Risk-shifting in the socially responsible mutual fund industry: tournament versus strategic behavior

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Abstract

This paper investigates the return/risk behavior of conventional and SRI mutual fund managers. Because fund managers are usually evaluated at the end of a year, we expect them to adjust the risk of their portfolio in the second part of each year relative to an observed performance on a first part of the year. Using a database of US and European equity funds covering the years 2003 to 2014, we apply contingency tables and regression analysis to evaluate whether managers exhibit a tournament or strategic behavior. Overall, the regression results show that conventional fund managers exhibit strategic behavior. The results for SRI funds are mixed, depending on the evaluation periods, and whether social variables are considered. In particular, we find evidence of tournament (strategic) behavior for the global sample and US subsample when we exclude (include) social variables in the regression approach. The conclusions are dual for European (with and without UK) subsamples but, when we include social factors in the analysis, we document a strategic behavior pattern. For UK, using both methodologies, we detect the presence of tournament behavior. Finally, our empirical investigation indicates that some social factors influence the risk-taking by SRI managers: environmental, governance, and shareholder engagement screens seem to contribute to variation in risk, whereas sectoral and positive screens reduce the level of risk exposure. Social labels have a positive effect on risk variation for the US subsample, and a negative one for European (whole and without UK) and UK subsamples.

Keywords: Socially responsible investments, mutual funds, risk-taking, tournament behavior, strategic behavior.

1. Introduction

The behavior of mutual fund managers has been subject to considerable academic research particularly because, as rational agents, they are supposed to adjust their actions according to the incentives they face (Ammann and Verhofen, 2009). For instance, there are several authors that, from a theoretical point of view, focus on agency conflicts in the mutual

fund industry, with emphasis on asymmetric information between mutual fund managers and investors, and compensation schemes. Our main interest relies on managers' behavior pattern concerning the risk-return binomial, i.e., how managers adjust funds' risk in response to their past returns.

In the financial literature, there are two main contrasting views regarding how portfolio managers adapt their investment behavior to economic incentives. According to the competition hypothesis, the mutual fund industry can be viewed as a competition among managers aiming to finish in the best possible place at the year-end (tournament behavior). In turn, the interaction hypothesis (in the sense of taking into account the actions of the others) assumes interaction between active fund managers (strategic behavior). Existing empirical studies have failed to deliver clear evidence on this topic. On the one hand, some authors find evidence that managers of "loser" funds (funds with returns below the median) during the first months of the year increase their total risk during the rest of the year relative to higher performing funds (e.g., Brown *et al.*, 1996; Koski and Pontiff, 1999; Schwarz, 2012), supporting the tournament behavior. On the other hand, some papers document that it is intra-year "winners" that actively alter the risk in response to past performance (e.g., Chevalier and Ellison, 1997; Qui, 2003; Taylor, 2003), consistent with strategic behavior.

The purpose of this paper is to test the tournament and strategic hypotheses in the industry of socially responsible investment (SRI) funds. We investigate the pattern in SRI fund managers' risk-taking behavior by answering the question of whether managers of SRI portfolios likely to end up as "losers" will manipulate risk differently than those managing SRI portfolios likely to be "winners". It is well known that managers give considerable attention to fund performance as there is extensive evidence that high performing funds attract larger money flows from investors, resulting in a higher compensation for the manager. Nevertheless, the financial literature still discusses the moral hazard problems associated with managers' compensation schemes, particularly if fund managers act according to their private benefit, or in investors' best interest. As stated by Brown *et al*. (1996), the mutual fund industry, by focusing so much attention on relative fund performance that is evaluated on an annual basis, may as a matter of fact turn managers' goals from a long-term to a short-term horizon. Since the philosophy of responsible investing is mainly long-term oriented, we perform a comprehensive analysis of SRI fund managers' behavior concerning risk as a response to past returns (i.e., how they react and which factors drive their behavior).

We will also evaluate the tournament and strategic behavior hypotheses of SRI funds according to their ethical strategy focus, namely concerning screening intensity, types of screens (environment, social, governance, products, and shareholder engagement), sectoral and transversal screens, positive screening strategy, and labels. Given that socially responsible practices currently have strong societal visibility and reputational impact, funds' screening features may present additional pressure for management to deliver results. Previous research that has been devoted to the relationship between the screening process and financial performance shows that the number and type of screens employed by SRI funds (e.g., Barnett and Salomon, 2006; Renneboog *et al*., 2008), the positive screening strategy (e.g., Humphrey and Lee, 2011) and the application of sectoral vs. transversal screening criteria (e.g., Capelle-Blancard and Monjon, 2014) have an effect on financial returns of SRI funds. To the best of our knowledge, it is one of first studies analyzing competition in the context of the SRI fund industry.

Additionally, we will analyze if conventional and SRI fund managers behave differently, i.e., if managers of conventional and SRI funds adjust risk in the same direction as a response to past performance. On the one hand, the fact that managers of non-SRI funds are mainly profit-driven (they only consider risk and return in their utility function), whereas managers of SRI funds also recognize the importance of environmental, social, and governance (ESG) issues in the investment decision-making process may support different risk-taking behavior. On the other hand, if the compensation of mutual fund managers is mainly based in short-term compensation schemes, their risk-adjustment behavior may be similar to that of conventional fund managers.

