bond yield and the UK term spread indicator and a 5-month lag for the Euro-Area term spread variable.

Table 6.2 – Fixed-Income Fund Performance and Risk Estimates

This table presents estimates of performance (average conditional alphas expressed in percentage) and risk (average conditional betas) for each fixed-income SRI fund in our sample, as well as for each characteristics-matched portfolio, using the conditional 3-factor model of equation [6.2].[127] *Bond* corresponds to the monthly excess returns of the iBoxx € Corporate index for the "Euro Corporate Bond" funds, the iBoxx £ Non-Gilts index for the "Sterling Corporate Bond" funds and the iBoxx € Overall index for the "Euro Diversified Bond" and the balanced funds. Excess returns were computed using the 1-month Euribor as the risk-free rate for the Euro-denominated indices and the 1-month Libor for the Sterling-denominated indices. *Default* is a default spread variable, computed as the difference in returns between the Merrill Lynch € High-Yield TR index and the iBoxx € Sovereign TR index for the Euro-Area funds or the return difference between the Merrill Lynch £ High-Yield TR index and the iBoxx £ Gilts TR index for the UK funds. *Equity* corresponds to the monthly excess returns of the FSTE AW Europe TR index for the Euro-Area fund categories or the excess returns of the FTSE 100 TR index for the UK funds. The predetermined information variables are a term spread, the inverse relative wealth, a real bond yield and a January dummy. The first three instruments are demeaned, lagged 1-month and stochastically detrended by subtracting a trailing moving average of their own past values. W_1, W_2 and W_3 correspond to the probability values of the χ-square statistic of the Newey and West (1987) Wald test on the existence of time-varying alphas, time-varying betas and the joint time-variation in alphas and betas, respectively. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for bond funds and Panel B for balanced funds.

Panel A: Bond Funds

Code		α_{0P}	β_{0P} (*Bond*)	β_{1P} (*Default*)	β_{2P} (*Equity*)	W_1	W_2	W_3	R^2 *adj.*
BEC1	SRI Fund	-0.1214	1.0978 ***	-0.0002	0.0158	0.0000	0.0000	0.0000	97.59%
	Matched-portfolio	-0.1109 **	0.9058 ***	0.1461 ***	-0.0207	0.0000	0.0000	0.0000	96.85%
BEC2	SRI Fund	-0.1111 ***	0.9651 ***	0.0098	0.0199	0.0050	0.0000	0.0000	96.20%
	Matched-portfolio	-0.0127	0.9735 ***	0.0044	0.0065	0.0000	0.0000	0.0000	97.41%
BEC3	SRI Fund	-0.1855 ***	0.7886 ***	-0.0156	0.0203	0.0000	0.0000	0.0000	96.31%
	Matched-portfolio	-0.1648 ***	0.5668 ***	-0.0232	0.0501 ***	0.0007	0.0514	0.0000	93.39%
BEC4	SRI Fund	0.0348	0.7106 ***	-0.0479	-0.0316	0.1105	0.0000	0.0000	62.49%
	Matched-portfolio	-0.1585 ***	0.8949 ***	-0.0184	0.0028	0.0324	0.0000	0.0000	80.22%
BED1	SRI Fund	-0.0733	0.9015 ***	-0.0010	0.0023	0.6671	0.0000	0.0000	86.05%
	Matched-portfolio	-0.1158 **	0.7034 ***	0.0250	0.0055	0.0000	0.0000	0.0000	76.71%
BED2	SRI Fund	-0.1540 *	0.9440 ***	-0.0079	-0.0202	0.0003	0.0000	0.0000	78.84%
	Matched-portfolio	-0.0154	0.7404 ***	-0.1115 ***	0.0243	0.0000	0.0000	0.0000	81.67%
BED3	SRI Fund	-0.0281	0.8250 ***	-0.0279 *	0.0081	0.2821	0.0000	0.0000	77.07%
	Matched-portfolio	-0.0533 ***	0.8860 ***	-0.0022	0.0101 **	0.8724	0.0000	0.0000	95.22%
BED4	SRI Fund	-0.0733 **	0.7604 ***	0.0128	0.0057	0.0354	0.0000	0.0000	88.48%
	Matched-portfolio	-0.0748 ***	0.8388 ***	-0.0307 ***	0.0144	0.8167	0.2164	0.0035	90.97%
BED5+	SRI Fund	-0.0348	0.5865 ***	0.0412 *	-0.0014	----	0.0000	0.0000	85.46%
	Matched-portfolio	-0.0636	0.8910 ***	0.0216	0.0051	----	0.0000	0.0000	90.92%
BED6	SRI Fund	-0.0548 ***	0.9009 ***	-0.0173 *	-0.0068	0.5610	0.0006	0.0000	94.85%
	Matched-portfolio	-0.0990 ***	0.7878 ***	0.0179	-0.0151 **	0.4905	0.0000	0.0000	89.89%
BED7	SRI Fund	0.0115	0.7170 ***	-0.0364 *	0.0377 **	0.6796	0.0614	0.0388	67.19%
	Matched-portfolio	0.0015	0.7966 ***	-0.0483 **	0.0075	0.1948	0.0000	0.0000	80.22%
BED8	SRI Fund	-0.1631 ***	1.0230 ***	0.0370 **	0.0029	0.0592	0.0000	0.0000	94.80%
	Matched-portfolio	-0.0759 ***	0.5832 ***	-0.0168	-0.0095	0.0499	0.0000	0.0000	86.39%
BED9	SRI Fund	-0.0345	1.1402 ***	0.0743 ***	-0.0044	0.6500	0.0000	0.0000	97.24%
	Matched-portfolio	-0.1649 **	0.8730 ***	0.1931 ***	-0.0142	0.0013	0.0466	0.0000	86.76%
BED10	SRI Fund	-0.0501	0.7943 ***	-0.0415 **	0.0082	0.0012	0.0000	0.0000	92.63%
	Matched-portfolio	-0.1237 ***	0.8078 ***	0.0543 ***	-0.0071	0.0007	0.0000	0.0000	95.77%
BSC1	SRI Fund	-0.2209 ***	1.0775 ***	0.0842 ***	0.0215	0.0001	0.0000	0.0000	87.94%
	Matched-portfolio	0.0036	0.9334 ***	0.0186	0.0504 ***	0.0000	0.0002	0.0000	89.78%
BSC2	SRI Fund	-0.1967 **	0.8292 ***	0.2370 ***	0.0396	0.6515	0.0000	0.0000	77.03%
	Matched-portfolio	0.0691	0.9392 ***	0.1013 ***	-0.0101	0.0024	0.0000	0.0000	88.92%
BSC3	SRI Fund	-0.1575	0.9541 ***	0.1534 **	-0.0035	0.1624	0.0000	0.0000	68.44%
	Matched-portfolio	-0.0291	0.9590 ***	-0.0103	-0.0074	0.0006	0.0002	0.0000	92.14%

[127] Given the number of parameters of our full conditional multi-factor model, we have only applied it to funds with at least 36 monthly observations. For the only two funds that had between 24 and 36 monthly observations (signalled with a +), we applied the partial conditional version of the model, i.e., we only allowed for time-varying betas and not alphas.

Table 6.2 – Bond Fund Performance and Risk Estimates (continued)

Code		α_{0p}		β_{0p} (Bond)		β_{1p} (Default)		β_{2p} (Equity)		W_1	W_2	W_3	R^2 adj.
BSC4	SRI Fund	-0.2094	***	0.9590	***	0.0307		-0.0268		0.1414	0.0000	0.0000	88.38%
	Matched-portfolio	-0.0854	*	1.0040	***	0.1019	***	0.0017		0.0180	0.0000	0.0000	96.22%
BSC5	SRI Fund	-0.1308	*	0.8800	***	-0.0146		-0.0047		0.0012	0.0000	0.0000	90.53%
	Matched-portfolio	0.2228	***	1.2519	***	0.0615	**	-0.0001		0.0000	0.0000	0.0000	96.08%
BSC6+	SRI Fund	0.3169		0.5752	**	0.0351		0.0624		----	0.0000	0.0000	87.30%
	Matched-portfolio	0.3634		1.0251	***	0.1588	**	-0.0238		----	0.0000	0.0000	95.54%
Average SRI Funds		**-0.0818**		**0.8715**		**0.0253**		**0.0073**					**85.74%**
Average Matched-portfolios		**-0.0344**		**0.8681**		**0.0322**		**0.0035**					**90.05%**
					Panel B: Balanced Funds								
Code		α_{0p}		β_{0p} (Bond)		β_{1p} (Default)		β_{2p} (Equity)		W_1	W_2	W_3	R^2 adj.
BAL1	SRI Fund	-0.1677	**	0.2863	***	0.0087		0.2597	***	0.8547	0.0000	0.0000	62.41%
	Matched-portfolio	-0.0142		0.4963	***	0.1171	***	0.1971	***	0.0111	0.0000	0.0000	79.38%
BAL2	SRI Fund	-0.0502		0.4829	***	-0.0342		0.3012	***	0.0559	0.0000	0.0000	93.76%
	Matched-portfolio	-0.0854		0.3962	***	-0.0292		0.1758	***	0.0161	0.0000	0.0000	73.87%
BAL3	SRI Fund	-0.2009	**	0.5358	***	0.0007		0.1896	***	0.0001	0.0000	0.0000	74.24%
	Matched-portfolio	-0.0620		0.6385	***	0.0481		0.1417	***	0.0000	0.0000	0.0000	77.85%
BAL4	SRI Fund	-0.1920		0.4368	**	0.0006		0.3212	***	0.0029	0.0000	0.0000	84.23%
	Matched-portfolio	0.0090		0.5205	***	-0.0498		0.1454	***	0.4555	0.0000	0.0000	80.77%
BAL5	SRI Fund	-0.2121	*	-0.0603		-0.1888		0.2969	***	0.2059	0.0000	0.0000	71.74%
	Matched-portfolio	-0.1836	***	0.1888	**	0.0291		0.2464	***	0.0079	0.0000	0.0000	92.24%
BAL6	SRI Fund	-0.1420	***	0.3083	***	-0.0368	*	0.1076	***	0.0671	0.0000	0.0000	90.81%
	Matched-portfolio	-0.1155		0.1171		-0.0102		0.1579	***	0.5488	0.0000	0.0000	87.50%
BAL7	SRI Fund	-0.0340		0.4257	***	-0.0656	***	0.1756	***	0.0134	0.0000	0.0000	54.73%
	Matched-portfolio	-0.1193	***	0.3062	***	0.1213	***	0.1034	***	0.0171	0.0000	0.0000	88.52%
BAL8	SRI Fund	-0.0056		0.3322	***	-0.0824		0.2845	***	0.0012	0.0000	0.0000	79.45%
	Matched-portfolio	-0.0130		0.2003	***	-0.0396		0.2497	***	0.6908	0.0000	0.0000	89.20%
BAL9	SRI Fund	-0.0427		0.2400	*	-0.0417		0.3423	***	0.8967	0.0000	0.0000	90.15%
	Matched-portfolio	0.0446		0.5499	***	-0.0765		0.2324	***	0.2515	0.0000	0.0000	82.55%
BAL10	SRI Fund	-0.1360	***	0.6926	***	-0.0087		0.1060	***	0.0043	0.0121	0.0000	76.87%
	Matched-portfolio	-0.0760	**	0.3456	***	0.0074		0.0699	***	0.9530	0.0000	0.0000	61.64%
BAL11	SRI Fund	-0.2083	***	0.5614	***	-0.1315	***	0.1555	***	0.0520	0.0000	0.0000	49.11%
	Matched-portfolio	-0.1385	***	0.3258	***	0.0040		0.0957	***	0.0160	0.0000	0.0000	75.34%
BAL12	SRI Fund	-0.1324	***	0.4981	***	-0.0479	***	0.0624	***	0.0006	0.0000	0.0000	80.45%
	Matched-portfolio	-0.1061	***	0.3936	***	-0.0568	**	0.1977	***	0.5193	0.0000	0.0000	89.87%
BAL13	SRI Fund	-0.1951	**	0.5021	***	-0.0523		0.5371	***	0.7091	0.0000	0.0000	90.08%
	Matched-portfolio	-0.1892	**	0.6095	***	0.1431	***	0.4329	***	0.0000	0.0000	0.0000	88.38%
BAL14	SRI Fund	-0.1593	***	0.5579	***	-0.0017		0.4789	***	0.4727	0.0000	0.0000	90.65%
	Matched-portfolio	-0.0739		0.2732	***	0.0129		0.5154	***	0.1031	0.0001	0.0000	90.30%
BAL15	SRI Fund	-0.2179		0.2487		-0.0210		0.4368	***	0.3137	0.0000	0.0000	56.29%
	Matched-portfolio	-0.1571	***	0.5865	***	0.0125		0.4078	***	0.0014	0.0000	0.0000	92.75%
BAL16	SRI Fund	-0.0641		0.2376	*	-0.1176	*	0.3430	***	0.0751	0.0000	0.0000	56.69%
	Matched-portfolio	-0.2078	***	0.3815	***	-0.0688		0.3429	***	0.1294	0.0000	0.0000	86.67%
BAL17	SRI Fund	0.0432		0.3257	**	-0.0972		0.4606	***	0.1574	0.0000	0.0000	91.78%
	Matched-portfolio	-0.0527		0.1091		-0.0582		0.3631	***	0.0032	0.0000	0.0000	93.67%
BAL18	SRI Fund	-0.2567	**	0.2239	*	-0.0474		0.4028	***	0.5368	0.0000	0.0000	79.50%
	Matched-portfolio	-0.1294	**	0.4169	***	-0.0506	**	0.4283	***	0.4377	0.0000	0.0000	95.08%
Average SRI Funds		**-0.1319**		**0.3798**		**-0.0536**		**0.2923**					**76.27%**
Average Matched-portfolios		**-0.0928**		**0.3809**		**0.0031**		**0.2502**					**84.75%**

In the first place, the results of the Wald tests unequivocally reinforce the appropriateness of using conditional models in evaluating fixed-income fund performance. At the usual significance levels, all balanced funds and all but one of the bond funds exhibit time-varying betas. Additionally, the majority of the funds present time-varying alphas (64% of the bond funds and 53% of the balanced funds) and not a single fund rejects the joint time-variation of alphas and betas. Second, in comparison with the unconditional version of this model, whose results are presented in Appendix 6.6, the incorporation of the lagged information variables increases the explanatory power of the models considerably. In relation to the unconditional version, the conditional model provides higher adjusted R^2's for approximately 92% of the funds, with increases of 3.95% and 5.75%, on average, for the bond and balanced fund categories, respectively.[128]

The adjusted R^2's of the bond funds reach average values of 85.74% for SRI funds and 90.05% for their matched-portfolios, which indicate that the conditional model performs well in explaining bond fund returns. As to the balanced funds, adjusted R^2's are not as high, probably as a result of a higher dispersion in investment scope and styles, but still reasonably high, reaching average values of 76.27% and 84.75% for SRI and conventional funds, respectively.

As we can observe, the performance of both SRI and conventional funds is negative in most cases and statistically significant for the majority of our funds. At the usual significance levels, 50% of the SRI bond funds and 55% of their matched-portfolios significantly underperform their benchmarks, as well as 56% of the SRI balanced funds and 50% of the respective matched-portfolios. On the other hand, there are only a few positive alphas, from which only one is statistically significant. Therefore, these results are consistent with most studies on conventional bond fund performance (e.g.: Blake *et al.*, 1993; Elton *et al.*, 1995; Maag and Zimmermann, 2000; Silva *et al.*, 2003; Ferson, Henry and Kisgen, 2006; Dietze *et al.*, 2009), which report evidence of underperformance or non-superior performance. In addition, they are also consistent with the results of Derwall and Koedijk (2009), who report significantly negative alphas for US SRI and conventional bond funds. On the other hand, while both Cortez *et al.* (2009) and Derwall and Koedijk (2009) found evidence of neutral

[128] We also used the unconditional 3-factor model to evaluate which bond index was more appropriate to explain the returns of the UK "Sterling Corporate Bond" funds. This robustness check was motivated by the fact that many of these funds, both SRI and conventional, pointed out that their benchmark was a £ Non-Gilts index and not a £ Corporate Bond index. Appendix 6.7 presents a comparison between the results obtained at the individual fund level (Table A) and at the portfolio level (Table B), using both the iBoxx £ Non-Gilts and the iBoxx £ Corporate TR indices. The results for the individual funds show that the iBoxx £ Non-Gilts TR index leads to higher adjusted R^2's for 67% of the funds (with increases of 1.73% for the SRI funds and 3.21% for the conventional funds, on average) and also to considerably higher betas for all funds. Since similar evidence is obtained when using fund portfolios, we chose to use the iBoxx £ Non-Gilts TR index to construct the bond factor for the UK funds. In contrast, a similar analysis for the "Euro Corporate Bond" funds showed that the iBoxx € Corporate TR index was much more appropriate for these funds than the iBoxx € Non-Sovereigns TR index.

performance for European and US SRI balanced funds, respectively, the majority of European SRI balanced funds in our sample exhibits significantly negative alphas.