This paper adds to the literature in several ways. First, we provide an interesting setting to examine the tournament *versus.* strategic behavior issue, by including conventional and SRI equity mutual funds from the US and Europe over 2003 to 2014. Previous studies in the field have mainly focused on US and UK conventional fund markets. To the best of our knowledge, this is the first investigation of the competition behavior of SRI funds in the US and a large set of European markets. To date, Marco *et al.* (2011) is the only paper to examine the risk-taking behavior of SRI fund managers in response to past performance, but their analysis is restricted to the British and Italian markets. Second, an important contribution of this paper is that it is the first one to incorporate screening characteristics in the analysis and thus, to provide insights on the impact of screening strategies on risk-shifting.

For the 2003 to 2014 period, our study empirically shows that conventional fund managers tend to present a strategic behavior pattern, i.e., managers of "winner" funds (funds with the highest ranking in the first part of the year) are the ones who increase risk the most. Differently, when we focus on SRI fund managers, we observe a tournament behavior pattern for the global sample and US subsample, and mixed evidence for European (with and without UK) subsamples. However, after introducing screening features in the models, this behavior pattern turns out to be strategic. For UK SRI funds, our tests show that managers exhibit a tournament behavior. In other words, managers of "loser" funds (funds with the worst ranking in the first part of the year) increase the level of risk in the second part of the year to a greater extent than managers of "winner" funds. Additionally, we also find evidence that the screening characteristics impact SRI managers' attitude towards risk. Particularly, some types of screens (environment, governance, and shareholder engagement) intensify the level of risk exposure, while the application of sectoral and positive screens contribute to risk reduction. Concerning SRI labels, we observe a dual effect: a positive impact for US funds, and a negative one for European (whole and except UK) and UK funds.

The remainder of this paper is structured as follows. Section 2 provides a brief discussion of the most relevant literature. In section 3 we outline the research hypotheses, while section 4 describes the data and methodology employed. The research findings are presented in section 5, and section 6 concludes the paper.

2. Prior research

There is extensive research on the effect of past performance on mutual fund managers' attitude towards risk, particularly concerning conventional funds, and with emphasis on whether managers behave as they are competing in a tournament, or engaging in strategic behavior. The central prediction of the tournament hypothesis formulated by the seminal paper of Brown *et al*. (1996) is that funds with below median returns during the first months of the year ("losers") increase their risk during the rest of the year relative to the higher performing funds ("winners"). Nevertheless, there are other theoretical arguments that suggest more complex hypotheses, and empirical results opposite to those found by Brown *et al*. (1996). For example, subsequent research by Chevalier and Ellison (1997) documents contrasting evidence to Brown *et al.* (1996), suggesting that it is "winners" rather than "losers" who gamble, a finding supported by Qui (2003) and Taylor (2003), among others. Taylor (2003) further shows

that the choice of the benchmark is determinant for the response of managers, while Busse (2001) considers that the tournament behavior is conditional on the frequency of data. Additionally, Kempf and Ruenzi (2008) defend that the size of the fund management company impacts the risk taken by fund managers.

2.1. Tournament behavior

The extension of the tournament model to the fund management industry began with Brown *et al.* (1996). Their seminal paper, considering monthly returns of 334 growth-oriented mutual funds during 1976 to 1991, reports empirical evidence that managers with poor relative performance in the first part of the year trade securities to increase the return of their portfolios during the latter part of the year (i.e., managers increase risk in an attempt to boost fund returns). By increasing fund volatility, mid-year "losers" increase their probability of finishing the tournament among the end of year "winners" (Busse, 2001). The authors attribute this behavior to fee contracts that base managers' compensation on the total amount of assets under management. This explanation is related with well-known evidence that. high-performing funds receive large inflows, but funds that underperform are not penalized with outflows to the same extent. Brown *et al.* (1996) also demonstrate that these results are robust with respect to the timing of the interim performance review as well as any "window dressing" effects that may occur in the month of December.

In a relatively similar direction, Busse (2001) finds the same pattern of tournament behavior documented by Brown *et al*. (1996) for 230 domestic US equity funds from 1985 through 1995. However, the author shows that the conclusions of Brown *et al*. (1996) are only supported when using monthly returns. When using daily returns, Busse (2001) was unable to find evidence that intra-year "winners" or "losers" actively shifted the risk of their portfolios in reaction to past performance. Furthermore, Busse (2001) finds that a large portion of a fund's intra-year change in risk arises from changes in the volatility of common stock market risk factors, suggesting that very little is attributable to the deliberate actions of the fund manager. Goriaev *et al.* (2005) corroborate the results of Busse (2001) that there is weak evidence of the tournament hypothesis. Nevertheless, the authors show that the cross-correlation in fund returns may lead to spurious tournament effects for both monthly and daily returns, and that the tests of the tournament hypothesis based on monthly data are more robust to autocorrelation effects than tests based on daily data.

For the US market, Koski and Pontiff (1999) and Schwarz (2012) are two studies that also document a negative relation between a fund's risk and prior performance. Koski and Pontiff (1999) analyze how derivatives affect the relation between past performance and risk. The authors propose an alternative explanation to managerial incentive gaming (as put forward by Brown *et al.*, 1996 and Chevalier and Ellison, 1997, among others), namely that managers may respond slowly to new cash flows. After a strong performance, new cash flows into a fund, and fund risk decreases until managers fully invest that cash. Likewise, after a poor performance, investors redeem shares, and fund risk increases as managers borrow to meet redemptions. For a sample of 679 US equity mutual funds over the period 1992 to 1994, the results show that change in risk is significantly related to prior performance, and that these changes are consistently less severe for derivative users. In particular, change in risk is negatively related to prior interim performance within one calendar year. Notwithstanding, change in fund risk during the early part of one year is significantly positively related to fund performance during the end of the prior year.

Employing US data from 1990 to 2006, Schwarz (2012) shows that it is the sorting process typically used in prior studies that is driving the results. The authors argue that when they correct for the sorting bias using a methodology based on portfolio holdings, the first half of the year low performing managers increase the risk of their portfolios in the second half of the year. Furthermore, they find that the tournament behavior over the 1990 to 2006 period is unrelated to the median mutual fund return in the first half of the year. Karoui and Meier (2015a) replicate the paper of Schwarz (2012) for a large sample of US domestic equity mutual funds and confirm the need to control for the sorting bias. In other words, they also find that regressing variation in risk over the second part of the year on performance ranks over the first part of the year generates biased results. The authors also show that introducing risk over the first part of the year in the regression approach is an efficient way to correct sorting bias.

With a quite different line of research, Karoui and Meier (2015b) investigate whether changes in fund risk derive from holding the portfolio or fund managers' actions. Employing data for 5,565 actively managed US equity mutual funds during 1991 to 2010, the authors show weak evidence of tournament behavior. In particular, they find that *volatility gap* variations (a proxy for managers' actions) only marginally contribute to the tournament process (fund managers actively alter the portfolio weights but their control over risk-shifting is limited).

Other two studies – Acker and Duck (2006) and Jans and Otten (2008) – examine the tournament hypothesis for UK funds. To incorporate the idea of taking bets (either with or

against the market), and using data for UK investment trusts over the period 1997 to 2001, Acker and Duck (2006) predict that "losing" managers will adopt extreme portfolios (portfolios that consists mainly of shares, i.e., involving very low or very high market exposure), and increasingly so, the further behind the fund is and the nearer the ranking date is. The authors find that UK investment trusts do indeed exhibit tournament behavior, and that "losing" managers choose a high/low market exposure depending both on anticipated market movements, and on whether they have sufficient assets to take advantage of a rising market.

The conclusions of Jans and Otten (2008) for 422 UK equity mutual funds from 1989 to 2003 are two-fold. First, using the entire sample period, no consistent evidence for tournament behavior is found. Second, splitting the sample period into two sub-periods reveals an interesting pattern: significant evidence for tournament behavior during the first part of the sample period (1989-1996), and significant support for strategic behavior during the second part of the sample period (1997-2003).

In a distinct approach, which incorporates the role played by employment and compensation incentives in the fund managers' risk-taking behavior, Kempf *et al.* (2009) reach a dual conclusion. Employing information on portfolio holdings of US equity mutual funds and stock returns from 1980 to 2003, the authors conclude that these incentives are decisive in determining the managerial risk-taking behavior. Specifically, compensation incentives lead managers with a poor midyear performance to increase risk to catch up with the midyear winners, whilst employment incentives lead managers with a poor midyear performance to decrease risk relative to leading managers to prevent potential job loss. Popescu and Xu (2017) confirm these results but for the period between 1980 and 2010, as. they find that "loser" ("winner") funds are likely to increase (decrease) risk in bull markets, while the opposite occurs in bear markets.

2.2. Strategic behavior

Chevalier and Ellison (1997) are one of the first studies to present contrasting evidence to the tournament hypothesis. The authors estimate the shape of the relationship between performance and new fund flows because it may create incentives for fund managers to increase or decrease the risk of the fund. Using monthly returns, they find that higher January-September excess returns are clearly correlated with larger risk increases.

The results of Chevalier and Ellison (1997) are consistent with the theoretical developments of Taylor (2003), who suggests that the choice of the tournament benchmark for deciding "winners" and "losers" will influence strategic responses by participants. Essentially, Taylor (2003) argues that using an exogenous benchmark will induce "losing" managers to gamble while "winning" managers will lock their lead. In contrast, using an endogenous benchmark, such as the median fund performance, will induce "winning" managers to gamble. The intuition behind this result is that the "winner" will expect the "loser" to gamble (based on tournament hypothesis) so the "winner" will therefore gamble in order to maintain the lead. As the "loser" recognizes that the "winner" has a higher probability of success, and given the asymmetric nature of the flow-performance relationship, the "loser" also recognizes that the optimum strategy is not to gamble. Therefore, previous results that were first interpreted as evidence against tournament hypothesis might well be explained as strategic behavior instead (Hallahan *et al*., 2008).

The evidence of Qiu (2003) is consistent with the hypothesis of Taylor (2003). Analyzing US growth-oriented funds from 1992-1999, and using both a contingency table test and semi-parametric regression analysis, the author shows that managers of "loser" funds adjust their portfolios' risk lower than do those of "winner" funds, in what the author interprets as the "*winner takes it all*" phenomenon (i.e., a strong incentive for the fund managers to be the top manager).

Furthermore, for a sample of US equity funds from 2001 to 2005, Ammann and Verhofen (2007, 2009) find that performance in the first half of the year has, in general, a positive impact on the choice of the risk level in the second half of the year. Successful fund managers increase volatility, beta, and assign a higher proportion of their portfolio to value stocks, small firms, and momentum stocks in comparison to unsuccessful fund managers. Unsuccessful fund managers only increase, on average, the tracking error. The authors give a two-sided explanation that combines the models of Lynch and Musto (2003) for unsuccessful managers, and Berk and Green (2004) for successful managers: first, poor performing managers follow a more passive strategy to minimize the risk of their own future replacement; second, successful managers take more risk, because they have become more confident in their own skills.

Following a similar line of reasoning (use of additional risk measures beyond returns' volatility) and employing data on US mutual funds during 1962 to 2006, Chen and Pennacchi

(2009) document a tendency for underperforming fund managers to increase the standard deviation of the tracking error, but not the standard deviation of returns.