Although the percentage of funds with significantly negative alphas is similar between SRI and conventional funds, both SRI fixed-income fund categories present lower average conditional alphas than their peers, with differences reaching -0.0474% per month for the bond funds and -0.0391% per month for the balanced funds. To examine if the alphas of the SRI funds were significantly different than the alphas of the conventional funds we used both parametric (*t*-tests) and non-parametric tests (Mann-Whitney *U*-tests). The results of these tests, available in Appendix 6.8, show that differences in performance are not significant for both bond and balanced fund categories, using both parametric and non-parametric tests.[129] Therefore, our results for European SRI bond funds are consistent with the findings of Derwall and Koedijk (2009) for US SRI bond funds. However, while US SRI balanced funds significantly outperform conventional funds, we find no significant differences in performance for European balanced funds.

Nevertheless, it is very interesting to see that the results for the bond funds vary considerably between funds from the Euro-Area countries (i.e., funds from the "Euro Corporate Bond" and "Euro Diversified Bond" fund categories) and the UK funds (i.e., the "Sterling Corporate Bond" funds). After splitting our bond fund sample into these two categories, we find evidence that Euro-Area SRI bond funds perform slightly better than their matched-portfolios (on average, differences reach 0.0139% per month), whereas UK SRI bond funds perform considerably worse than their conventional peers, with differences reaching an average of 0.1905% per month. After testing the significance of these differences, we find no significant differences between the alphas of the Euro-Area SRI bond funds and the alphas of their matched-portfolios. Yet, UK SRI bond funds significantly underperform their peers, at the 5% level, using the non-parametric test. In addition, the results of the unconditional model, presented in Appendix 6.9, reinforce this finding, with this significant underperformance being valid under both parametric and non-parametric tests at the same significance level.

Hence, to further assess the robustness of our inferences, we constructed two equally-weighted portfolios of UK bond funds, one for the SRI funds and another for the conventional funds, and analysed the significance of the differences between the two fund categories by means of a "difference" portfolio. The results of these tests, presented in Appendix 6.10, show

[129] Similar evidence was obtained with the unconditional model, with the only significant difference being the fact that, with this last specification, SRI balanced funds seem to underperform their matched-portfolios significantly, although only with the parametric test and only at the 10% level, as we can confirm in Appendix 6.9.

UK SRI bond funds significantly underperform their matched-portfolios, at the 5% level, by an ever higher margin of 0.2108% per month, i.e., more than 2.5% per year, with the conditional model. Additionally, even with the unconditional model, the underperformance of UK SRI bond funds is still significant (at the 5% level) and substantial, reaching approximately 2% per year (0.1637% per month).[130]

A possible justification for an underperformance of SRI fixed-income funds in relation to conventional funds could be related to the expenses they charge.[131] In fact, since SRI funds incur in additional costs by acquiring information on social, environmental and governance aspects of the companies and countries in which they invest and, subsequently, spend time converting that data into investment decisions, they could have higher expense rations than their peers, as documented by Bauer *et al.* (2005) for SRI equity funds. Nevertheless, Derwall and Koedijk (2009) found that the expenses charged by US SRI fixed-income funds match those charged by conventional funds.

In our case, given the magnitude of the underperformance of UK SRI bond funds, even the existence of higher expense ratios associated to SRI funds could not certainly fully account for differences in performance. In addition, based on the information available at the Morningstar website and on the individual fund's prospectuses, UK SRI bond funds in our sample have an average annual Total Expense Ratio (TER) of around 1.11% only. A closer look at the results in Appendix 6.10 provides an additional hint that could help to explain these results: UK SRI funds are significantly more exposed to high-yield bonds and, consequently, to default risk than their peers. This is in clear contrast with the results of Derwall and Koedijk (2009), which reported significantly lower exposures to high-yield bonds for US SRI bond funds than for conventional funds.

In terms of market sensitivities, and turning to pure bond funds first, Panel A of Table 6.2 shows that they have considerably high exposures to the bond factor, which are significant at the 1% level in practically all cases. Exposures to the default variable are also relevant and statistically significant for half of our sample. Although the European high-yield bond market is still far less developed than the US market, 33% of our bond funds have significant exposures to low-grade bonds, especially in the UK market. Since the default spread variable

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130 It is worth to mention that even if we had used the iBoxx £ Corporate index to construct the bond factor for the UK funds, the results would have been very similar, with SRI funds significantly underperforming by 0.2114% per month with the conditional model (at the 1% level) and by 0.1664% per month with the unconditional model (at the 5% level).

131 The relationship between expense ratios and performance has received considerable attention in conventional bond mutual fund studies, which have been mainly conducted in the US market. For this market, several studies (e.g.: Blake *et al.*, 1993; Khan and Rudd, 1995) found a significant negative relation between expense ratios and performance. However, conclusions seem to differ in the European market, where the few studies conducted report an insignificant relation between these parameters (e.g.: Maag and Zimmermann, 2000; Dietze *et al.*, 2009).

was computed as the return difference between a high-yield index and a government bond index, the significant negative exposure to this factor may also be explained by significant exposure to government bonds. In fact, we ran auxiliary regressions for all funds with significant negative exposures to the default variable (all “Euro Diversified Bond” funds) and found that they all exhibited significant exposures (at the 1% level) to the excess returns of a government bond index, proxied by the iBoxx € Sovereign TR index. Furthermore, significant loadings on the equity variable are found for only 13% of our sample, approximately, most probably because, according to Morningstar,[132] bond funds in our sample invest the majority (at least 80%) of their assets in bonds.[133]

Statistical tests for differences in investment styles between SRI bond funds and conventional funds, available in Appendix 6.11, show no significant differences in any of their risk exposures, using both parametric and non-parametric tests. These results, which are based on individual fund regressions, are also valid for UK bond funds. Therefore, they are in contrast to those obtained using a portfolio-level analysis (Appendix 6.10), which have shown significant differences between UK SRI bond funds and their matched-portfolios in terms of their exposure to the default spread variable.

Given the relatively low proportion of bond funds with significant exposures to equities, we have also estimated a full conditional 2-factor model for these funds, similar to that of equation [6.2] but without the equity variable, as well as its cross-products with each of the predetermined information variables. From the results of this additional robustness test, presented in Appendix 6.12, we make two important observations: (1) the explanatory power of the conditional 3-factor model is higher than that of the 2-factor model for 73% of our bond funds, with increases in adjusted R^2’s reaching an average of 0.74% for SRI funds and 1.09% for their matched-portfolios; (2) the performance estimates obtained with the 2-factor model are similar to those reported in Panel A of Table 6.2, with differences in the average conditional alphas between SRI and conventional funds being practically the same (-0.0484% and -0.0474% per month for the 2-factor and 3-factor models, respectively). In addition, (unreported) statistical tests for the differences in the alphas of SRI and conventional funds do not change any of our previous inferences.[134]

[132] Available at http://www.morningstar.com/InvGlossary/morningstar_category.aspx.

[133] It is important to mention that, with the unconditional multi-factor model, the percentage of bond funds with significant exposures to the default spread (60%) and the equity variables (30%) is considerably higher, as we can confirm in Appendix 6.6.

[134] Specifically, we found no significant differences in performance between SRI and conventional funds when considering all bond funds. However, while no significant differences were found between the alphas of the Euro-Area SRI bond funds and their matched-portfolios, with SRI funds outperforming by an average of 0.0110% per month, UK SRI bond funds significantly underperformed their peers by 0.1871% per month, on average, with differences being significant at the 5% level with the non-parametric test. Additionally, the alpha estimate of the “difference” portfolio constructed for the UK funds showed a significant underperformance (at the 5% level) of SRI funds of -0.1931% per month.

In relation to balanced funds, Panel B of Table 6.2 clearly shows the relevance of the bond and equity variables. Indeed, 90% of these funds exhibit significant exposures to the bond factor and all funds have significance exposures (at the 1% level) to the equity factor, especially funds classified as “Euro Moderate Balanced” (i.e., codes BAL13 to BAL18). When compared with pure bond funds, balanced funds exhibit lower exposures to the bond factor and higher exposures to the equity factor, reflecting their significant investments in both bonds and stocks. If we compare our factor loadings with those obtained by Derwall and Koedijk (2009), we can conclude that our sample of European balanced funds is substantially more invested in bonds and less invested in equities than their US balanced fund sample. The default variable is the least important in the models, but still statistically significant for approximately 30% of our sample.[135] Furthermore, statistical tests for the differences in risk exposures between SRI balanced funds and conventional funds (Appendix 6.11) show that the only significant difference is related to the default spread variable. In fact, SRI balanced funds are significantly (at the 5% level) less exposed to the default spread variable than their matched-portfolios, according to both parametric and non-parametric tests.

6.4.2 Fixed-Income Fund Performance and Investment Styles across Different Market States

In this section we aim to assess if the more long-term perspective of SRI fixed-income funds, in relation to conventional funds, provides them an additional protection from market downturns. Recent research on the performance of SRI equity funds found that they tend to perform better during recessions than during periods of expansion (Areal *et al.*, 2010), in line with the results obtained for conventional equity mutual funds (e.g.: Wang, 2010; Glode, 2011; Kosowski, 2011). However, we are not aware of any study that investigates if the performance and investment styles of fixed-income funds, both SRI and conventional, varies considerably across different market states.

[135] Again, like with bond funds, this percentage is slightly higher (36%) with the unconditional multi-factor model, as we can confirm in Appendix 6.6.

In order to fill this gap, we begin by identifying the different market states across our sample period, based on the business cycles provided by the National Bureau of Economic Research (NBER).[136] From January 2000 to December 2009, the NBER identified two recession periods: April 2001 to November 2001 and January 2008 to June 2009. All the remaining periods are considered periods of expansion.

To analyse the performance and risk estimates of SRI and conventional fixed-income funds, during both expansion and recession periods, we add a dummy variable to our unconditional 3-factor model, in order to obtain the coefficients for each market state. Consequently, our new specification is given by the following regression:

$$r_{p,t} = \alpha_p + \alpha_{rec,p}\,\mathrm{D_t} + \beta_p\,Bond_t + \beta_{rec,p}\,Bond_t\,\mathrm{D_t} + \beta_{1p}Default_t + \beta_{1rec,p}Default_t\,\mathrm{D_t} + \\ + \beta_{2p}\,Equity_t + \beta_{2rec,p}\,Equity_t\,\mathrm{D_t} + \varepsilon_{p,t} \qquad [6.3]$$

where $\mathrm{D_t}$ is a dummy variable that takes a value of zero in periods of expansion and a value of one in periods of recession.

The results of applying equation [6.3] to our SRI and conventional fixed-income fund samples are presented in Table 6.3. As we can observe, there is little evidence of significant shifts in performance between recession and expansion periods. In fact, at the 5% level, only 5 SRI funds (2 SRI bond and 3 SRI balanced funds) and 2 matched-portfolios of conventional funds (1 bond and 1 balanced), which represent 13% and 5% of our samples, respectively, exhibit significant $\alpha_{rec,p}$ coefficients. Nevertheless, the contrast between the results obtained for bond and balanced fund categories is very interesting.

[136] Available at http://www.nber.org/cycles.html.

Table 6.3 – Fixed-Income Fund Performance and Risk Estimates during Recession and Expansion Periods

This table presents estimates of performance (alphas expressed in percentage) and risk for each fixed-income SRI fund in our sample, as well as for each characteristics-matched portfolio, across recession and expansion periods, based on the NBER business cycles. A dummy variable with a value of one in recessions and zero in expansions is included in our unconditional 3-factor model, as specified in equation [6.3]. *Bond* corresponds to the monthly excess returns of the iBoxx € Corporate index for the "Euro Corporate Bond" funds, the iBoxx £ Non-Gilts index for the "Sterling Corporate Bond" funds and the iBoxx € Overall index for the "Euro Diversified Bond" and the balanced funds. Excess returns were computed using the 1-month Euribor as the risk-free rate for the Euro-denominated indices and the 1-month Libor for the Sterling-denominated indices. *Default* is a default spread variable, computed as the difference in returns between the Merrill Lynch € High-Yield TR index and the iBoxx € Sovereign TR index for the Euro-Area funds or the return difference between the Merrill Lynch £ High-Yield TR index and the iBoxx £ Gilts TR index for the UK funds. *Equity* corresponds to the monthly excess returns of the FSTE AW Europe TR index for the Euro-Area fund categories or the excess returns of the FTSE 100 TR index for the UK funds. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for bond funds and Panel B for balanced funds.

Panel A: Bond Funds

Code		α_p	$\alpha_{rec,p}$	β_p (Bond)	$\beta_{rec,p}$ (Bond)	β_{1p} (Default)	$\beta_{1rec,p}$ (Default)	β_{2p} (Equity)	$\beta_{2rec,p}$ (Equity)	R^2 adj.
BEC1	SRI Fund	-0.036	-0.118	1.100 ***	-0.074	0.030	-0.110 ***	-0.002	0.091 **	92.4%
BEC1	Matched-portfolio	-0.119 *	-0.254	0.871 ***	0.007	0.070 **	0.084 *	-0.003	-0.008	94.4%
BEC2	SRI Fund	-0.053 *	-0.537 ***	0.913 ***	0.034	-0.002	-0.052	0.010	0.042	90.0%
BEC2	Matched-portfolio	-0.078 ***	0.335 ***	1.046 ***	-0.066	0.046 ***	-0.083 ***	0.009	0.015	97.1%
BEC3	SRI Fund	-0.112 ***	0.127	0.915 ***	-0.046	0.076 **	-0.110	0.008	0.074	79.8%
BEC3	Matched-portfolio	-0.184 ***	-0.055	0.567 ***	-0.002	0.012	-0.017	0.058 ***	-0.022	93.6%
BEC4	SRI Fund	-0.042	-0.045	0.874 ***	-0.408 ***	-0.051	0.026	-0.021	-0.018	64.5%
BEC4	Matched-portfolio	-0.113 **	0.073	1.059 ***	-0.313 **	-0.024	-0.027	0.013	0.076 *	79.2%
BED1	SRI Fund	-0.075 **	-0.083	1.040 ***	-0.264 ***	0.020	0.005	0.007	-0.017	86.1%
BED1	Matched-portfolio	-0.185 ***	0.126	0.659 ***	-0.067	0.020	0.029	0.022	-0.064	63.5%
BED2	SRI Fund	-0.086	-0.062	1.046 ***	-0.204	0.018	0.004	0.019	-0.042	78.3%
BED2	Matched-portfolio	-0.090 *	0.069	0.878 ***	-0.137	-0.072 *	0.028	0.016	-0.011	70.2%
BED3	SRI Fund	-0.090 ***	0.163 **	0.914 ***	-0.329 ***	-0.048 ***	0.085 ***	0.026 **	-0.077 ***	81.5%
BED3	Matched-portfolio	-0.056 ***	0.039	0.893 ***	0.031	0.000	-0.019 *	0.006	0.019 *	95.1%
BED4	SRI Fund	-0.071 ***	0.122	0.755 ***	0.110	0.036 *	-0.035	-0.001	0.035 *	84.3%
BED4	Matched-portfolio	-0.096 ***	0.057	0.866 ***	-0.029	-0.015	-0.005	0.011	-0.015	91.7%
BED5	SRI Fund	-0.102 **	0.063	0.518 ***	0.100	-0.005	0.126 ***	0.058 ***	-0.112 ***	84.9%
BED5	Matched-portfolio	-0.027	-0.018	0.996 ***	-0.082	0.009	0.069	0.011	0.006	81.1%
BED6	SRI Fund	-0.074 ***	-0.047	0.933 ***	-0.133 ***	-0.011	0.022 *	-0.003	-0.022 **	94.6%
BED6	Matched-portfolio	-0.077 ***	-0.045	0.722 ***	0.146 **	0.009	0.037 **	-0.012 **	-0.008	89.7%
BED7	SRI Fund	0.006	0.106	0.707 ***	0.110	0.006	-0.069	0.005	0.021	65.0%
BED7	Matched-portfolio	0.003	0.001	0.819 ***	0.047	-0.005	-0.028	-0.003	0.004	75.5%

Table 6.3 – Fixed-Income Fund Performance and Risk Estimates during Recession and Expansion Periods (continued)

Code		α_p	$\alpha_{rec,p}$	β_p (*Bond*)	$\beta_{rec,p}$ (*Bond*)	β_{1p} (*Default*)	$\beta_{1rec,p}$ (*Default*)	β_{2p} (*Equity*)	$\beta_{2rec,p}$ (*Equity*)	R^2 *adj.*
BED8	SRI Fund	-0.107 ***	-0.124	1.042 ***	0.012	0.090 ***	-0.090 ***	0.006	0.024	91.3%
	Matched-portfolio	-0.039	0.150	0.558 ***	0.054	0.017	-0.004	-0.014	-0.002	73.8%
BED9	SRI Fund	-0.029	0.176 *	1.122 ***	0.017	0.080 ***	-0.081 ***	0.007	0.066 ***	95.1%
	Matched-portfolio	-0.091 *	-0.264 *	0.779 ***	0.060	0.121 ***	0.053	0.022	-0.035	82.5%
BED10	SRI Fund	-0.081 **	-0.082	0.794 ***	-0.010	-0.012	-0.037	0.018 *	-0.028	90.0%
	Matched-portfolio	-0.115 ***	0.081	0.782 ***	0.108 *	0.067 **	0.008	0.006	-0.023 *	92.9%
BSC1	SRI Fund	-0.137 ***	-0.467 *	1.050 ***	0.037	0.130 **	-0.086	0.002	-0.015	84.0%
	Matched-portfolio	-0.007	-0.004	0.946 ***	-0.029	0.027	0.042	0.055 ***	-0.057 ***	89.2%
BSC2	SRI Fund	-0.180 **	-0.065	0.761 ***	0.142	0.222 ***	-0.074	0.003	0.100	76.7%
	Matched-portfolio	0.123 *	-0.129	0.974 ***	0.192	0.069 ***	0.085	-0.008	0.026	85.3%
BSC3	SRI Fund	-0.034	-0.122	0.993 ***	0.002	0.192	0.082	-0.028	-0.009	63.8%
	Matched-portfolio	-0.120 ***	0.116	0.969 ***	0.041	-0.035 *	0.015	0.016	-0.035	91.9%
BSC4	SRI Fund	-0.158 ***	-0.406 **	0.854 ***	0.366 ***	0.029	-0.058	-0.018	-0.044	85.1%
	Matched-portfolio	-0.185 ***	0.090	0.966 ***	0.048	0.055 ***	0.033	0.018	0.002	93.6%
BSC5	SRI Fund	-0.158 ***	0.064	0.899 ***	-0.072	-0.045	-0.004	-0.008	0.001	89.4%
	Matched-portfolio	0.106	0.059	1.170 ***	-0.048	0.000	0.007	0.012	0.039	94.0%
BSC6	SRI Fund	-0.136 *	0.185	0.946 ***	0.072	-0.029	0.007	-0.005	-0.035	79.9%
	Matched-portfolio	0.311 *	-0.351	0.994 ***	0.033	0.110 ***	-0.001	-0.065 *	0.074	93.7%
Average SRI Funds		**-0.088**	**-0.058**	**0.909**	**-0.027**	**0.036**	**-0.022**	**0.004**	**0.002**	**82.8%**
Average Matched-portfolios		**-0.052**	**0.004**	**0.876**	**0.000**	**0.024**	**0.015**	**0.009**	**-0.001**	**86.4%**
Panel B: Balanced Funds										
Code		α_p	$\alpha_{rec,p}$	β_p (*Bond*)	$\beta_{rec,p}$ (*Bond*)	β_{1p} (*Default*)	$\beta_{1rec,p}$ (*Default*)	β_{2p} (*Equity*)	$\beta_{2rec,p}$ (*Equity*)	R^2 *adj.*
BAL1	SRI Fund	-0.106	0.071	0.319 ***	0.003	0.029	0.010	0.232 ***	-0.069	54.2%
	Matched-portfolio	-0.004	0.023	0.508 ***	-0.206	0.071 **	0.032	0.189 ***	0.018	75.7%
BAL2	SRI Fund	-0.088 **	0.016	0.418 ***	0.266 ***	-0.008	0.002	0.299 ***	-0.065 **	93.2%
	Matched-portfolio	-0.126 *	-0.023	0.354 ***	0.274 *	-0.006	-0.004	0.176 ***	-0.101 ***	73.0%
BAL3	SRI Fund	-0.079	-0.348 *	0.445 ***	0.222	0.031	0.052	0.177 ***	-0.108 *	65.5%
	Matched-portfolio	-0.064	-0.197	0.478 ***	0.241	0.026	0.007	0.187 ***	-0.114 **	65.6%
BAL4	SRI Fund	-0.045	-0.446	0.556 ***	0.248	0.024	0.003	0.280 ***	0.021	69.8%
	Matched-portfolio	-0.073	-0.083	0.480 ***	0.170	-0.046	0.089 *	0.175 ***	-0.124 **	72.9%

Table 6.3 – Fixed-Income Fund Performance and Risk Estimates during Recession and Expansion Periods (continued)

Code		α_p	$\alpha_{rec,p}$	β_p (*Bond*)	$\beta_{rec,p}$ (*Bond*)	β_{1p} (*Default*)	$\beta_{1rec,p}$ (*Default*)	β_{2p} (*Equity*)	$\beta_{2rec,p}$ (*Equity*)	R^2 *adj.*
BAL5	SRI Fund	-0.201 **	0.194	0.389 ***	-0.426	0.049	-0.051	0.271 ***	-0.059	64.8%
BAL5	Matched-portfolio	-0.045	-0.390 ***	0.266 ***	0.062	0.030	0.015	0.244 ***	-0.043	90.4%
BAL6	SRI Fund	-0.134 ***	0.090	0.236 ***	0.137	-0.005	0.015	0.111 ***	-0.063 *	61.6%
BAL6	Matched-portfolio	-0.031	-0.064	0.218 ***	0.141	-0.014	0.058 *	0.185 ***	-0.044	86.5%
BAL7	SRI Fund	-0.159 ***	0.102	0.499 ***	0.027	0.001	-0.050	0.177 ***	-0.131 ***	61.6%
BAL7	Matched-portfolio	-0.104 ***	0.110	0.344 ***	-0.138 **	0.111 ***	0.002	0.118 ***	0.027	86.9%
BAL8	SRI Fund	-0.006	-0.158	0.305 ***	0.140	-0.053	0.064	0.279 ***	-0.082	70.5%
BAL8	Matched-portfolio	-0.071	0.047	0.237 ***	0.046	-0.006	0.019	0.246 ***	-0.067	86.4%
BAL9	SRI Fund	-0.024	-0.004	0.202 ***	0.238	0.023	-0.059	0.286 ***	0.029	91.0%
BAL9	Matched-portfolio	-0.011	-0.122	0.527 ***	0.144	-0.087	0.075	0.248 ***	-0.089	84.0%
BAL10	SRI Fund	-0.172 ***	0.134	0.684 ***	0.100 *	-0.023 *	0.033 **	0.112 ***	-0.022	77.3%
BAL10	Matched-portfolio	-0.072 **	-0.035	0.309 ***	-0.001	0.006	0.025	0.060 ***	-0.005	56.3%
BAL11	SRI Fund	-0.247 ***	0.145	0.540 ***	-0.002	-0.073 ***	0.015	0.140 ***	-0.062	40.0%
BAL11	Matched-portfolio	-0.152 ***	0.056	0.323 ***	0.053	0.023	-0.033	0.095 ***	0.015	68.2%
BAL12	SRI Fund	-0.125 ***	0.225 **	0.520 ***	-0.078	-0.021	-0.020	0.052 ***	0.021	75.3%
BAL12	Matched-portfolio	-0.189 ***	0.110	0.331 ***	0.188 **	-0.040 *	0.027	0.235 ***	-0.099 ***	90.6%
BAL13	SRI Fund	-0.204 **	0.027	0.321 ***	0.423	-0.094 ***	0.130 **	0.544 ***	-0.093	90.0%
BAL13	Matched-portfolio	-0.084	-0.079	0.331 **	0.334	0.077	0.081	0.447 ***	-0.082	83.7%
BAL14	SRI Fund	-0.133 **	0.053	0.415 ***	0.221	-0.046	0.023	0.476 ***	0.042	91.0%
BAL14	Matched-portfolio	-0.141 **	0.269	0.227 **	0.086	-0.005	0.078	0.534 ***	-0.099 ***	91.0%
BAL15	SRI Fund	-0.470 ***	0.554	0.188	-0.118	-0.011	-0.021	0.477 ***	-0.192	55.8%
BAL15	Matched-portfolio	-0.081	0.023	0.572 ***	-0.040	-0.017	0.014	0.388 ***	0.051	93.0%
BAL16	SRI Fund	-0.245 *	-0.296	0.101	0.187	-0.222 **	0.334 ***	0.446 ***	-0.426 ***	56.2%
BAL16	Matched-portfolio	-0.193 ***	-0.069	0.335 ***	0.075	-0.023	0.004	0.341 ***	-0.104	83.0%
BAL17	SRI Fund	-0.023	-0.094	0.530 ***	-0.215	0.086	-0.023	0.364 ***	0.057	91.3%
BAL17	Matched-portfolio	-0.052	-0.122	0.209 *	0.052	0.077	-0.099	0.297 ***	-0.007	90.7%
BAL18	SRI Fund	-0.242 ***	0.918 ***	0.155	0.091	-0.031	0.006	0.400 ***	0.111	79.3%
BAL18	Matched-portfolio	-0.228 ***	0.246 *	0.299 ***	0.309 ***	-0.052	0.028	0.455 ***	-0.062 *	95.0%
Average SRI Funds		**-0.150**	**0.066**	**0.379**	**0.081**	**-0.019**	**0.026**	**0.285**	**-0.061**	**71.6%**
Average Matched-portfolios		**-0.095**	**-0.017**	**0.353**	**0.099**	**0.007**	**0.023**	**0.257**	**-0.052**	**81.8%**

SRI bond funds underperform conventional funds by an average of 0.036% per month during expansions. During recessions, the performance of SRI funds deteriorates, whereas conventional fund performance improves marginally. As a result, during recessions, the underperformance of SRI bond funds is even higher, reaching an average of 0.097% per month. Nevertheless, statistical tests for differences in performance between SRI and conventional funds over expansions and recessions, available in Appendices 6.13 and 6.14, respectively, show that none of these differences is statistically significant according to both parametric and non-parametric tests. Additionally, consistent with the results obtained in section 6.4.1, when we split the results of SRI bond funds into Euro-Area funds and UK funds, we find that differences are small and not statistically significant for Euro-Area funds (SRI bond funds outperform conventional funds by an average of 0.022% per month during expansions and underperform by an average of 0.023% per month during recessions), whereas differences for UK funds indicate a significant underperformance for SRI funds, in relation to conventional funds, during both recession and expansion periods. On average, UK SRI bond funds underperform their matched-portfolios by 0.172% per month during expansions and by 0.271% per month during recessions. In both cases, differences are statistically significant according to parametric (at the 5% level) and non-parametric (at the 10% level) tests.

In this way, SRI bond funds, and especially those that are UK-based, do not seem to provide any additional protection against market downturns in relation to conventional funds. On the contrary, when compared with their matched-portfolios, SRI bond funds perform worse during periods of recession than during periods of expansion.

As to balanced funds, we find that SRI funds underperform their conventional peers during expansions by 0.055% per month, on average, and this difference is statistically significant (although only at the 10% level) according to both parametric and non-parametric tests. However, while the performance of SRI funds improves considerably during recessions, the performance of conventional funds decreases. Consequently, SRI balanced funds outperform conventional funds during recessions by an average of 0.028% per month. Although this difference is not statistically significant, it seems that, in comparison to their matched-portfolios, SRI balanced funds provide an additional protection against market downturns.

In terms of investment styles, we find little evidence of significant shifts across different market states. In fact, at the 5% level, only 6 SRI funds and 5 matched-portfolios, which represent 16% and 13% of our samples, respectively, present a significantly different exposure to the bond market during recession and expansion periods. Besides, only 8 SRI funds and 2 matched-portfolios exhibit significantly different exposures to the default spread variable in the two market states. Furthermore, significantly different exposures to the equity market between recession and expansion periods are only found for 8 SRI funds and 6 matched-portfolios (i.e., 21% and 16% of our samples, respectively).

Finally, to further confirm if the risk exposures of SRI and conventional funds change significantly over recession and expansion periods, we computed the coefficients for each market state and performed some additional significance tests. The results of these (unreported) tests showed no significant differences in the risk exposures of SRI and conventional fixed-income funds over both recession and expansion periods.

6.4.3 SRI vs. Conventional Benchmarks

Several studies on SRI equity funds have shown that conventional benchmarks have a higher explaining power of SRI fund returns than SRI benchmarks (e.g.: Bauer *et al.*, 2005; Bauer *et al.*, 2007; Cortez *et al.*, 2009, *forthcoming*). This is a puzzling result since SRI indices, just as SRI funds, are built using social screens. However, to the best of our knowledge, this topic has never been addressed in the context of SRI fixed-income funds, i.e., using SRI bond indices.[137] Therefore, in this section we aim to investigate whether SRI benchmarks, including bond and equity indices, are as powerful as conventional benchmarks in explaining SRI fixed-income fund returns.

Our main set of SRI benchmarks comes from E. Capital Partners (ECPI). Due to the availability of the ECPI indices, our analysis is conducted for the period of January 2001 to December 2009. In addition, given the unavailability of an appropriate SRI index for the "Sterling Corporate Bond" funds, this analysis will be restricted to funds from the 7 Euro-Area countries, which make up a total of 32 SRI fixed-income funds (14 SRI bond and 18 SRI balanced funds).

As bond indices we use the ECPI Ethical Euro Corporate Bond TR index for the "Euro Corporate Bond" funds and the ECPI Ethical Euro Composite Bond TR index for the "Euro Diversified Bond" and also for the balanced funds.[138] Our SRI stock market index is the ECPI

[137] However, it is important to mention that Cortez *et al.* (2009) have studied if the returns of European SRI balanced funds were better explained by SRI or conventional indices, but they used only equity indices. In addition, they did not analyse SRI bond funds.
[138] The ECPI Ethical Euro Composite Bond Index is composed by the following three indices: the ECPI Euro Government Bond index (50%), the ECPI Euro Corporate Bond index (30%) and the ECPI Euro Agency and Supranational Bond index (20%). ECPI Total Return indices involve the reinvestment of coupon payments at the beginning of the month, as with the iBoxx indices. In fact, the ECPI index construction methodologies, whose details are available in ECPI (2011), have many similarities with those used by iBoxx.

Ethical Euro Index.[139] Excess returns were computed using the 1-month Euribor as the risk-free rate. Data on all SRI benchmark indices was collected from Datastream.

Appendix 6.15 presents some summary statistics for the SRI bond and equity benchmarks, as well as their correlation matrixes, for our sample period. As with conventional benchmarks, results show that monthly excess returns are, on average, positive for the SRI bond indices and negative for the equity index.[140] Since correlations between the variables are relatively low (ranging from -0.2066 to 0.6692), multicollinearity will not be an additional concern.

The results of our analysis, presented in Table 6.4, show that SRI indices are as powerful as conventional indices in explaining SRI fixed-income fund returns. On the one hand, the use of SRI benchmarks increases the explanatory power of the models for 53% of our SRI fixed-income funds. On the other hand, adjusted R^2's are 0.15% higher, on average, with the conventional benchmarks. Furthermore, the average conditional betas of the bond and equity factors are higher with the conventional benchmarks, but differences are marginal (on average, 0.0216 and 0.0097 for the bond and equity factors, respectively).

[139] We have also used the FTSE4GOOD Europe TR index as our SRI equity benchmark and obtained very similar results. In fact, for our sample period, the correlation between this index and the ECPI Ethical Index Euro was of 0.985.

[140] In addition, at the usual significance levels, we cannot reject the hypothesis of equal means, medians or variances between SRI and conventional benchmarks, as confirmed by additional (unreported) statistical tests.

Table 6.4 – SRI Fixed-Income Fund Performance and Risk Estimates: SRI vs. Conventional Benchmarks

This table presents estimates of performance (average conditional alphas expressed in percentage) and risk (average conditional betas) for each SRI fixed-income fund, using the conditional 3-factor model of equation [6.2], with both SRI and conventional benchmarks. As conventional bond indices, we use the iBoxx € Corporate TR index for the "Euro Corporate Bond" funds and the iBoxx € Overall TR index for the "Euro Diversified Bond" and the balanced funds. The SRI bond indices used are ECPI Ethical Euro Corporate Bond TR index for the "Euro Corporate Bond" funds and the ECPI Ethical Euro Composite Bond TR index for the "Euro Diversified Bond" and the balanced funds. The conventional equity index used is the FTSE AW Europe TR index, while the SRI equity index is the ECPI Ethical Euro. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987).