The studies of Hallahan *et al*. (2008), Hallahan and Faff (2009) and Elton *et al*. (2010) also support Taylor's (2003) risk-shifting hypothesis for financial year-end tournaments, i.e., they find that good (poor) interim performers tend to increase (decrease) risk. Hallahan *et al.* (2008) explore the tournament effect in the behavior of Australian superannuation fund managers over the period 1989-2004. In particular, the authors conduct comparative tests of the Brown *et al.* (1996) and Taylor (2003) versions of the risk-shifting hypothesis. The findings support the hypothesis formulated by Taylor (2003) of a positive association between interim performance and risk-shifting for the financial year tournaments. Employing Australian multi-sector growth funds for the 1989-2001 period and applying a non-parametric methodology, Hallahan and Faff (2009) also find evidence in favor of Taylor's model: when an exogenous benchmark is used, the support is particularly evident for the calendar-year analysis; viewed as a whole, the analysis involving endogenous benchmarks is also quite supportive.

Finally, focusing on 215 domestic US stock mutual funds during the period 1994 to 2005, Elton *et al.* (2010) study the phenomenon of tournament behavior using a methodology based on monthly holdings data and two different measures of risk – beta and standard deviation. The authors conclude that mutual funds that had high return in the first part of the year increase risk while low return funds decrease risk.

Marco *et al.* (2011) conduct a similar analysis to Kempf *et al*. (2009), focusing on ethical funds and their conventional peers in the British and Italian markets. In the preliminary analysis, the authors find weak evidence of strategic behavior for British conventional global equity funds and the absence of prior performance having any influence on risk-taking behavior. However, by explicitly considering employment incentives, they observed strategic behavior for both conventional and ethical mutual funds, and for both the Italian and British markets. The authors also conclude that ethical investment portfolios managers enjoy greater freedom for shifting their risk exposure compared to conventional counterparts.

Furthermore, investigating US mutual funds over the period January 1991-June 2006 and distinguishing intentional changes from changes that occur through trades for other reasons (and that may cause mean reversion of risk), Cullen *et al.* (2012) note that there is no evidence of a relationship between past performance and changes to return variance or tracking error variance when considering funds that deliberately trade to change risk.

3. Research hypotheses

Rational managers attempting to maximize their expected compensation may revise the composition of their portfolios depending on their relative performance during the year (Brown *et al*., 1996). Thus, a large number of studies in Finance have focused on the search of a pattern in this risk-shifting behavior of fund managers. Some studies find that it is interim "losers" who appear to increase risk the most in subsequent periods – the tournament hypothesis (Brown *et al*., 1996; Koski and Pontiff, 1999; Acker and Duck, 2006; Schwarz, 2012) whereas others find interim "winners" adopting this behavior – the strategic behavior hypothesis (Chevalier and Ellison, 1997; Qiu, 2003; Taylor, 2003; Elton *et al*., 2010). We will analyze how SRI fund managers adjust risk as a response to prior returns, and we will also compare their behavior with the behavior of conventional fund managers. Since SRI funds incorporate social concerns beyond the simple pursue of financial gains, it is quite reasonable to assume that their pattern of risk-shifting behavior may be different. Thus, we established two competing testable hypotheses for both SRI and conventional funds:

Hypothesis 1a: Managers of "losing" funds in the first part of the interim assessment period will increase portfolio risk in the second part of the interim assessment period (tournament hypothesis).

Hypothesis 1b: Managers of "winning" funds in the first part of the interim assessment period will increase portfolio risk in the second part of the interim assessment period (strategic behavior hypothesis).

Turning to SRI funds' idiosyncrasies, we will evaluate if certain screening characteristics influence the risk-taking behavior of SRI fund managers. Our empirical investigation comprises several aspects of the screening process likely to affect returns and hence the managers' behavior with regard to the risk/return binomial: screening intensity, type of screens (environment, social, governance, products, and shareholder engagement), sectoral and transversal screens, screening signal (positive vs. negative), and labels. Along these social dimensions, managers may be induced to exhibit a different risk-taking behavior depending on the firm's social responsibility policy. For example, if some component of executive

compensation is linked to social responsibility, the screening process may influence the risk-taking by managers to boost performance and, hence, their earnings.

Regarding funds' screening intensity and its impact on performance, there are two distinct views widely discussed in SRI research, based on modern portfolio theory and stakeholder theory, respectively. On the one hand, following modern portfolio theory (Markowitz,1952), the imposition of social screens limits a manager's ability to diversify, implying that the portfolio's risk is higher and that risk-adjusted returns are sacrificed. On the other hand, in line with stakeholder theory (Freeman, 1984), companies are responsible towards all stakeholders. According to this perspective, the implementation of corporate social responsibility practices is a mechanism that allows to integrate all stakeholders' interests in the company's strategy, thereby signaling information on management quality. Following these lines of reasoning, we establish the following hypothesis:

Hypothesis 2: The screening intensity affects the risk-taking behavior of SRI fund managers in the second part of the interim assessment period.

Socially responsible funds vary not only on the intensity of their social screening, but also in the types of screens they employ. Previous research (e.g., Barnett and Salomon, 2006; Renneboog *et al.* 2008; Laurel, 2011) finds evidence of specific screens impacting the performance of SRI funds. Therefore, we will apply the screening criteria adopted by US SIF – The Forum for Sustainable and Responsible Investment, according to which SRI funds may use 16 screens (classified in five major categories – environment, social, governance, products, and shareholder engagement) to filter firms from their investment portfolios, and postulate the next hypotheses:

Hypothesis 3a: Environmental screening (e.g., screens related with climate/clean tech, or pollution/toxics) influences the risk-taking behavior of SRI fund managers in the second part of the interim assessment period.