Panel A: Bond Funds										
	SRI Benchmarks					**Conventional Benchmarks**				
Code	α_{0p}	β_{0p} (*Bond*)	β_{1p} (*Default*)	β_{2p} (*Equity*)	R^2 *adj.*	α_{0p}	β_{0p} (*Bond*)	β_{1p} (*Default*)	β_{2p} (*Equity*)	R^2 *adj.*
BEC1	-0.0801	1.1019 ***	-0.0001	0.0162	97.95%	-0.1214	1.0978 ***	-0.0002	0.0158	97.59%
BEC2	-0.1035 ***	0.9616 ***	0.0205	0.0162	95.48%	-0.1111 ***	0.9651 ***	0.0098	0.0199	96.20%
BEC3	-0.1588 ***	0.7850 ***	-0.0036	0.0120	96.59%	-0.1855 ***	0.7886 ***	-0.0156	0.0203	96.31%
BEC4	0.0417	0.6979 ***	-0.0433	-0.0217	62.97%	0.0348	0.7106 ***	-0.0479	-0.0316	62.49%
BED1	-0.0560	0.8884 ***	0.0045	0.0052	86.28%	-0.0733%	0.9015 ***	-0.0010	0.0023	86.05%
BED2	-0.1587 *	0.9423 ***	-0.0035	-0.0159	78.87%	-0.1540 *	0.9440 ***	-0.0079	-0.0202	78.84%
BED3	-0.0395	0.8269 ***	-0.0199	-0.0082	79.62%	-0.0362	0.8277 ***	-0.0248	-0.0006	80.05%
BED4	-0.0795 **	0.7655 ***	0.0167	0.0004	88.39%	-0.0733 **	0.7604 ***	0.0128	0.0057	88.48%
BED5[+]	-0.0542	0.5725 ***	0.0550 **	-0.0083	88.21%	-0.0348	0.5865 ***	0.0412 *	-0.0014	85.46%
BED6	-0.0614 ***	0.8998 ***	-0.0088	-0.0151 **	94.65%	-0.0548 ***	0.9009 ***	-0.0173 *	-0.0068	94.85%
BED7	0.0067	0.7250 ***	-0.0366 *	0.0368 **	68.43%	0.0115	0.7170 ***	-0.0364 *	0.0377 **	67.19%
BED8	-0.1724 ***	1.0096 ***	0.0435 **	0.0020	94.57%	-0.1631 ***	1.0230 ***	0.0370 **	0.0029	94.80%
BED9	-0.0404	1.1288 ***	0.0833 ***	-0.0049	97.28%	-0.0345	1.1402 ***	0.0743 ***	-0.0044	97.24%
BED10	-0.0520	0.7801 ***	-0.0461 ***	0.0142	92.61%	-0.0501	0.7943 ***	-0.0415 **	0.0082	92.63%
Average All SRI Bond Funds	**-0.0720**	**0.8632**	**0.0044**	**0.0021**	**87.28%**	**-0.0747**	**0.8684**	**-0.0013**	**0.0034**	**87.01%**

Table 6.3 – SRI Fixed-Income Fund Performance and Risk Estimates: SRI vs. Conventional Benchmarks (continued)

Panel B: Balanced Funds										
	SRI Benchmarks					Conventional Benchmarks				
Code	α_{0p}	β_{0p} (*Bond*)	β_{1p} (*Default*)	β_{2p} (*Equity*)	R^2 *adj.*	α_{0p}	β_{0p} (*Bond*)	β_{1p} (*Default*)	β_{2p} (*Equity*)	R^2 *adj.*
BAL1	-0.1104	0.3059 ***	-0.0040	0.2384 ***	67.83%	-0.1717 **	0.3380 ***	-0.0120	0.2601 ***	70.71%
BAL2	-0.0348	0.4673 ***	-0.0213	0.2864 ***	93.36%	-0.0502	0.4829 ***	-0.0342	0.3012 ***	93.76%
BAL3	-0.1599 *	0.5056 ***	0.0214	0.1670 ***	70.33%	-0.2009 **	0.5358 ***	0.0007	0.1896 ***	74.24%
BAL4	-0.1246	0.3519 *	0.0184	0.3089 ***	84.31%	-0.1920	0.4368 **	0.0006	0.3212 ***	84.23%
BAL5	-0.1327	-0.1088	-0.1756	0.2946 ***	71.73%	-0.2121 *	-0.0603	-0.1888	0.2969 ***	71.74%
BAL6	-0.1257 ***	0.2871 ***	-0.0316	0.1038 ***	92.68%	-0.1420 ***	0.3083 ***	-0.0368 *	0.1076 ***	90.81%
BAL7	-0.0128	0.4325 ***	-0.0584 **	0.1674 ***	56.71%	-0.0340	0.4257 ***	-0.0656 ***	0.1756 ***	54.73%
BAL8	0.0754	0.3026 ***	-0.0740	0.2820 ***	78.98%	-0.0056	0.3322 ***	-0.0824	0.2845 ***	79.45%
BAL9	0.0361	0.1747 *	-0.0408	0.3433 ***	91.82%	-0.0427	0.2400 *	-0.0417	0.3423 ***	90.15%
BAL10	-0.1490 ***	0.6974 ***	-0.0045	0.0934 ***	92.44%	-0.1650 ***	0.7065 ***	-0.0119	0.1050 ***	92.00%
BAL11	-0.1717 ***	0.5526 ***	-0.1208 ***	0.1428 ***	49.88%	-0.2083 ***	0.5614 ***	-0.1315 ***	0.1555 ***	49.11%
BAL12	-0.1242 ***	0.4906 ***	-0.0437 ***	0.0620 ***	81.79%	-0.1324 ***	0.4981 ***	-0.0479 ***	0.0624 ***	80.45%
BAL13	-0.0967	0.4193 ***	0.0168	0.4762 ***	87.25%	-0.1657 **	0.4950 ***	-0.0289	0.5383 ***	92.10%
BAL14	-0.1001	0.4753 ***	0.0706 **	0.4225 ***	89.79%	-0.1810 ***	0.5411 ***	0.0421	0.4656 ***	91.86%
BAL15	-0.1875	0.2741	-0.0092	0.4098 ***	56.83%	-0.2521 *	0.2716	-0.0201	0.4325 ***	53.69%
BAL16	0.0120	0.2299	-0.0843	0.3134 ***	51.76%	-0.0641	0.2376 *	-0.1176 *	0.3430 ***	56.69%
BAL17	0.1522	0.2102 *	-0.0972	0.4554 ***	91.99%	0.0432	0.3257 **	-0.0972	0.4606 ***	91.78%
BAL18	-0.2088	0.2140 *	-0.0167	0.3853 ***	78.95%	-0.2567 **	0.2239 *	-0.0474	0.4028 ***	79.50%
Average All SRI Balanced Funds	**-0.0813**	**0.3490**	**-0.0364**	**0.2751**	**77.13%**	**-0.1352**	**0.3834**	**-0.0511**	**0.2914**	**77.61%**
Average All SRI Fixed-Income Funds	**-0.0772**	**0.5740**	**-0.0185**	**0.1557**	**81.57%**	**-0.1087**	**0.5956**	**-0.0293**	**0.1654**	**81.72%**

+ Since this fund has less than 36 monthly observations, alpha was estimated by means of a partial conditional multi-factor model, i.e., considering only time-varying betas and not alphas.

If we compare the results obtained for the pure bond funds (Panel A) and the balanced funds (Panel B), we can see that the average adjusted R^2's obtained with the SRI benchmarks are 0.27% higher for bond funds and 0.48% lower for balanced funds. For bond funds, the average conditional betas of the bond and equity factors are very similar when using SRI and conventional benchmarks (differences reach average values of only 0.0052 and 0.0014 for the bond and equity factors, respectively). For balanced funds, differences are more pronounced (0.0343 and 0.0162, on average, for the bond and equity factors, respectively), with SRI benchmarks leading to lower average conditional betas for the vast majority of the funds. Therefore, the results obtained for the balanced funds show that conventional indices are somewhat better than SRI indices in explaining fund returns, although differences are relatively small and clearly not as high as those obtained by Cortez *et al.* (2009).

In terms of performance estimates, SRI benchmarks lead to higher average conditional alphas for 72% of the funds, with differences reaching 0.0315% per month, on average, when compared with the conventional benchmarks. For bond funds, differences in alphas are very small (0.0027%, on average) and do not change any of our previous inferences (43% of these funds still present significantly negative alphas at the usual levels). On the other hand, for balanced funds, conditional alphas increase an average of 0.0539% per month, with individual fund alphas increasing in all situations and generating significant improvements in performance. With SRI benchmarks, only 28% of the funds have significantly negative alphas, whereas with conventional benchmarks the same indicator reaches 61%.

6.5 Conclusions

Although we can find many empirical studies on the performance of SRI equity funds, the performance of SRI funds investing in fixed-income securities has remained practically unexplored. In fact, there are only a couple of studies on this subject and both focused on the US market. In the European market, to the best of our knowledge, there is no study on the performance of SRI bond funds. In this chapter, we tried to fill this gap, by investigating the performance of 38 SRI fixed-income funds, from seven European markets, over the period of January 2000 to December 2009. Our sample includes pure bond funds (SRI bond funds), as well as balanced funds investing predominantly in bonds or in similar proportions of bonds and equities (SRI balanced funds).

Our results show that, although both SRI bond funds and SRI balanced funds present lower average conditional alphas than their peers, differences are not statistically significant. These results are in line with those of Derwall and Koedijk (2009) for US SRI bond funds. Nevertheless, while Euro-Area SRI bond funds perform slightly (but not significantly) better than their matched-portfolios, UK SRI bond funds perform significantly worse than their conventional peers. The significant underperformance of the UK funds is substantial, reaching more than 2% per year, and robust to the use of alternative performance evaluation models and also different methodologies to assess significance, both at the individual fund level (parametric and non-parametric tests) and at the portfolio level ("difference" portfolios). Possible differences in expense ratios cannot fully explain these differences in performance. However, we also find that UK SRI funds are significantly more exposed to high-yield bonds and, consequently, to default risk, than their peers and this can be an important factor when financial markets pass through turbulent times.

After analysing fund performance and investment styles across different market states, we find little evidence of statistically significant shifts for both SRI and conventional fixed-income funds. In terms of investment styles, we find no significant changes in the risk exposures of SRI and conventional fixed-income funds during both periods of recession and periods of expansion. However, in terms of performance, results are slightly different, especially for balanced funds.

In fact, for bond funds, differences in performance between SRI and conventional funds are not statistically significant, over both expansion and recession periods, when we consider all bond funds or just the Euro-Area funds. On the other hand, consistent with our previous findings, UK SRI bond funds significantly underperform their matched-portfolios during both recession and expansion periods. Therefore, SRI bond funds, and especially those that are UK-based, do not seem to provide any protection against market downturns, since they perform even worse (although not significantly) than their matched-portfolios during periods of recession than during periods of expansion. For balanced funds, SRI funds underperform conventional funds significantly (at the 10% level) during expansions, but outperform their peers, although not significantly, during recessions. In this way, the performance of SRI balanced funds, in relation to conventional funds, improves significantly during recessions, suggesting that they may provide some additional benefits in times of crisis.

Furthermore, our results also show that SRI indices are as powerful as conventional indices in explaining SRI fixed-income fund returns. Therefore, unlike previous studies on

SRI equity funds (e.g.: Bauer *et al.*, 2005; Bauer *et al.*, 2007; Cortez *et al.*, 2009, *forthcoming*), which have shown that conventional equity benchmarks have a higher explanatory power of SRI fund returns than SRI benchmarks, our results show that SRI bond indices perform at least as well as conventional indices in explaining the returns of SRI fixed-income funds.

Overall, since the performance of European SRI fixed-income funds is, in general, comparable to the performance of characteristics-matched conventional funds, socially responsible investors do not seem to bear any sacrifice in financial performance for diversifying their investments in order to include fixed-income securities. In fact, SRI in the fixed-income area seems financially worthwhile. However, socially responsible investors in the UK may have to be willing to pay a price for satisfying their environmental, social and governance beliefs and accept lower financial performance from SRI bond funds when compared to their conventional peers.

APPENDICES

Appendix 6.1 – Fixed-Income Funds in the Sample

This appendix describes our sample of SRI fixed-income funds, as well as their characteristics-matched portfolios of conventional funds. For each fund we present the following characteristics: fund name, Morningstar category, legal domicile country (AT = Austria; BE = Belgium; DE = Germany; ES = Spain; FR = France; IT = Italy; NL = Netherlands; UK = United Kingdom), fund type (SRI / Ethical or conventional), start date and International Securities Identification Number (ISIN). In addition, we also report the age of each SRI fund and the mean age of the respective matched-portfolio, both expressed in months. Table A presents bond funds while Table B refers to balanced funds.

Table A – Bond Funds

Code	Fund Name	Morningstar Category	Domicile	Fund Type	Start Date	Age / Mean Age (months)	ISIN
BEC1	Dexia Sust Euro Corporate Bonds C Acc	Euro Corporate Bond	BE	SRI	11-10-2005	51	BE0945493345
BEC1	Amonis Corporate Bonds Europe (C)	Euro Corporate Bond	BE	Conventional	12-10-2001	63	BE0058024184
BEC1	Transparant B Bond Corporate Acc	Euro Corporate Bond	BE	Conventional	27-11-2007		BE0947722329
BEC2	SG Oblig Corporate ISR	Euro Corporate Bond	FR	SRI	23-08-2002	89	FR0007074844
BEC2	Allianz Euro Investment Grade R (C)	Euro Corporate Bond	FR	Conventional	14-01-2002	90	FR0010714949
BEC2	LBPAM Obli Crédit C/D	Euro Corporate Bond	FR	Conventional	11-03-2002		FR0000982217
BEC2	Regard Euro Crédit	Euro Corporate Bond	FR	Conventional	28-05-2003		FR0007083365
BEC3	Pioneer Obbligazionario Euro Corporate Etico dis A Inc	Euro Corporate Bond	IT	SRI	29-09-2003	76	IT0003531610
BEC3	BIM Corporate Mix	Euro Corporate Bond	IT	Conventional	03-04-2001	93	IT0003054183
BEC3	Eurizon Focus Obbligazioni Euro Corporate	Euro Corporate Bond	IT	Conventional	07-04-2003		IT0003459473
BEC4	Triodos Meerwaarde Obligatiefonds	Euro Corporate Bond	NL	SRI	12-10-2000	111	NL0000289759
BEC4	Delta Lloyd Euro Credit Fund	Euro Corporate Bond	NL	Conventional	03-10-2001	95	NL0000286482
BEC4	ING Euro Credit Obligatie Fonds Inc	Euro Corporate Bond	NL	Conventional	26-06-2002		NL0006311854
BED1	KEPLER Ethik Rentenfonds T	Euro Diversified Bond	AT	SRI	05-05-2003	80	AT0000642632
BED1	HYPO Rendite Plus T Acc	Euro Diversified Bond	AT	Conventional	17-12-2003	68	AT0000633078
BED1	RT Euro Rent Plus T Acc	Euro Diversified Bond	AT	Conventional	05-11-2004		AT0000619473
BED2	ESPA Vinis Bond T	Euro Diversified Bond	AT	SRI	02-01-2006	48	AT0000686084
BED2	Schoellerbank Zinsstruktur Plus T Acc	Euro Diversified Bond	AT	Conventional	01-09-2005	48	AT0000497417
BED2	ESPA Bond Euro-Reserva T Acc	Euro Diversified Bond	AT	Conventional	11-01-2006		AT0000A001L7
BED2	Klassik Dynamic Anleihen T Acc	Euro Diversified Bond	AT	Conventional	08-05-2006		AT0000A00NF7
BED3	LIGA-Pax-RentUnion Inc	Euro Diversified Bond	DE	SRI	28-12-1989	241	DE0008491226
BED3	CS Rent Zukunft A Inc	Euro Diversified Bond	DE	Conventional	02-10-1989	240	DE0008477878
BED3	EuroRent-INVEST Inc	Euro Diversified Bond	DE	Conventional	27-12-1989		DE0008479254
BED3	UBS (D) Rent-Euro Inc	Euro Diversified Bond	DE	Conventional	02-01-1990		DE0009752501

Appendix 6.1 – SRI Fixed-Income Funds in the Sample (continued)