Hypothesis 3b: Social screening (e.g., screens related with community development, or labor relations) influences the risk-taking behavior of SRI fund managers in the second part of the interim assessment period.

Hypothesis 3c: Governance screening (e.g., screens related with board issues, or executive pay) influences the risk-taking behavior of SRI fund managers in the second part of the interim assessment period.

Hypothesis 3d: Products screening (e.g., screens related with alcohol, gambling, or tobacco) influences the risk-taking behavior of SRI fund managers in the second part of the interim assessment period.

Hypothesis 3e: Shareholder engagement screening (e.g., screens related with filling shareholder resolution, or private dialogue concerning ESG issues) influences the risk-taking behavior of SRI fund managers in the second part of the interim assessment period.

Following Capelle-Blancard and Monjon (2014), who advocate that the only damaging exclusion criteria for SRI investors are those who target specific sectors (sectoral screens), and not those that apply to all firms (transversal screens), we will distinguish between sectoral and transversal criteria. This distinction may be relevant and have a different impact on the binomial risk/return. Thus, we hypothesize the following:

Hypothesis 4: The application of sectoral and transversal screens impacts the risk-taking behavior of SRI fund managers in the second part of the interim assessment period.

Furthermore, screens applied by funds may be positive (in that they select certain desirable firms into the portfolio) or negative (in that they eliminate entire industries and sectors from a portfolio), implying a trade-off between selectivity and diversification. Previous papers in SRI literature (e.g., Humphrey and Lee, 2011; Nofsinger and Varma, 2014; Leite and Cortez, 2015) show that the screening strategy (positive *versus* negative) may impact performance differently. We thereby postulate the next hypothesis:

Hypothesis 5: The enforcement of a positive screening strategy has an effect on the risk-taking behavior of SRI fund managers in the second part of the interim assessment period.

Finally, we will also analyze if the certification by social labels may influence fund managers' attitude towards risk. Social labels are an instrument to guide investors on the funds'

commitment to observing ESG standards in the investment process. These labels are attributed by independent entities with the purpose of providing investors with more information and more transparency on socially responsible investment products[1]. We thus hypothesize:

Hypothesis 6: The certification by social labels affects the risk-taking behavior of SRI fund managers in the second part of the interim assessment period.

4. Data and Methods

4.1. Sample description

Our sample covers conventional and SRI equity mutual funds from the US and 11 European countries (Austria, Belgium, Denmark, France, Germany, Italy, Luxembourg, Netherlands, Norway, Sweden, and United Kingdom). Although ethical investment is currently a global phenomenon, US and Europe are still the most relevant markets around the world in terms of number of funds and assets under management. The Global Sustainable Investment Alliance (GSIA), an alliance of well-known sustainable investment organizations (like US SIF or EUROSIF), reports about 23 trillion dollars of assets under management at the start of 2016, of which Europe accounts about 53%, while the US accounts for 38%.

Information on the number and types of social screens of US funds is mainly obtained from the Mutual Fund Performance Chart at the end of 2014, and SRI Trends Reports from US SIF[2]. Additionally, we also check the funds' prospectuses and websites, and the US Securities and Exchange Commission (SEC) files. Regarding Europe, we focus on the countries analyzed by reports and studies from Vigeo Eiris. To collect data on screening, we first construct a list of funds based on a search of certain keywords on Datastream (e.g., socially responsible investment, ethical, green, religious), and then crossed the list with the funds' fact sheets available on the yourSRI website. These fact sheets disclose information on investment objectives, SRI classification (screens and social labels), and investment profile of SRI funds. Based on the SRI subsample, we construct a matched sample of conventional funds (for each SRI fund, we select three conventional funds) based on fund size and age.

[1] Considering that the denomination of a fund as SRI is self-assigned by the fund itself, there are concerns that this denomination may be more of a marketing tool (Utz and Wimmer, 2014). Thus, the purpose of social labels is to ensure investors that the fund is actually following the stated social screens.

[2] Our analysis includes the years 2001, 2003, 2005, 2007, 2010 and 2012.

As mentioned by Brown et *al.* (1996), disappearance is more likely to be associated to underperforming funds and therefore the results of the tournament hypothesis may be biased if only surviving funds are considered. To minimize those effects, we consider both surviving and non-surviving funds[3].

Following prior research (e.g., Jans and Otten, 2008), the tournaments are evaluated on an annual basis, and a fund is only included in a certain year if at least a full year of data is available, starting the first of January. This implies that in each year all funds with less than 12 monthly returns a year are excluded. Furthermore, a critical issue in this field of research is the periodicity of the returns data, namely the use of daily or monthly returns. For example, Busse (2001) argues that autocorrelation in daily fund returns can bias monthly volatility estimates, leading to the spurious appearance of a tournament effect. None the less, Goriaev *et al.* (2005) find that tests of the tournament hypothesis based on monthly data are more robust to autocorrelation effects than tests based on daily data, although they also find that cross-correlation in fund returns may lead to spurious tournament effects. Thus, we chose to employ monthly observations of returns and, as funds within the same investment style exhibit higher cross-correlation of fund returns, we mitigate the critique of Goriaev *et al.* (2005) by including equity funds with different Lipper categories. The returns are extracted from CRSP (US funds) and Datastream (European funds) and, in order to avoid duplication, only one class of each fund is considered. Accordingly, our database contains monthly returns of 253 SRI funds and 759 conventional funds from the US and Europe over the period between January 2003 and December 2014.