Code	Fund Name	Morningstar Category	Domicile	Fund Type	Start Date	Age / Mean Age (months)	ISIN
BED4	KCD-Union Nachhaltig-RENTEN Inc	Euro Diversified Bond	DE	SRI	01-03-2001	106	DE0005326524
BED4	Degussa-Renten-Universal-Fonds Acc	Euro Diversified Bond	DE	Conventional	06-09-2000	102	DE0005316996
BED4	HL BasisInvest FT Inc	Euro Diversified Bond	DE	Conventional	10-10-2000		DE0005317317
BED4	Monega Euro-Bond Inc	Euro Diversified Bond	DE	Conventional	04-12-2000		DE0005321061
BED5	MAM Obligations Ethique (C)	Euro Diversified Bond	FR	SRI	26-03-2007	34	FR0000971012
BED5	Simbad Obligations C	Euro Diversified Bond	FR	Conventional	08-02-2006	37	FR0010260018
BED5	Fédéris Obligations Euros R (C)	Euro Diversified Bond	FR	Conventional	19-12-2005		FR0010258251
BED5	Marignan Taux	Euro Diversified Bond	FR	Conventional	22-10-2007		FR0010523290
BED6	Dexia Ethique Gestion Obligataire (C)	Euro Diversified Bond	FR	SRI	21-03-2000	118	FR0000934978
BED6	SG Valor Taux Euro (C)	Euro Diversified Bond	FR	Conventional	21-10-1998	122	FR0000448854
BED6	MMA Euro-Spread	Euro Diversified Bond	FR	Conventional	30-11-1998		FR0000441651
BED6	Etoile Obli 3-5 Ans	Euro Diversified Bond	FR	Conventional	12-09-2001		FR0010540880
BED7	Macif Obligations Développement Dur (C)	Euro Diversified Bond	FR	SRI	25-06-2001	103	FR0000975559
BED7	AXA IM Euro All Maturities C/D	Euro Diversified Bond	FR	Conventional	26-07-2002	92	FR0000987182
BED7	Capitop Revenus (D)	Euro Diversified Bond	FR	Conventional	12-03-2002		FR0000983330
BED7	CNP Assur Sogepcrédit A/I	Euro Diversified Bond	FR	Conventional	15-05-2002		FR0000984270
BED8	BNP Paribas Obli Ethéis (C)	Euro Diversified Bond	FR	SRI	24-11-2003	73	FR0010076893
BED8	CMNE Moyen Terme (C)	Euro Diversified Bond	FR	Conventional	19-05-2003	71	FR0000170888
BED8	Regard Positif Taux	Euro Diversified Bond	FR	Conventional	07-04-2004		FR0010060012
BED8	BNP Paribas Obli Long Terme (C)	Euro Diversified Bond	FR	Conventional	23-08-2004		FR0010098210
BED9	HSBC Oblig Développement Durable A (C)	Euro Diversified Bond	FR	SRI	12-02-2004	71	FR0010061283
BED9	BNP Paribas Obli Moyen Terme (C)	Euro Diversified Bond	FR	Conventional	22-09-2004	62	FR0010112615
BED9	MMA Euroblig C/D	Euro Diversified Bond	FR	Conventional	06-12-2004		FR0010127043
BED9	Alcis Capi (C)	Euro Diversified Bond	FR	Conventional	24-12-2004		FR0010135327
BED10	Gestielle Etico per AIL A	Euro Diversified Bond	IT	SRI	02-09-2002	88	IT0003329502
BED10	Gestielle Obbligazionario Corp A	Euro Diversified Bond	IT	Conventional	21-03-2001	100	IT0003066641
BED10	UBI Pramerica Euro Medio Lungo Termine Acc	Euro Diversified Bond	IT	Conventional	27-03-2002		IT0003242184
BSC1	AEGON Ethical Corporate Bond A Acc	Sterling Corporate Bond	UK	SRI	28-04-2000	117	GB0005342646
BSC1	Clerical Medical Income Inc	Sterling Corporate Bond	UK	Conventional	03-01-1999	130	GB0005590525
BSC1	Schroder Corporate Bond Acc	Sterling Corporate Bond	UK	Conventional	25-01-1999		GB0004433594
BSC1	Standard Life AAA Income R Acc	Sterling Corporate Bond	UK	Conventional	04-06-1999		GB0006604820

Appendix 6.1 – SRI Fixed-Income Funds in the Sample (continued)

Code	Fund Name	Morningstar Category	Domicile	Fund Type	Start Date	Age / Mean Age (months)	ISIN
BSC2	Aviva Investors Sustainable Future Corporate Bond SC1 Inc	Sterling Corporate Bond	UK	SRI	19-02-2001	107	GB0030028988
BSC2	Old Mutual Corporate Bond Acc	Sterling Corporate Bond	UK	Conventional	17-06-2000	99	GB00B1XG6V40
BSC2	Royal Liver UK Fixed Interest	Sterling Corporate Bond	UK	Conventional	25-03-2002		GB0030311376
BSC2	Halifax Corporate Bond B	Sterling Corporate Bond	UK	Conventional	11-08-2002		GB0031809097
BSC3	Rathbone Ethical Bond Acc	Sterling Corporate Bond	UK	SRI	07-05-2002	92	GB0030957137
BSC3	MS Sterling Corporate Bond A Acc	Sterling Corporate Bond	UK	Conventional	03-02-2003	80	GB0032487661
BSC3	Standard Life Select Income R Acc	Sterling Corporate Bond	UK	Conventional	29-04-2003		GB0032784737
BSC3	RBS Extra Income 1	Sterling Corporate Bond	UK	Conventional	23-09-2003		GB0033520544
BSC4	CIS Corporate Bond Income Trust Inc	Sterling Corporate Bond	UK	SRI	29-09-2003	76	GB0033583427
BSC4	Threadneedle UK Corp Bd Ret Grs GBP	Sterling Corporate Bond	UK	Conventional	08-12-2003	71	GB0033749739
BSC4	MandG Strategic Corporate Bond A Acc	Sterling Corporate Bond	UK	Conventional	20-02-2004		GB0033828137
BSC4	AXA Sterling Corporate Bond R Acc	Sterling Corporate Bond	UK	Conventional	31-03-2004		GB0034229137
BSC5	Standard Life Ethical Corporate Bond Acc	Sterling Corporate Bond	UK	SRI	02-11-2005	50	GB00B0LNNH51
BSC5	LandG (Barclays) Monthly Income Trust	Sterling Corporate Bond	UK	Conventional	06-12-2005	47	GB00B034PD63
BSC5	AXA Sterling Long Corp Bond R	Sterling Corporate Bond	UK	Conventional	09-12-2005		GB00B0T9VC62
BSC5	LandG (Barclays) MM Sterling Corporate	Sterling Corporate Bond	UK	Conventional	25-05-2006		GB00B11Z4M03
BSC6	FandC Ethical Bond 1 Inc	Sterling Corporate Bond	UK	SRI	01-01-2007	36	GB00B23YHT07
BSC6	AEGON Investment Grade Bd A Acc	Sterling Corporate Bond	UK	Conventional	01-06-2006	34	GB00B140FR45
BSC6	Aberdeen Corporate Bond A Acc	Sterling Corporate Bond	UK	Conventional	23-03-2007		GB00B1C42C27
BSC6	LV=UK Corporate Bond R	Sterling Corporate Bond	UK	Conventional	20-12-2007		GB00B29JJW60

Appendix 6.1 – SRI Fixed-Income Funds in the Sample (continued)

Table B – Balanced Funds

Code	Fund Name	Morningstar Category	Domicile	Fund Type	Start Date	Age / Mean Age (months)	ISIN
BAL1	Dr. Hoeller PRIME VALUES Income EUR Acc	Euro Cautious Balanced	AT	SRI	28-12-1995	169	AT0000973029
BAL1	Meinl Capital Invest A	Euro Cautious Balanced	AT	Conventional	02-08-1993	178	AT0000921747
BAL1	Value Investment Fonds Klassik T	Euro Cautious Balanced	AT	Conventional	15-10-1996		AT0000990346
BAL2	WestLB Mellon Werte Fonds Inc	Euro Cautious Balanced	DE	SRI	31-01-2002	96	DE0007045148
BAL2	cominvest Heraeus WS P Fonds	Euro Cautious Balanced	DE	Conventional	02-07-2001	95	DE0006372402
BAL2	Oppenheim Strategiekonzept	Euro Cautious Balanced	DE	Conventional	06-05-2002		DE0009799395
BAL2	Deka-Kommunal Euroland Balance	Euro Cautious Balanced	DE	Conventional	17-06-2002		DE0007019499
BAL3	DWS Stiftungsfonds	Euro Cautious Balanced	DE	SRI	15-04-2002	93	DE0005318406
BAL3	V/A Stiftungsfonds UI	Euro Cautious Balanced	DE	Conventional	02-09-2002	84	DE0005896922
BAL3	OP Bond Euro Plus	Euro Cautious Balanced	DE	Conventional	31-01-2003		DE0009799510
BAL3	Deka-Stiftungen Balance	Euro Cautious Balanced	DE	Conventional	28-04-2003		DE0005896864
BAL4	BfS Nachhaltigkeitsfonds Ertrag SEB Invest Inc	Euro Cautious Balanced	DE	SRI	30-09-2005	76	DE000A0B7JB7
BAL4	Stratego Ertrag	Euro Cautious Balanced	DE	Conventional	01-04-2005	80	DE000A0DNG57
BAL4	Metzler FlexPro	Euro Cautious Balanced	DE	Conventional	04-04-2005		DE000A0DJ4E5
BAL4	Allianz Strat Stabilität	Euro Cautious Balanced	DE	Conventional	24-06-2005		DE0009797282
BAL5	Foncaixa Priv. F. Activo Ético FI Acc	Euro Cautious Balanced	ES	SRI	09-04-1999	129	ES0138516036
BAL5	CAN Gestión 15 FI	Euro Cautious Balanced	ES	Conventional	29-01-1999	132	ES0165547037
BAL5	CAN Gestión 30 FI	Euro Cautious Balanced	ES	Conventional	29-01-1999		ES0165533037
BAL5	Caixa Galicia Mix 25 FI	Euro Cautious Balanced	ES	Conventional	12-02-1999		ES0115356034
BAL6	Santander Responsabilidad Conservador FI Acc	Euro Cautious Balanced	ES	SRI	16-06-2003	79	ES0145821031
BAL6	Plusmadrid España FI	Euro Cautious Balanced	ES	Conventional	04-06-2003	78	ES0170162038
BAL6	AC Fonandalucía Mixto FI	Euro Cautious Balanced	ES	Conventional	06-06-2003		ES0107384036
BAL6	Fonditel Renta Fija Mixta Int. FI	Euro Cautious Balanced	ES	Conventional	21-08-2003		ES0138047032
BAL7	Libertés and Solidarité C/D	Euro Cautious Balanced	FR	SRI	24-07-2001	102	FR0000004962
BAL7	Eurose C	Euro Cautious Balanced	FR	Conventional	10-11-2000	105	FR0007051040
BAL7	Unifed Epargne Temps (C)	Euro Cautious Balanced	FR	Conventional	05-04-2001		FR0000989261
BAL7	Alterna Plus	Euro Cautious Balanced	FR	Conventional	23-10-2001		FR0010466128

Appendix 6.1 – SRI Fixed-Income Funds in the Sample (continued)

Code	Fund Name	Morningstar Category	Domicile	Fund Type	Start Date	Age / Mean Age (months)	ISIN
BAL8	LBPAM Voie Lactée 2 (C)	Euro Cautious Balanced	FR	SRI	12-11-2003	74	FR0010030049
BAL8	AIM Cristal A/I	Euro Cautious Balanced	FR	Conventional	12-07-2002	86	FR0007075098
BAL8	Placements Euro 25 A/I	Euro Cautious Balanced	FR	Conventional	31-03-2003		FR0000985707
BAL9	Choix Solidaire C (C)	Euro Cautious Balanced	FR	SRI	15-09-2005	52	FR0010222281
BAL9	SG Valor Alpha Taux Euro	Euro Cautious Balanced	FR	Conventional	17-03-2006	52	FR0010289025
BAL9	Gan Prudence N (C)	Euro Cautious Balanced	FR	Conventional	25-04-2006		FR0010287730
BAL9	BNP Paribas Revenus Diversifiés (D)	Euro Cautious Balanced	FR	Conventional	22-09-2004		FR0010117127
BAL10	Nordfondo Etico Obbl Misto Acc	Euro Cautious Balanced	IT	SRI	29-03-1999	130	IT0001316261
BAL10	Zenit Obbligazionario Cl.R	Euro Cautious Balanced	IT	Conventional	09-06-1997	141	IT0001112090
BAL10	Azimut Formula 1 Low Risk	Euro Cautious Balanced	IT	Conventional	15-02-1999		IT0001313292
BAL11	Bnl per Telethon Acc	Euro Cautious Balanced	IT	SRI	15-11-2000	110	IT0003020820
BAL11	Nextam Partners Obbligaz Misto	Euro Cautious Balanced	IT	Conventional	02-04-2002	102	IT0003245393
BAL11	Leonardo 80/20	Euro Cautious Balanced	IT	Conventional	02-10-2000		IT0003013411
BAL12	Valori Responsabili Obbligazionario Misto Acc	Euro Cautious Balanced	IT	SRI	18-02-2003	83	IT0003409197
BAL12	UBI Pramerica Bilanciato Euro a RC	Euro Cautious Balanced	IT	Conventional	12-04-2002	87	IT0003242309
BAL12	UBI Pramerica Portafoglio Moderato	Euro Cautious Balanced	IT	Conventional	12-04-2002		IT0003242341
BAL12	BancoPosta Mix 1	Euro Cautious Balanced	IT	Conventional	15-09-2003		IT0003511588
BAL13	Altervision Balance Europe C Acc	Euro Moderate Balanced	BE	SRI	13-11-1998	134	BE0169414522
BAL13	Balanced Fund (D)	Euro Moderate Balanced	BE	Conventional	01-11-1997	136	BE0389440828
BAL13	Horizon Investments Bal Gr (C)	Euro Moderate Balanced	BE	Conventional	30-07-1999		BE0171619266
BAL14	Dexia Sust Euro Bal Medium C Acc	Euro Moderate Balanced	BE	SRI	20-03-2000	118	BE0159411405
BAL14	Transparant Balanced (C)	Euro Moderate Balanced	BE	Conventional	20-09-1999	124	BE0172280084
BAL14	DVV Horizon 5 (C)	Euro Moderate Balanced	BE	Conventional	30-09-1999		BE0942534828
BAL15	LIGA-Pax-Balance-Stiftungsfonds-Union Inc	Euro Moderate Balanced	DE	SRI	02-05-2000	116	DE0005314215
BAL15	WandW Europa-Fonds BWI	Euro Moderate Balanced	DE	Conventional	14-02-2000	116	DE0009780486
BAL15	Postbank Triselect	Euro Moderate Balanced	DE	Conventional	01-03-2000		DE0009770370
BAL15	HL MediumInvest FT	Euro Moderate Balanced	DE	Conventional	10-10-2000		DE0005317325
BAL16	Fonds für Stiftungen Invesco Inc	Euro Moderate Balanced	DE	SRI	17-02-2003	83	DE0008023565
BAL16	Allianz Strat Balance	Euro Moderate Balanced	DE	Conventional	02-12-2002	81	DE0009797258
BAL16	Moeller Mitarbeiter-Fonds-Universal	Euro Moderate Balanced	DE	Conventional	01-04-2003		DE0002605037
BAL16	cominvest Heraeus WS G	Euro Moderate Balanced	DE	Conventional	18-07-2003		DE0006372550

Appendix 6.1 – SRI Fixed-Income Funds in the Sample (continued)

Code	Fund Name	Morningstar Category	Domicile	Fund Type	Start Date	Age / Mean Age (months)	ISIN
BAL17	Hymnos C/D	Euro Moderate Balanced	FR	SRI	15-09-2005	52	FR0007447891
BAL17	GTG Croissance (C)	Euro Moderate Balanced	FR	Conventional	11-10-2005	48	FR0010231936
BAL17	Fédéris Epargne Equilibrée (C)	Euro Moderate Balanced	FR	Conventional	05-12-2005		FR0010250720
BAL17	Gan Equilibre N	Euro Moderate Balanced	FR	Conventional	27-04-2006		FR0010271387
BAL18	Valori Responsabili Bilanciato Acc	Euro Moderate Balanced	IT	SRI	18-02-2003	83	IT0003409213
BAL18	UBI Pramerica Portafoglio Dinamico	Euro Moderate Balanced	IT	Conventional	12-04-2002	79	IT0003242366
BAL18	BancoPosta Mix 2	Euro Moderate Balanced	IT	Conventional	15-09-2003		IT0003511646
BAL18	Carige Bilanciato 50 A	Euro Moderate Balanced	IT	Conventional	07-06-2004		IT0003652671

Appendix 6.2 – Summary Statistics for the Excess Returns of the Fixed-Income SRI Funds and their Matched-portfolios

This appendix presents summary statistics for the monthly excess returns of the fixed-income socially responsible (SRI) funds, as well as for their respective matched-portfolios of conventional funds (CONV), during the sample period. Panel A refers to bond funds, while Panel B refers to balanced funds. The risk-free rate was proxied by the 1-month Euribor for funds from the Euro-Area countries and the 1-month Libor for the UK funds.