Tables 1.A, 1.B and 1.C report the descriptive statistics concerning the monthly returns of our sample (SRI and conventional funds) by geographic region (global, US and Europe).

[INSERT TABLES 1.A TO 1.C]

Both when we focus on the global sample, or when we split the sample between US and European funds, the tables show a similar evolution over time of the statistics of the returns of conventional and SRI funds. Nevertheless, it is worth mentioning that in 4 of the 12 years considered (2006, 2009, 2012, and 2013), socially responsible funds outperformed (in average) conventional funds for either US and European markets.

[3] Nevertheless, we cannot ensure that we were able to identify all dead funds.

4.2. Risk and returns

In this study, we will apply two methodologies – contingency tables and regression analysis – to evaluate the relationship between prior returns and subsequent risk.

With regard to the contingency tables approach, we will employ two variables regarding returns and risk, namely the cumulative return and risk adjustment ratio, respectively. In general, the cumulative return is a measure based on funds' monthly returns (calculated for each year), while the risk adjustment ratio quantifies the funds' volatility (or standard deviation)[4]. Since we consider five cut-off points in terms of midyear periods (as we will explain later), we will establish five rankings by year for each group of funds (conventional and SRI). Furthermore, the rankings will be drawn up globally, and by geographical regions (US, Europe, Europe except UK, and UK).

Slightly differently, in regression analysis, and similar to Kempf *et al.* (2009) and Marco *et al*. (2011), we will use raw monthly returns as basis[5], and calculate the position that a fund *i* occupies in the ranking at the end of the first part of the year *t*. Similar to the contingency tables approach, rankings will be defined for the global sample, and geographical subsamples (US, Europe, Europe except UK, and UK). A fund ranking is computed by comparing the total returns obtained by the fund at the end of the first part of the year relative to total returns of the competing funds. Funds are ordered from greatest to least total return, and assigned a number in descending order. For example, if we have a group of five funds, we will assign number 5 to the fund with the highest return, and number 1 to the fund with the lowest return. In order to be able to compare the results and given that the number of funds varies between years and countries, rankings are normalized to be equally distributed between zero and one. In other words, managers of funds which have shown the best performance will have a ranking closer to one, while managers of those that performed the worst will have a ranking closer to zero. Managers with a ranking below 0.5 are classified as midyear "losers", whilst managers with a ranking not below 0.5 are classified as midyear "winners". Like Marco *et al.* (2011), risk is computed through the annualized standard deviations of monthly returns.

[4] Section 4.5.1 describes in detail the construction of these two variables.
[5] Kempf *et al.* (2009) justify the use of performance ranks based on raw returns instead of risk-adjusted returns with the argument that investors mainly care about ranks when making the investment decisions.

4.3. Social variables

We will employ in the regression analysis variables that we consider to reflect distinct dimensions of social screening, namely screening intensity, screening types, positive screening strategy, and labels.

The variable screening intensity is measured as the number of screens applied by each fund (between 1 and 16), while screening types are dummy variables which represent five types of screening criteria. Both variables are based on US SIF categorization, who defines 16 screens pooled by 5 categories: environment (screens related to climate, clean technology, pollution, toxics and other environmental issues), social (screens associated with community development, diversity and equal employment, human rights, labor relations and Sudan), governance (screens that account for board and executive pay issues), products (screens that exclude companies involved in alcohol, animal welfare, defense/weapons, gambling and tobacco products) and shareholder engagement. As an alternative to total screening intensity, and to test hypothesis 4, we use the number of sectoral screens (screens that exclude entire sectors), and the number of transversal screens (screens that apply to all firms). Sectoral screens vary from 1 to 8, and transversal screens from 1 to 4. The positive screening variable is quantified as the number of positive screens (screens that seek to provide incentives in the form of investment for companies that act in a socially responsible manner) employed by each fund, while labels is a dummy variable that assumes the value of 1 if a fund has been certified with at least one social label.

As previously mentioned, for US funds, the information on the social variables (except for the dummy labels) was collected from the US SIF Mutual Fund Performance Chart at the end of year 2014, as well as from the funds' prospectuses and websites, and SEC files. For European funds, the data was obtained from the yourSRI fact sheets. From this source we also retrieved data for the social labels awarded to US funds.

4.4. Control variables

Concerning the regression approach, we will also investigate the impact of additional factors that might influence the behavior of fund managers, specifically age, size and expense ratio. By way of example, Qiu (2003) and Hallahan *et al.* (2008) control for age and size, whilst Kempf *et al*. (2009) explore as well the effect of the expense ratio.

With regard to age, Hallahan *et al.* (2008) argue that younger funds have a greater incentive and greater freedom to chase returns in comparison to older funds. According to the authors, investors will be presumably more influenced by poor short-term performance for a fund with a short performance history than for a fund that has been around for some time. In what concerns size, they contend that the smaller (larger) the assets of a fund, the easier (harder) it is for the fund to alter its risk. Additionally, larger funds are likely to face greater scrutiny from the investment community. The expense ratio may also impact funds' financial returns, and thus affect the relationship between risk and returns.

In this study, age is measured as the total number of months since the fund's inception, whilst size is computed through the fund's total net assets (in million US dollars). Total expense ratio is a measure of total costs associated with managing and operating an investment fund. Annual data with regard to funds' total net assets and expense ratio are collected from Datastream (European funds) and CRSP (US funds) databases, whereas inception dates are obtained from Bloomberg and Morningstar websites.

4.5 Assessing the relationship between returns and risk-shifting

In order to analyze the risk-taking behavior of fund managers, we employ two different approaches. First, we apply a non-parametric approach, namely contingency tables, which allows us to verify how SRI and conventional fund managers adjust risk in the second part of the year as a reaction to funds' performance in the first part of the year. Second, we apply a parametric approach, specifically regression analysis, to also evaluate the impact of social factors and control variables on risk-taking by SRI fund managers. The advantage of this approach is that while the contingency table approach only allows for a distinction between midyear "winners" and midyear "losers", the regression approach allows us to examine the continuous impact of the fund's ranking on variations in risk.

4.5.1 Contingency tables

Following Brown *et al.* (1996) and subsequent studies, we will test whether funds' performance in the first part of an interim assessment period explains the change in the volatility of funds' returns in the second part of that interim assessment period by means of contingency tables. We first start be computing two variables regarding return and risk. For

each period, we compute the first-half returns, and the risk adjustment ratios to test whether "winners" or "losers" adjust the second-half risk of their portfolios.

The underlying intuition of the tournament hypothesis is the following:

$$\left(\frac{\sigma_{2L}}{\sigma_{1L}}\right) > \left(\frac{\sigma_{2W}}{\sigma_{1W}}\right) \quad (1)$$

Where:

σ_{1L} (σ_{2L}) represents the standard deviation of the "loser" fund returns in the first (second) part of the year; and
σ_{1W} (σ_{2W}) represents the standard deviation of the "winner" fund returns in the first (second) part of the year.

To test the intuition represented by equation (1)[6], two variables from the monthly mutual fund data are constructed. First, sub-groups of interim "winners" and "losers" are constructed according to the funds' cumulative returns. For fund *j*, month *M*, and year *y*, the M-month cumulative return (RTN) is calculated as follows:

$$RTN_{jMy} = \left[\left(1 + r_{j1y}\right)\left(1 + r_{j2y}\right) \ldots \left(1 + r_{jMy}\right)\right] - 1 \quad (2)$$

Where:

r_{jMy} is the raw return of fund *j*, on month *M*, in year *y*.

Concerning the assessment periods, besides the typical division of the year into the first six months versus last six months, there are other possible cut-offs. For example, Brown *et al.* (1996) and Elton *et al.* (2010) look for evidence of risk-shifting in the last five months of the year versus the first seven months, whereas Busse (2001) separates the evaluation period from the latter part of the year at five different break points: April, May, June, July, and August. So, following previous literature and since managers do not mandatorily compare the first six

[6] Equation (1) represents only a general trend and does not have to be verified in all situations, i.e., risk does not always have to be higher (lower) in the second period for "loser" ("winner") funds.

months of the year and adjust the risk of their portfolios for the last six months of the year (even because countries' fiscal years are not necessarily coincident), in our analysis M varies between April and August.

Based on the cumulative returns (RTN) calculated for each year, and for each different evaluation period, funds are ranked from high RTN to low RTN: funds that perform above the median RTN are labelled "winner" funds, while funds that perform below the median[7] RTN are considered "loser" funds[8]. Given that we use five cut-off points, five RTN rankings are created for every year in the sample.

Second, a ratio of each funds' volatility before and after the interim assessment period is computed as Brown *et al.* (1996), Qiu (2003), and Schwarz (2012), among others. The Risk Adjustment Ratio (RAR) is calculated as follows:

$$RAR_{ij} = \sqrt{\frac{\sum_{m=M+1}^{12}\left(r_{jmy} - r_{j(12-M)y}\right)^2/((12-M)-1)}{\sum_{m=1}^{M}\left(r_{jmy} - r_{jMy}\right)^2/(M-1)}} \quad (3)$$

The Risk Adjustment Ratio (RAR) measures the standard deviation of the second period of the year, relative to the standard deviation of the first period of the same year, with the cut-off points taken at five points during the year, as previously mentioned.

After calculating the returns and risk variables, we build two-way contingency tables – a commonly used methodology in the risk-shifting behavior literature (e.g., Brown *et al*., 1996; Jans and Otten, 2008; Hallahan and Faff, 2009) – to assess the relationship between returns and risk-shifting. Funds are classified into winners and losers on the basis of those two variables: whether the first-half returns are above ("winners") or below ("losers") that period's median first-half returns, and whether the risk adjustment ratios are above or below that period's median risk adjustment ratios. The intuition is that if underperforming funds tend to have above median risk adjustment ratios, there is evidence of tournament behavior. Conversely, if outperforming funds tend to have above median risk adjustment ratios, there is evidence of strategic behavior.

[7] The use of the median (instead of the mean, for example) to split the sample between "winners" and "losers" is due to the fact that it generates two samples of the same dimension to compare. This division of "winners" and "losers" based on the median is also typically used in performance persistence studies (e.g., Brown and Goetzmann, 1995).

[8] If the RTN and/or the RAR of a fund in a given year and evaluation period is coincident with the median, we exclude that fund for that year and evaluation period.

Thus, based on equations (2) and (3), for each fund *j* on month *M* of year *y*, we create pairs consisting of the RTN measure linked to the RAR measure of that fund in the same year, which can be summarized in four different categories: (high RTN, high RAR), (high RTN, low RAR), (low RTN, high RAR), and (low RTN, low RAR). We classify each observation into one of these four cells of the contingency tables and calculate the sample frequency for each cell. The null hypothesis of independency between the two variables is that each of the four categories would contain 25 per cent of the frequencies. To test this hypothesis, we will use the Chi-square (χ^2) test with one degree of freedom. For every year of the 12-year sample, a matrix was created for every month between April and August. The χ^2 tests were performed on each of the five matrixes. The null hypothesis for the χ^2 tests (i.e., that each cell is independent and that the percentage in each cell is 25%) means that the fund's risk adjustment ratio in period 2 is independent of its compounded return in period 1 (Qiu, 2003).