Panel A: Bond Funds					**Panel B: Balanced Funds**				
Code	**Mean**		**Std. Deviation**		**Code**	**Mean**		**Std. Deviation**	
	SRI	CONV	SRI	CONV		SRI	CONV	SRI	CONV
BEC1	-0.0016	-0.0025	0.0164	0.0184	**BAL1**	-0.0006	0.0000	0.0146	0.0148
BEC2	-0.0004	0.0018	0.0126	0.0124	**BAL2**	0.0001	-0.0001	0.0144	0.0087
BEC3	-0.0002	-0.0011	0.0136	0.0084	**BAL3**	0.0005	0.0012	0.0108	0.0101
BEC4	0.0009	0.0003	0.0096	0.0126	**BAL4**	-0.0025	-0.0001	0.0220	0.0087
BED1	-0.0002	-0.0005	0.0090	0.0071	**BAL5**	-0.0012	-0.0017	0.0153	0.0147
BED2	-0.0003	-0.0004	0.0100	0.0098	**BAL6**	-0.0005	-0.0007	0.0058	0.0107
BED3	0.0012	0.0011	0.0083	0.0083	**BAL7**	0.0002	-0.0003	0.0090	0.0116
BED4	0.0009	0.0008	0.0080	0.0085	**BAL8**	0.0011	0.0008	0.0130	0.0105
BED5	0.0009	0.0006	0.0077	0.0112	**BAL9**	-0.0009	-0.0005	0.0167	0.0116
BED6	0.0006	0.0003	0.0087	0.0075	**BAL10**	-0.0004	-0.0005	0.0082	0.0054
BED7	0.0017	0.0016	0.0090	0.0093	**BAL11**	-0.0012	-0.0011	0.0093	0.0067
BED8	0.0004	0.0009	0.0099	0.0060	**BAL12**	-0.0001	0.0004	0.0058	0.0087
BED9	0.0008	-0.0008	0.0112	0.0109	**BAL13**	-0.0024	-0.0014	0.0260	0.0268
BED10	0.0005	0.0007	0.0082	0.0077	**BAL14**	-0.0022	-0.0018	0.0253	0.0274
BSC1	-0.0008	0.0010	0.0177	0.0150	**BAL15**	-0.0035	-0.0013	0.0253	0.0211
BSC2	-0.0010	0.0015	0.0192	0.0195	**BAL16**	0.0007	0.0007	0.0145	0.0140
BSC3	0.0012	-0.0005	0.0222	0.0149	**BAL17**	-0.0023	-0.0014	0.0269	0.0172
BSC4	-0.0028	-0.0015	0.0165	0.0170	**BAL18**	0.0008	0.0010	0.0226	0.0190
BSC5	-0.0028	-0.0006	0.0147	0.0213					
BSC6	0.0003	0.0013	0.0214	0.0263					

Appendix 6.3 – Summary Statistics for the Risk Factors

This appendix presents summary statistics for the risk factors (which were denominated in Euros for funds from the Euro-Area countries and UK pounds for the UK funds) during the period of January 2000 to December 2009. $BI_{EURCORP}$ is the monthly excess return of the iBoxx € Corporate TR index, BI_{EUROV} is the monthly excess return of the iBoxx € Overall TR index and $BI_{STRNONG}$ is the monthly excess return of the iBoxx £ Non-Gilts TR index. Risk-free rates were proxied by the 1-month Euribor for the Euro-denominated factors and the 1-month Libor for the UK factors. DS_{EUR} is the Euro-Area default spread, computed as the difference in returns between the Merrill Lynch € High-Yield TR index and the iBoxx € Sovereign TR index. DS_{UK} is the UK default spread, computed as the return difference between the Merrill Lynch £ High-Yield TR index and the iBoxx £ Gilts TR index. SI_{EUR} is the monthly excess returns of the FSTE AW Europe TR index, while SI_{UK} is the monthly excess returns of the FTSE 100 TR index. Table **A1** presents some descriptive statistics for the factors, while Tables **B1** and **B2** present their correlation matrix.

Table A1 – Descriptive Statistics

	Euro-Area Funds				UK Funds		
	$BI_{EURCORP}$	**BI_{EUROV}**	**DS_{EUR}**	**SI_{EUR}**	**$BI_{STRNONG}$**	**DS_{UK}**	**SI_{UK}**
Mean	0.0017	0.0019	-0.0020	-0.0027	0.0010	0.0032	-0.0021
Median	0.0023	0.0024	0.0020	0.0083	0.0018	0.0028	0.0047
Maximum	0.0355	0.0265	0.1294	0.1386	0.0438	0.1516	0.0832
Minimum	-0.0530	-0.0163	-0.2154	-0.1550	-0.0528	-0.1078	-0.1429
Std. Deviation	0.0112	0.0090	0.0461	0.0511	0.0146	0.0403	0.0437
Skewness	-0.7282	-0.0298	-1.0188	-0.6722	-0.1559	0.1329	-0.8085
Kurtosis	7.5033	2.6344	7.1300	3.9139	4.1254	5.1829	3.8439
Jarque-Bera (JB)	111.0705	0.6802	105.1583	13.1041	6.7626	23.9768	16.4950
***p-val* (JB)**	0.0000	0.7117	0.0000	0.0014	0.0340	0.0000	0.0003

Table B1 – Correlation Matrix (Euro-Area)

	$BI_{EURCORP}$	**BI_{EUROV}**	**DS_{EUR}**	**SI_{EUR}**
$BI_{EURCORP}$	1.0000			
BI_{EUROV}	-------	1.0000		
DS_{EUR}	0.3401	-0.1911	1.0000	
SI_{EUR}	0.2254	-0.2362	0.6800	1.0000

Table B2 – Correlation Matrix (UK)

	$BI_{STRNONG}$	**DS_{UK}**	**SI_{UK}**
$BI_{STRNONG}$	1.0000		
DS_{UK}	0.0623	1.0000	
SI_{UK}	0.1900	0.5452	1.0000

Appendix 6.4 – Summary Statistics for the Euro-Area Information Variables

This appendix presents summary statistics for the Euro-Area lagged information variables for the period of January 2000 to December 2009: the inverse relative wealth (IRW), the real bond yield (RBY) and the term spread (TS). The instruments were all stochastically detrended by subtracting a trailing moving average of their own past values. Table **A** presents several statistics for these variables (annual, demeaned and expressed in percentage) as well as their first-order autocorrelation coefficients (AC1). Table **B** presents the correlation matrix among the instruments.

Table A – Descriptive Statistics and Autocorrelations

	IRW	RBY	TS
Mean	0.0000	0.0000	0.0000
Median	-0.0108	-0.0601	-0.0237
Maximum	0.3826	1.9265	2.0323
Minimum	-0.4003	-1.2316	-0.9497
Std. Deviation	0.1535	0.6031	0.4632
Skewness	-0.0529	0.9990	1.7376
Kurtosis	3.4609	4.8029	8.3080
AC1	0.8370	0.8920	0.8900

Table B – Correlation Matrix

	IRW	RBY	TS
IRW	1.0000		
RBY	-0.2280	1.0000	
TS	0.0717	0.6215	1.0000

Appendix 6.5 – Summary Statistics for the UK Information Variables

This appendix presents summary statistics for the UK lagged information variables for the period of January 2000 to December 2009: the inverse relative wealth (IRW), the real bond yield (RBY) and the term spread (TS). The instruments were all stochastically detrended by subtracting a trailing moving average of their own past values. Table **A** presents several statistics for these variables (annual, demeaned and expressed in percentage) as well as their first-order autocorrelation coefficients (AC1). Table **B** presents the correlation matrix among the instruments.

Table A – Descriptive Statistics and Autocorrelations

	IRW	RBY	TS
Mean	0.0000	0.0000	0.0000
Median	0.0075	-0.0240	-0.1393
Maximum	0.2907	1.8453	2.6044
Minimum	-0.2862	-2.1595	-0.9344
Std. Deviation	0.0994	0.6943	0.6377
Skewness	-0.2558	-0.3636	1.9823
Kurtosis	3.9132	4.4377	8.0530
AC1	0.7980	0.8200	0.8970

Table B – Correlation Matrix

	IRW	RBY	TS
IRW	1.0000		
RBY	-0.5388	1.0000	
TS	0.2973	-0.1536	1.0000

Appendix 6.6 – Fixed-Income Fund Performance and Risk Estimates using an Unconditional Model

This appendix presents estimates of performance (alphas expressed in percentage) and risk for each SRI fund in our sample, as well as for each characteristics-matched portfolio, using the unconditional 3-factor model of equation [6.1]. *Bond* corresponds to the monthly excess returns of the iBoxx € Corporate TR index for the "Euro Corporate Bond" funds, the iBoxx £ Non-Gilts TR index for the "Sterling Corporate Bond" funds and the iBoxx € Overall TR index for the "Euro Diversified Bond" funds and for the balanced funds. Excess returns were computed using the 1-month Euribor as the risk-free rate for the Euro-denominated indices and the 1-month Libor for the Sterling-denominated indices. *Default* is a default spread variable, computed as the difference in returns between the Merrill Lynch € High-Yield TR index and the iBoxx € Sovereign TR index for the Euro-Area funds or the return difference between the Merrill Lynch £ High-Yield TR index and the iBoxx £ Gilts TR index for the UK funds. *Equity* corresponds to the monthly excess returns of the FSTE AW Europe TR index for the Euro-Area fund categories or the excess returns of the FTSE 100 TR index for the UK funds. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Panel A presents the results for bond funds and Panel B for balanced funds.

Panel A: Bond Funds										
Code		α_p		β_p *(Bond)*		β_{1p} *(Default)*		β_{2p} *(Equity)*		R^2 *adj.*
BEC1	SRI Fund	-0.0951		1.0512	***	-0.0670	**	0.0753	**	92.05%
	Matched-portfolio	-0.2516	***	0.8608	***	0.1429	***	-0.0015		94.08%
BEC2	SRI Fund	-0.1784	***	0.9374	***	-0.0359		0.0481	*	86.82%
	Matched-portfolio	0.0421		1.0023	***	-0.0156		0.0057		95.29%
BEC3	SRI Fund	-0.0993		0.8910	***	-0.0052		0.0490		79.89%
	Matched-portfolio	-0.1684	***	0.5553	***	-0.0081		0.0508	***	93.31%
BEC4	SRI Fund	-0.0074		0.6771	***	-0.0505	*	-0.0348	**	60.40%
	Matched-portfolio	-0.1109	*	0.9522	***	-0.0366	*	0.0286		77.74%
BED1	SRI Fund	-0.0922	***	0.9150	***	0.0232	***	0.0001		84.69%
	Matched-portfolio	-0.0998	**	0.6382	***	0.0408		-0.0262		62.99%
BED2	SRI Fund	-0.0846		0.9322	***	0.0194		-0.0093		78.29%
	Matched-portfolio	-0.0799	*	0.8080	***	-0.0413	***	0.0005		72.23%
BED3	SRI Fund	-0.0326		0.7823	***	-0.0044		-0.0096		75.42%
	Matched-portfolio	-0.0532	***	0.9077	***	-0.0083		0.0124	**	95.01%
BED4	SRI Fund	-0.0491		0.8005	***	0.0153		0.0134		83.61%
	Matched-portfolio	-0.0695	***	0.8462	***	-0.0224	***	0.0051		91.71%
BED5	SRI Fund	-0.0417		0.5790	***	0.1045	***	-0.0399	*	81.25%
	Matched-portfolio	-0.0750		0.9172	***	0.0732	**	0.0113		81.79%
BED6	SRI Fund	-0.0763	***	0.8881	***	0.0028		-0.0134	**	94.14%
	Matched-portfolio	-0.0951	***	0.7684	***	0.0309	***	-0.0136	*	89.18%
BED7	SRI Fund	0.0445		0.7358	***	-0.0452	*	0.0166		64.32%
	Matched-portfolio	0.0139		0.8282	***	-0.0276	*	0.0019		76.15%
BED8	SRI Fund	-0.1204	***	1.0310	***	0.0102		0.0318		89.96%
	Matched-portfolio	0.0021		0.5852	***	0.0168		-0.0234		74.01%
BED9	SRI Fund	-0.0036		1.1395	***	0.0239		0.0423	**	94.09%
	Matched-portfolio	-0.1579	***	0.7901	***	0.1534	***	0.0133		82.55%
BED10	SRI Fund	-0.0453		0.7709	***	-0.0521	***	0.0121		88.60%
	Matched-portfolio	-0.0780	***	0.8054	***	0.0637	***	-0.0039		92.16%
BSC1	SRI Fund	-0.2062	***	1.0379	***	0.0845	***	0.0128		82.32%
	Matched-portfolio	0.0014		0.9181	***	0.0476	***	0.0295	**	89.03%
BSC2	SRI Fund	-0.2202	***	0.8491	***	0.1826	***	0.0581	*	76.06%
	Matched-portfolio	0.0310		1.0993	***	0.1202	***	0.0069		83.90%
BSC3	SRI Fund	-0.0899		1.0202	***	0.2393	***	-0.0383		64.88%
	Matched-portfolio	-0.0911	**	0.9663	***	-0.0262	**	0.0017		91.93%
BSC4	SRI Fund	-0.2516	***	1.0038	***	-0.0144		-0.0021		82.25%
	Matched-portfolio	-0.1835	***	0.9943	***	0.0792	***	0.0146		93.66%
BSC5	SRI Fund	-0.1262	**	0.8614	***	-0.0474	***	-0.0142		90.11%
	Matched-portfolio	0.0991		1.1521	***	0.0037		0.0340	**	94.36%

Appendix 6.6 – Fixed-Income Fund Performance and Risk Estimates using the Unconditional Model (continued)

Code		α_p		β_p (Bond)		β_{1p} (Default)		β_{2p} (Equity)		R^2 adj.
BSC6	SRI Fund	-0.0115		0.9962	***	-0.0222		-0.0384		83.33%
	Matched-portfolio	-0.0040		1.0228	***	0.1067	***	0.0033		94.24%
Average SRI Funds		**-0.0894**		**0.8950**		**0.0181**		**0.0080**		**81.62%**
Average Matched-portfolios		**-0.0664**		**0.8709**		**0.0347**		**0.0075**		**86.27%**
Panel B: Balanced Funds										
Code		α_p		β_p (Bond)		β_{1p} (Default)		β_{2p} (Equity)		R^2 adj.
BAL1	SRI Fund	-0.0567		0.2888	***	0.0199		0.2076	***	54.58%
	Matched-portfolio	-0.0143		0.4529	***	0.0993	***	0.1907	***	75.51%
BAL2	SRI Fund	-0.0335		0.4502	***	-0.0364	***	0.2870	***	91.58%
	Matched-portfolio	-0.0473		0.3632	***	-0.0520	***	0.1558	***	64.00%
BAL3	SRI Fund	-0.0796		0.4753	***	0.0298		0.1478	***	63.35%
	Matched-portfolio	0.0023		0.5052	***	-0.0131		0.1520	***	61.23%
BAL4	SRI Fund	-0.2035		0.6487	*	0.0092		0.3231	***	71.42%
	Matched-portfolio	-0.0155		0.5542	***	0.0115		0.0929	***	70.23%
BAL5	SRI Fund	-0.0832		0.1941		0.0088		0.2216	***	64.06%
	Matched-portfolio	-0.1347	*	0.2612	***	0.0234		0.2389	***	89.63%
BAL6	SRI Fund	-0.0425		0.3160	***	-0.0014		0.0652	**	59.26%
	Matched-portfolio	-0.0329		0.2832	***	0.0289	*	0.1571	***	86.89%
BAL7	SRI Fund	-0.0163		0.4046	***	-0.0856	***	0.1425	***	44.52%
	Matched-portfolio	-0.1038	***	0.3179	***	0.1269	***	0.1189	***	86.81%
BAL8	SRI Fund	0.0044		0.3540	***	-0.0190		0.2368	***	71.26%
	Matched-portfolio	-0.0035		0.2537	***	-0.0010		0.2029	***	86.00%
BAL9	SRI Fund	-0.0022		0.3223	***	-0.0323	**	0.3115	***	91.04%
	Matched-portfolio	0.0016		0.5893	***	-0.0382	*	0.1937	***	83.83%
BAL10	SRI Fund	-0.1410	***	0.7135	***	-0.0080		0.1029	***	76.72%
	Matched-portfolio	-0.0828	**	0.3122	***	0.0213		0.0588	***	56.94%
BAL11	SRI Fund	-0.1808	**	0.5104	***	-0.0785	*	0.1165	***	39.45%
	Matched-portfolio	-0.1346	***	0.3397	***	-0.0003		0.1022	***	68.49%
BAL12	SRI Fund	-0.0844	**	0.5024	***	-0.0267		0.0515	***	74.47%
	Matched-portfolio	-0.0750	*	0.3745	***	-0.0414	*	0.1810	***	85.59%
BAL13	SRI Fund	-0.1871	**	0.4504	***	-0.0357		0.5163	***	89.27%
	Matched-portfolio	-0.0831		0.4265	***	0.1056	***	0.4250	***	83.72%
BAL14	SRI Fund	-0.1548	***	0.5175	***	-0.0246		0.4917	***	90.95%
	Matched-portfolio	-0.0507		0.2212	***	0.0231		0.4940	***	90.52%
BAL15	SRI Fund	-0.2360		0.0393		-0.0676		0.3991	***	52.15%
	Matched-portfolio	-0.1070	**	0.5854	***	0.0043		0.4038	***	92.75%
BAL16	SRI Fund	-0.0432		0.1079		-0.0335		0.2209	***	40.45%
	Matched-portfolio	-0.1000		0.3287	***	-0.0482		0.2933	***	81.73%
BAL17	SRI Fund	-0.1099		0.4116	***	0.0741	**	0.4067	***	91.81%
	Matched-portfolio	-0.0250		0.2300	***	-0.0209		0.3086	***	90.09%
BAL18	SRI Fund	-0.1470		0.2429	*	0.0239		0.4065	***	77.09%
	Matched-portfolio	-0.1191	**	0.3954	***	-0.0431	**	0.4130	***	94.03%
Average SRI Funds		**-0.0999**		**0.3861**		**-0.0158**		**0.2586**		**69.08%**
Average Matched-portfolios		**-0.0625**		**0.3775**		**0.0103**		**0.2324**		**80.44%**

Appendix 6.7 – Performance and Risk Estimates for UK Bond Funds using the Unconditional Model with Alternative Bond Indices

This appendix presents estimates of performance (alphas expressed in percentage) and risk for SRI "Sterling Corporate Bond" funds and their matched-portfolios, using the unconditional 3-factor model of equation [6.1], with two alternative bond indices: the iBoxx £ Non-Gilts and the iBoxx £ Corporate. In this way, in Panel A, *Bond* corresponds to the monthly excess returns of the iBoxx £ Non-Gilts TR index, while in Panel B it represents the monthly excess returns of the iBoxx £ Corporate TR index. The risk-free rate was proxied by the 1-month Libor. *Default* is the difference in returns between the Merrill Lynch £ High-Yield TR index and the iBoxx £ Gilts TR index. *Equity* corresponds to the monthly excess returns of the FTSE 100 TR index. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987). Table **A** presents the results at the individual fund level, while Table **B** presents the results at the portfolio level, based on equally-weighted portfolios of all SRI funds and all characteristics-matched samples.

Table A – Individual Fund Analysis

		Panel A: iBoxx £ Non-Gilts Index					**Panel B: iBoxx £ Corporate Index**				
Code		α_p	β_p *(Bond)*	β_{1p} *(Default)*	β_{2p} *(Equity)*	R^2 *adj.*	α_p	β_p *(Bond)*	β_{1p} *(Default)*	β_{2p} *(Equity)*	R^2 *adj.*
BSC1	SRI Fund	-0.2062 ***	1.0379 ***	0.0845 ***	0.0128	82.32%	-0.1582 **	0.8941 ***	0.0264	-0.0102	83.69%
	Matched-portfolio	0.0014	0.9181 ***	0.0476 ***	0.0295 **	89.03%	0.0462	0.7624 ***	-0.0028	0.0124	84.72%
BSC2	SRI Fund	-0.2202 ***	0.8491 ***	0.1826 ***	0.0581 *	76.06%	-0.1798 **	0.7313 ***	0.1344 ***	0.0381	76.47%
	Matched-portfolio	0.0310	1.0993 ***	0.1202 ***	0.0069	83.90%	0.0828	0.9598 ***	0.0573 *	-0.0207	86.55%
BSC3	SRI Fund	-0.0899	1.0202 ***	0.2393 ***	-0.0383	64.88%	-0.0030	0.8803 ***	0.1711 ***	-0.0613 *	68.08%
	Matched-portfolio	-0.0911 **	0.9663 ***	-0.0262 **	0.0017	91.93%	-0.0095	0.7813 ***	-0.0884 ***	-0.0126	86.72%
BSC4	SRI Fund	-0.2516 ***	1.0038 ***	-0.0144	-0.0021	82.25%	-0.1742 **	0.7829 ***	-0.0801 **	-0.0065	77.02%
	Matched-portfolio	-0.1835 ***	0.9943 ***	0.0792 ***	0.0146	93.66%	-0.1050	0.7863 ***	0.0137	0.0073	90.37%
BSC5	SRI Fund	-0.1262 **	0.8614 ***	-0.0474 ***	-0.0142	90.11%	-0.0650	0.6508 ***	-0.1034 ***	-0.0131	82.43%
	Matched-portfolio	0.0991	1.1521 ***	0.0037	0.0340 **	94.36%	0.1845 **	0.8848 ***	-0.0720 ***	0.0316	89.69%
BSC6	SRI Fund	-0.0115	0.9962 ***	-0.0222	-0.0384	83.33%	0.1610	0.7292 ***	-0.0867 ***	-0.0231	80.86%
	Matched-portfolio	-0.0040	1.0228 ***	0.1067 ***	0.0033	94.24%	0.1754	0.7244 ***	0.0419	0.0268	89.83%
Average SRI Funds		**-0.1509**	**0.9614**	**0.0704**	**-0.0037**	**79.83%**	**-0.0699**	**0.7781**	**0.0103**	**-0.0127**	**78.09%**
Average Matched-portfolios		**-0.0245**	**1.0255**	**0.0552**	**0.0150**	**91.19%**	**0.0624**	**0.8165**	**-0.0084**	**0.0075**	**87.98%**

Table B – Portfolio-Level Analysis

	Panel A: iBoxx £ Non-Gilts TR Index					**Panel B: iBoxx £ Corporate TR Index**				
	α_p	β_p *(Bond)*	β_{1p} *(Default)*	β_{2p} *(Equity)*	R^2 *adj.*	α_p	β_p *(Bond)*	β_{1p} *(Default)*	β_{2p} *(Equity)*	R^2 *adj.*
SRI Funds	-0.1507 ***	0.9074 ***	0.0856 ***	0.0164	88.40%	-0.1077 **	0.7686 ***	0.0353	-0.0022	87.22%
Matched-portfolios	0.0130	0.9668 ***	0.0341 *	0.0383 **	82.87%	0.0592	0.8141 ***	-0.0193	0.0191	80.85%

Appendix 6.8 – Statistical Tests for the Differences in Performance between Fixed-Income SRI and Conventional Funds using the Conditional Model

This appendix reports the *t*-statistics and the *U*-statistics for the null hypothesis that the members of each group (SRI and conventional) have equal means/medians in terms of their performance. Alphas are based on the conditional multi-factor model of equation [6.2]. We also report the respective *p-values* for a two-sided test and indicate in bold the cases in which we reject the null hypothesis at the usual significance levels. Panel A presents the results for all bond funds and is further subdivided into two categories: Euro-Area funds, which include the "Euro Corporate Bond" and "Euro Diversified Bond" categories (Panel A1), and UK "Sterling Corporate Bond" funds (Panel A2). Panel B presents the results for balanced funds, which include the "Euro Cautious Balanced" and "Euro Moderate Balanced" categories.

Panel A: Bond Funds – All		**Panel B: Balanced Funds**	
t-statistic	1.2014	*t*-statistic	1.4926
p-val	*0.2370*	*p-val*	*0.1448*
U-statistic	1.2578	*U*-statistic	1.6294
p-val	*0.2085*	*p-val*	*0.1032*
Panel A1: Bond Funds – Euro-Area			
t-statistic	0.6030		
p-val	*0.5517*		
U-statistic	0.7122		
p-val	*0.4763*		
Panel A2: Bond Funds – UK			
t-statistic	1.7406		
p-val	*0.1124*		
U-statistic	**2.0016**		
p-val	***0.0453***		

Appendix 6.9 – Statistical Tests for the Differences in Performance between Fixed-Income SRI and Conventional Funds using the Unconditional Model

This appendix reports the *t*-statistics and the *U*-statistics for the null hypothesis that the members of each group (SRI and conventional) have equal means/medians in terms of their performance. Alphas are based on the unconditional multi-factor model of equation [6.1]. We also report the respective *p-values* for a two-sided test and indicate in bold the cases in which we reject the null hypothesis at the usual significance levels. Panel A presents the results for all bond funds and is further subdivided into two categories: Euro-Area funds, which include the "Euro Corporate Bond" and "Euro Diversified Bond" categories (Panel A1), and UK "Sterling Corporate Bond" funds (Panel A2). Panel B presents the results for balanced funds, which include the "Euro Cautious Balanced" and "Euro Moderate Balanced" categories.

Panel A: Bond Funds – All		**Panel B: Balanced Funds**	
t-statistic	0.8856	*t*-statistic	**1.8096**
p-val	*0.3814*	*p-val*	***0.0792***
U-statistic	0.8250	*U*-statistic	1.5661
p-val	*0.4094*	*p-val*	*0.1173*
Panel A1: Bond Funds – Euro-Area			
t-statistic	0.8463		
p-val	*0.4051*		
U-statistic	0.7352		
p-val	*0.4622*		
Panel A2: Bond Funds – UK			
t-statistic	**2.2963**		
p-val	***0.0445***		
U-statistic	**2.0016**		
p-val	***0.0453***		

Appendix 6.10 – Differences in Performance and Risk Estimates for Equally-Weighted Portfolios of UK SRI and Conventional Bond Funds

This appendix presents estimates of performance (average conditional alphas expressed in percentage) and risk (average conditional betas) for equally-weighted portfolios of all UK SRI bond funds (i.e., funds classified as "Sterling Corporate Bond") and all characteristics-matched portfolios of conventional funds, using the unconditional 3-factor model of equation [6.1] (Panel A) and the conditional 3-factor model of equation [6.2] (Panel B). *Difference* is a portfolio constructed by subtracting the returns of the matched-portfolios from the returns of the SRI funds. *Bond* corresponds to the monthly excess returns of the iBoxx £ Non-Gilts TR index, with the risk-free rate being proxied by the 1-month Libor. *Default* is the difference in returns between the Merrill Lynch £ High-Yield TR index and the iBoxx £ Gilts TR index. *Equity* corresponds to the monthly excess returns of the FTSE 100 TR index. The predetermined information variables are a term spread, the inverse relative wealth, a real bond yield and a January dummy. The first three instruments are demeaned, lagged 1-month and stochastically detrended by subtracting a trailing moving average of their own past values. W_1, W_2 and W_3 correspond to the probability values of the χ-square statistic of the Newey and West (1987) Wald test on the existence of time-varying alphas, time-varying betas and the joint time-variation in alphas and betas, respectively. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987).

Panel A: Unconditional 3-Factor Model								
	α_p	β_p (*Bond*)	β_{1p} (*Default*)	β_{2p} (*Equity*)				R^2 *adj.*
SRI Funds	-0.1507 ***	0.9074 ***	0.0856 ***	0.0164				88.40%
Matched-portfolios	0.0130	0.9668 ***	0.0341 *	0.0383 **				82.87%
Difference	-0.1637 **	-0.0594	0.0516 **	-0.0219				4.77%
Panel B: Conditional 3-Factor Model								
	α_{0p}	β_{0p} (*Bond*)	β_{1p} (*Default*)	β_{2p} (*Equity*)	W_1	W_2	W_3	R^2 *adj.*
SRI Funds	-0.1568 ***	0.9082 ***	0.1044 ***	0.0157	0.0028	0.0020	0.0000	89.27%
Matched-portfolios	0.0540	0.9091 ***	0.0211	0.0503	0.2021	0.9307	0.0270	83.46%
Difference	-0.2108 **	-0.0009	0.0834 ***	-0.0346	0.0014	0.0008	0.0000	9.29%

Appendix 6.11 – Statistical Tests for the Differences in Risk Estimates between Fixed-Income SRI and Conventional Funds

This appendix reports the *t*-statistics and the *U*-statistics for the null hypothesis that the members of each group (SRI and conventional) have equal means/medians in terms of their risk exposures, based on the conditional multi-factor model of equation [6.2]. We also report the respective *p-values* for a two-sided test and indicate in bold the cases in which we reject the null hypothesis at the usual significance levels. Panel A presents the results for bond funds[141] and Panel B for balanced funds.

Panel A: Bond Funds				Panel B: Balanced Funds			
	β_{0p} (*Bond*)	β_{1p} (*Default*)	β_{2p} (*Equity*)		β_{0p} (*Bond*)	β_{1p} (*Default*)	β_{2p} (*Equity*)
t-statistic	0.0691	0.2995	0.5521	*t*-statistic	0.0192	**2.8077**	0.9285
p-val	*0.9453*	*0.7662*	*0.5841*	*p-val*	*0.9848*	***0.0082***	*0.3597*
U-statistic	0.1488	0.3381	0.7980	*U*-statistic	0.0475	**2.1672**	0.9333
p-val	*0.8817*	*0.7353*	*0.4249*	*p-val*	*0.9621*	***0.0302***	*0.3506*

[141] These results include all bond funds. However, we have also analysed bond funds domiciled in the Euro-Area countries and bond funds domiciled in the UK separately and obtained similar results (i.e., we found no significant differences between SRI and conventional funds in any of their factor exposures).

Appendix 6.12 – Bond Fund Performance using a Conditional 2-Factor Model

This appendix presents estimates of performance (average conditional alphas expressed in percentage) for each bond SRI fund in our sample, as well as for each characteristics-matched portfolio (CONV), using a conditional 2-factor model, based on equation [6.2] but without the *equity* variable (as well as its cross-products with each of the predetermined information variables). *Bond* corresponds to the monthly excess returns of the iBoxx € Corporate TR index for the "Euro Corporate Bond" funds, the iBoxx £ Non-Gilts TR index for the "Sterling Corporate Bond" funds and the iBoxx € Overall TR index for the "Euro Diversified Bond" funds. Excess returns were computed using the 1-month Euribor as the risk-free rate for the Euro-denominated indices and the 1-month Libor for the Sterling-denominated indices. *Default* is a default spread variable, computed as the difference in returns between the Merrill Lynch € High-Yield TR index and the iBoxx € Sovereign TR index for the Euro-Area funds or the return difference between the Merrill Lynch £ High-Yield TR index and the iBoxx £ Gilts TR index for the UK funds. The predetermined information variables are a term spread, the inverse relative wealth, a real bond yield and a January dummy. The first three instruments are demeaned, lagged 1-month and stochastically detrended by subtracting a trailing moving average of their own past values. R^2 *(adj.)* is the adjusted coefficient of determination. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels, based on heteroskedasticity and autocorrelation adjusted errors (following Newey and West, 1987).

Code	α_{0p} SRI		R^2 adj.	α_{0p} CONV		R^2 adj.
BEC1	-0.1416	**	96.86%	-0.0861	*	97.19%
BEC2	-0.1472	***	93.23%	-0.0121		97.42%
BEC3	-0.2091	***	95.16%	-0.1648	***	90.98%
BEC4	0.0435		62.34%	-0.1794	***	80.00%
BED1	-0.1117	**	86.43%	-0.0663		71.41%
BED2	-0.1336	**	81.12%	-0.1119	*	78.39%
BED3	-0.0025		76.88%	-0.0659	***	94.83%
BED4	-0.0868	***	88.44%	-0.0707	***	91.09%
BED5+	0.0271		79.33%	-0.1093		89.99%
BED6	-0.0555	***	95.00%	-0.0922	***	89.37%
BED7	0.0205		66.80%	-0.0265		79.71%
BED8	-0.1827	***	94.89%	-0.0396		83.02%
BED9	-0.0537		96.75%	-0.1102	**	85.09%
BED10	-0.0482	*	91.02%	-0.1006	***	95.32%
BSC1	-0.2326	***	88.06%	-0.0115		88.71%
BSC2	-0.2014	**	76.84%	0.0718		87.44%
BSC3	-0.1356		68.93%	-0.0329		92.50%
BSC4	-0.1906	***	87.80%	-0.0784	*	95.82%
BSC5	-0.0943		90.84%	0.2044	***	94.77%
BSC6+	0.2852		83.35%	0.3999		96.14%
Averages	**-0.0825**		**85.00%**	**-0.0341**		**88.96%**

+ For these funds we used a partial conditional 2-factor model, which allowed for time-varying betas but not time-varying alphas.

Appendix 6.13 – Statistical Tests for the Differences in Performance between Fixed-Income SRI and Conventional Funds during Expansion Periods

This appendix reports the *t*-statistics and the *U*-statistics for the null hypothesis that the members of each group (SRI and conventional) have equal means/medians in terms of their performance over periods of expansion, as defined in regression [6.3]. We also report the respective *p-values* for a two-sided test and indicate in bold the cases in which we reject the null hypothesis at the usual significance levels. Panel A presents the results for all bond funds and is further subdivided into two categories: Euro-Area funds, which include the "Euro Corporate Bond" and "Euro Diversified Bond" categories (Panel A1), and UK "Sterling Corporate Bond" funds (Panel A2). Panel B presents the results for balanced funds, which include the "Euro Cautious Balanced" and "Euro Moderate Balanced" categories.

Panel A: Bond Funds – All		**Panel B: Balanced Funds**	
t-statistic	1.2469	*t*-statistic	**1.8029**
p-val	*0.2201*	*p-val*	***0.0803***
U-statistic	0.3652	*U*-statistic	**1.6610**
p-val	*0.7150*	*p-val*	***0.0967***
Panel A1: Bond Funds – Euro-Area			
t-statistic	1.3322		
p-val	*0.1944*		
U-statistic	1.3555		
p-val	*0.1753*		
Panel A2: Bond Funds – UK			
t-statistic	**2.2441**		
p-val	***0.0487***		
U-statistic	**1.6813**		
p-val	***0.0927***		

Appendix 6.14 – Statistical Tests for the Differences in Performance between Fixed-Income SRI and Conventional Funds during Recession Periods

This appendix reports the *t*-statistics and the *U*-statistics for the null hypothesis that the members of each group (SRI and conventional) have equal means/medians in terms of their performance over periods of recession, as defined in regression [6.3]. We also report the respective *p-values* for a two-sided test and indicate in bold the cases in which we reject the null hypothesis at the usual significance levels. Panel A presents the results for all bond funds and is further subdivided into two categories: Euro-Area funds, which include the "Euro Corporate Bond" and "Euro Diversified Bond" categories (Panel A1), and UK "Sterling Corporate Bond" funds (Panel A2). Panel B presents the results for balanced funds, which include the "Euro Cautious Balanced" and "Euro Moderate Balanced" categories.

Panel A: Bond Funds – All		**Panel B: Balanced Funds**	
t-statistic	1.6429	*t*-statistic	0.4073
p-val	*0.1087*	*p-val*	*0.6863*
U-statistic	1.4201	*U*-statistic	0.5220
p-val	*0.1556*	*p-val*	*0.6016*
Panel A1: Bond Funds – Euro-Area			
t-statistic	0.3489		
p-val	*0.7300*		
U-statistic	0.2527		
p-val	*0.8005*		
Panel A2: Bond Funds – UK			
t-statistic	**2.3983**		
p-val	***0.0344***		
U-statistic	**1.8415**		
p-val	***0.0656***		

Appendix 6.15 – Summary Statistics for the Excess Returns of the SRI Benchmarks

This appendix presents summary statistics for the excess returns of the Euro-Area SRI bond and SRI equity benchmarks (denominated in Euros), during the period of January 2001 to December 2009. The SRI bond indices are the ECPI Ethical Euro Corporate Bond TR index ($ECPI_{ECORP}$) and the ECPI Ethical Euro Composite Bond TR index ($ECPI_{ECOMP}$), while the SRI equity index is the ECPI Ethical Index Euro ($ECPI_{EURO}$). Risk-free rates were proxied by the 1-month Euribor. Table **A** presents some descriptive statistics for the benchmarks, while Table **B** presents the correlation matrix among all factors used in the models, i.e., the SRI bond index, the SRI equity index and the Euro-Area default spread (DS_{EUR}).

Table A – Descriptive Statistics

	$ECPI_{ECORP}$	$ECPI_{ECOMP}$	$ECPI_{EURO}$
Mean	0.0016	0.0018	-0.0050
Median	0.0021	0.0027	0.0077
Maximum	0.0381	0.0291	0.1403
Minimum	-0.0510	-0.0157	-0.1622
Std. Deviation	0.0117	0.0093	0.0550
Skewness	-0.4681	0.0348	-0.5131
Kurtosis	6.9037	2.7115	3.6189
Jarque-Bera (JB)	72.5180	0.3964	6.4636
***p-val* (JB)**	0.0000	0.8202	0.0395

Table B – Correlation Matrix

	$ECPI_{ECORP}$	$ECPI_{ECOMP}$	DS_{EUR}	$ECPI_{EURO}$
$ECPI_{ECORP}$	1.0000			
$ECPI_{ECOMP}$	--------	1.0000		
DS_{EUR}	0.3265	-0.2027	1.0000	
$ECPI_{EURO}$	0.2128	-0.2066	0.6692	1.0000

CHAPTER 7

CONCLUSIONS, LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

Although the performance evaluation of actively managed mutual funds has been one of the most studied topics in finance over the last four decades, the investigation of SRI fund performance has only received noteworthy attention since the 2000s, following the development of SRI fund markets around the world. Most empirical studies conducted so far have found no statistically significant differences between the performance of SRI and conventional funds. However, recent studies have revealed that the costs of imposing SRI constraints can be substantial and lead to significantly lower returns (e.g.: Geczy *et al.*, 2005). Indeed, some of the latest investigations on this topic have found evidence of significant underperformance of SRI funds in some European fund markets (e.g.: Renneboog *et al.*, 2008b; Cortez *et al.*, 2009, *forthcoming*), thus justifying further research on whether it is possible to satisfy environmental, social and governance concerns without sacrificing financial performance.

In this investigation, and after characterizing the European SRI fund market, in Chapter 2, we reviewed and discussed, in Chapter 3, prior research in the SRI field. We began by reviewing the literature on the performance of both equity and fixed-income SRI funds, as well as on other important issues that have emerged even more recently, such as SRI fund performance persistence, the timing abilities of SRI fund managers and the relationship between SRI fund performance and fund flows or screening activities. Then, we performed our empirical analysis, which was structured into three chapters (Chapters 4 to 6), addressing many important research issues on the performance of European SRI funds, some of which have been completely unexplored to date. In this concluding chapter, we emphasise the main contributions of this thesis and summarise our main empirical results. Also, we present the main limitations of our study and point out some interesting topics for future research.

In Chapter 4 we used several model specifications to investigate (and, subsequently, compare) the performance, investment styles and timing abilities of internationally-oriented SRI funds, which have received far less attention in the literature than SRI funds investing in their local markets. Since we examined funds from eight different markets and fund classifications are different across European countries, we used the Morningstar classification scheme for all markets involved, in order to have more homogeneous fund samples. In addition, since taxation aspects could differ from one European country to another, our main focus was not on comparing funds from different countries, but rather on comparing the performance of each SRI fund in relation to a characteristics-matched portfolio of conventional funds. To the best of our knowledge, this was the first multi-country study, focused on international SRI funds, to combine the matched-pairs approach with the use of robust conditional multi-factor performance evaluation models, which allow for both time-varying alphas and betas and control for both home biases and spurious regression biases. Besides, as far as we are aware of, this was also the first investigation to analyse the relationship between market states and both SRI fund performance and investment styles in the European market.

Our results showed that, during the period of January 2000 to December 2008, differences in performance between international SRI funds, investing in Global and in European equities, and their matched-portfolios were not statistically significant. After examining the investment styles of international SRI and conventional funds, we only found significant differences in some of the market and size factor exposures. In fact, in most cases, UK Global SRI funds presented significantly lower market betas and significantly higher exposures to small caps than their matched-portfolios. On the other hand, SRI funds investing in European equities exhibited significantly lower exposures to small caps than conventional funds in all performance evaluation models used. None of the differences between SRI and conventional funds in terms of their book-to-market, momentum and local factor exposures was statistically significant, although both fund groups exhibited significant home biases. A probable explanation for these results may be the use of the “best-in-class” approach, the most common screening strategy in continental Europe, which may result in SRI funds having similar portfolio compositions to non-SRI funds.

When comparing between unconditional and conditional models, we found strong evidence of time-varying betas (but not alphas) for both SRI and conventional funds. In addition, conventional benchmarks presented a higher explanatory power of SRI fund returns than SRI benchmarks.

After analysing performance and investment styles across different market states, we found no evidence to support the argument that SRI equity funds offer some additional protection to investors in times of crisis. On the contrary, although both SRI and conventional funds performed worse during periods of recession than during periods of expansion, differences were always higher for the socially-screened funds than for their conventional counterparts. Nevertheless, at the 5% level, differences in performance between SRI and conventional funds were never statistically significant during both market states. Additionally, we found some significant shifts in funds' risk exposures across recession and expansion periods, but these varied considerably between our three fund categories.

Furthermore, we did not find many significant differences between the selectivity and market timing abilities of international SRI and conventional funds. In fact, the only exception was that SRI funds investing in European equities presented significantly worse selectivity abilities than their conventional peers. In sum, since the above mentioned results are similar to most studies conducted with samples of SRI funds that invest in their local markets, it seems that international SRI funds are not able to exploit the potential benefits that arise from international diversification.

Although recent statistics have shown that France is currently the largest European SRI fund market in terms of assets under management, very few attempts have been made to analyse the performance of French SRI funds. Therefore, in Chapter 5, we focused on investigating the performance, investment styles, timing abilities and, especially, the performance persistence of French SRI funds, in comparison with characteristics-matched samples of conventional funds.

Overall, our results suggested that the performance of French SRI funds was comparable to the performance of conventional funds during the period of January 2000 to December 2008. Nevertheless, we did find significant differences in their investment styles, timing abilities and performance persistence. In terms of investment styles, French SRI funds presented significantly higher market betas and significantly lower exposures to small caps than their conventional peers. These findings are in clear contrast with the vast majority of previous SRI fund studies, conducted on many international markets. Although both SRI and conventional funds exhibited significant home biases, we did not find any significant differences in their exposures to the book-to-market, momentum and local factors.

Additionally, we have also evaluated performance and investment styles across recession and expansion periods. Our results showed no evidence of a statistically significant relationship between market states and fund performance, but we did find several significant shifts in the investment styles of SRI funds from expansions to recessions. In fact, SRI funds presented significantly lower market betas, significantly higher exposure to small caps and significantly lower exposure to momentum strategies during recessions than during expansions. In contrast, conventional funds did not exhibit any significant shift in their factor exposures across different market states.

Another interesting finding of our research was that French SRI funds performed significantly better than conventional funds in terms of market timing and significantly worse in terms of selectivity. Since overall performance was similar for both fund groups, these results seem to indicate that the selectivity and timing components tend to offset each other and, also, that any weak performance from SRI funds seems to be more a result of poor stock selection than poor market timing abilities. In addition, we have also examined the style timing abilities of French SRI fund managers, another topic that, as far as we are aware of, has remained unexplored. However, our results showed very little evidence of style timing abilities from both SRI and conventional fund managers, as well as the absence of any significant differences between them.

We have also investigated fund performance persistence. As far as we are aware of, this was only the second investigation worldwide on the performance persistence of SRI funds and the first to do so using conditional models. To assess persistence, we used both contingency tables and performance-ranked portfolio strategies. The contingency tables showed evidence of significant positive persistence in absolute (excess) returns for the conventional funds, but not for their SRI counterparts, at the 6 and 12-month horizons. At the 36-month horizon, these results were reversed, with SRI funds (but not their conventional peers) showing evidence of significantly positive persistence in excess returns. Nevertheless, at this longer-term horizon, the use of risk-adjusted performance measures (alphas), instead of excess returns, removed any evidence of persistence for both fund groups.

In line with the results of the contingency tables, performance-ranked portfolios formed on lagged excess returns showed evidence of significant positive persistence at the 6 and 12-month horizons for conventional funds, but not for SRI funds. This evidence was robust to the use of many alternative performance evaluation models. At the 36-month horizon, evidence of performance persistence was weakened, though still significant for conventional funds when using return-sorted portfolios. When we used alpha-sorted portfolios, however, practically all previous evidence of performance persistence was eliminated. Overall, we did find significant differences between the persistence of French SRI and conventional funds when using return-sorted portfolios: the difference between funds with good past performance and bad past performance was, in practically all cases, significantly higher for conventional funds than for SRI funds, especially at the shorter-term horizons.

In Chapter 6 we conducted, to the best of our knowledge, the first comprehensive investigation of the performance of European SRI fixed-income funds. The relative weight of SRI fixed-income funds within European SRI assets under management has increased considerably over the last years, having already surpassed equity funds in some European markets. In this chapter we evaluated the performance of 38 SRI fixed-income funds, from seven European markets, in comparison with characteristics-matched samples of conventional funds. Our sample included pure bond funds (SRI bond funds) and balanced funds investing mostly in bonds or in similar proportions of bonds and equities (SRI balanced funds).

In general, our results showed no significant differences in the performance of European SRI fixed-income funds and their matched-portfolios over the period of January 2000 to December 2009. However, SRI bond funds from the UK performed significantly and substantially worse than their conventional peers, with differences reaching more than 2% per year, on average.

We have also found that fixed-income fund performance and investment styles do not seem to vary significantly across different market states. However, while SRI bond funds performed even worse (although not significantly) than their matched-portfolios during periods of recession than during periods of expansion, SRI balanced funds underperformed their conventional peers significantly during expansions, but outperformed (although not significantly) during recessions. In this way, in relation to conventional funds, SRI bond funds did not seem to provide any additional protection against market downturns, unlike SRI balanced funds. Additionally, our results also showed that SRI indices were as powerful as conventional indices in explaining SRI fixed-income fund returns.

Taken together, our results showed that, in most cases, the performance of SRI and conventional funds, including equity, bond and balanced funds, is comparable. The only exception to this trend were the UK SRI bond funds, which performed significantly worse than their matched-portfolios. Hence, it looks like socially responsible investors do not need to accept lower financial performance to satisfy their environmental, social and ethical beliefs.

Nevertheless, as in any other investigation, we have to recognise the limitations of this research. First of all, we relied on the “SRI funds service”, provided by Vigeo and Morningstar Europe, to identify SRI funds and their respective inception dates. Although we fairly believe in the quality of this database, as we could confirm through the analysis of many individual fund prospectuses, we did not have alternative data sources to compare it with or complement it.

In addition, another shortcoming of this work was that all of our fund samples (equity, bond and balanced) were not free of survivorship bias, since we were not able to identify non-surviving funds. Although the controversy about its impact on fund performance and, especially, on performance persistence is still considerable, the main issue is that our focus was on comparing the performance and performance persistence of SRI and conventional funds, and both fund groups were exposed to the same source of bias, even though attrition rates can differ between them. In addition, since fund age was one of the matching criteria used in selecting conventional funds, both SRI and conventional funds presented similar life spans. For this reason, we believe this shortcoming did not significantly affect our analysis. Moreover, even though we used several criteria to create our matched-portfolios, we could not match on fund size and this would further increase comparability between SRI and conventional funds.

Another limitation, which is also related to the data, was the fact that some of our funds (SRI and conventional) had relatively short sample periods, which could have been reflected in the quality of statistical estimation. Since the European SRI market is still a relatively young industry, especially in some of the countries involved, return series were not as long as would be desired. However, future research can certainly use longer time series of returns and easily overcome this problem.

Nevertheless, the use of only returns-based performance evaluation methodologies, both for assessing overall performance as well as selectivity and market timing abilities, can also be considered an additional limitation. In fact, as pointed out by Ferson and Khang (2002), when expected returns vary over time and fund managers can trade securities between return observation dates, returns-based methodologies (including conditional ones) may be biased, whereas conditional weight-based measures can control for this interim trading bias. Additionally, regarding market timing, several studies in the finance literature (e.g.: Jagannathan and Korajczyk, 1986; Chen *et al.*, 2010) call attention to the fact that non-linear relations between fund and market returns can be induced by other factors than active market timing, such as certain dynamic trading strategies, which may generate option-like features in fund returns and create "artificial timing" biases. Besides, Goetzmann, Ingersoll and Ivkovic (2000) showed that returns-based timing measures can also be biased when funds trade between the observation dates of fund returns. Therefore, an interesting topic for future research is the use of conditional models based on portfolio holdings, both to investigate overall performance and timing abilities, such as those proposed by Ferson and Khang (2002) and Jiang *et al.* (2007), respectively.

Another interesting line of investigation for the future might be the contribution of each type of investment screen to SRI fund performance, especially in the context of the European fund market. In fact, several SRI equity fund studies, mostly focused on the US market, show that different screens have different effects on financial performance (and also on diversification). Since both the number and nature of screens used by an SRI fund manager can change over time, future research should take this into consideration. In addition, this issue remains unexplored in the fixed-income area.

Another possible path for future investigation is the relationship between fund flows and SRI fund performance, a topic that has not received much attention in the SRI equity fund performance literature. Besides, it would also be interesting to explore the performance persistence of SRI funds in other markets besides France and the UK. As the number of SRI funds continues to grow, this will probably be a feasible task in the near future. In addition, both of these research topics remain unexplored in the context of SRI fixed-income funds, as well as the examination of the timing abilities of SRI fixed-income fund managers. However, even though these lines of research are all appealing, they will certainly need to wait for a higher development of the European SRI fund industry, as well as for the (construction and) availability of more detailed databases concerning SRI funds.

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