We also compute the cross product ratio, also known as the odds ratio, as follows:

$$CPR = \frac{(High\ RTN, Low\ RAR) * (Low\ RTN, High\ RAR)}{(High\ RTN, High\ RAR) * (Low\ RTN, Low\ RAR)} \quad (4)$$

An odds ratio higher than 1 indicates evidence of tournament behavior, i.e., managers of "loser" ("winner") funds in the first part of the year take more (less) risk in the second part of the year compared to "winner" ("loser") funds. Conversely, if the odds ratio is lower than 1, there is evidence of strategic behavior.

4.5.2 Regression analysis

Given that the contingency tables analysis does not allow us to investigate the impact of social variables and control for other fund characteristics that might affect the binomial risk/return, we will complement the empirical study with regression analysis. Following Marco *et al*. (2011), we regress funds' performance rankings on risk variation, as follows:

$$\Delta\sigma_{i,t} = \beta_1 Rank_{i,t} + \beta_2 Size_{i,t} + \beta_3 Age_{i,t} + \beta_4 TER_{i,t} + \varepsilon_{i,t} \quad (5)$$

Where:

$\Delta\sigma_{it}$ is the variation in risk experienced by fund *i* between the second and the first part of year *t*;
Rank_{it} is the ranking obtained by fund *i* by the end of the first part of year *t*;
$\text{Size}_{i,t}$ is the logarithm of the total net assets for fund *i* at time *t*;
$\text{Age}_{i,t}$ is the logarithm of the number of months since inception for fund *i* at time *t*; and
$\text{TER}_{i,t}$ is the total expense ratio for fund *i* at time *t*.

As previously mentioned, and similar to Marco *et al.* (2011), risk is measured based on the annualized standard deviation of monthly returns. Since β_1 is the coefficient on the ranking obtained by fund *i* by the end of the first part of the year, a significant $\beta_1$value would indicate that prior performance has an influence on the fund manager's risk-taking behavior. If β_1 is negative, this indicates the existence of tournament behavior, in which the interim "losers" – the fund managers with the worst ranking at the end of the first part of the year – increase the levels of risk exposure to a greater extent than interim "winners". On the other hand, a positive β_1 implies the existence of strategic behavior, whereby it is the interim "winners" who proportionally increase risk exposure the most.

Equation (5) is estimated through a random effects model with standard errors adjusted for potential autocorrelation and heteroskedasticity. Random effects and fixed effects are two adequate alternatives for panel data modelling (Verbeek, 2012). Notwithstanding, after performing a Hausman test, a statistical tool which compares the two estimators, we cannot reject the null hypothesis that random effects is the preferred model[9].

Similar to the contingency table approach, we consider five cut-offs between the first and second part of the year, namely in April, May, June, July, and August. Additionally, in line with Marco *et al*. (2011), we provide comparative empirical evidence for SRI and conventional mutual funds, but we further extend the analysis to examine if the screening features influence the SRI managers' risk-taking behavior. Therefore, regression (6) is formulated as follows:

[9] Verbeek (2012) draws attention to the fact that if the Hausman test does not reject the null hypothesis, it is not necessarily the case that the random effects model should be preferred. To ensure the robustness of our methodology, we tested the application of the fixed effects model. The results are very similar to the ones obtained by the random effects model.

$$\Delta\sigma_{i,t} = \gamma_1 Rank_{i,t} + \gamma_2 Screening\ Intensity_i + \gamma_3 Screening\ Types_i + \gamma_4 Positive\ Screening\ Intensity_i + \gamma_5 Labels_i + \gamma_6 Size_{i,t} + \gamma_7 Age_{i,t} + \gamma_8 TER_{i,t} + \varepsilon_{i,t} \quad (6)$$

Where:

Screening Intensity$_i$ represents the total number of screens of fund *i*, or the number of sectoral screens plus the number of transversal screens;
Screening Types$_i$ are dummy variables that represent the types of screens applied to fund *i*, namely Environment, Social, Governance, Products, and Shareholder Engagement;
Positive Screening Intensity$_i$ is the number of positive screens applied by fund *i*; and
Labels$_i$ is a dummy variable that assumes the value of 1 if the fund *i* has been certified with at least one social label.

Equation (6) will be estimated using a between effects model. Given our data structure – we have variables that vary over time (e.g., variation in risk and rankings), and screening strategies constant during the sample period –, we cannot apply a fixed effects model, in the sense that it suppresses the time-invariant variables from the model. With regard to random effects, we rejected the null hypothesis of the Hausman test that the random effects model is the preferred one. Thus, the between effects estimator emerges as a robust methodology for our panel data. Though it discards the information about time series contained in the data, it examines the cross-sectional information (i.e., the differences between funds).

5. Empirical results

This section presents the results on the risk-shifting behavior of SRI funds and conventional funds. We start by analyzing the results obtained from the contingency tables and then proceed the regression analysis (equations 5 and 6).

5.1 Contingency tables

We first perform a general test on the global sample and then we extend the analysis to geographical subsamples: US, Europe, Europe except UK, and UK. Table 2 (3) reports the

results for SRI (conventional) funds.

[INSERT TABLES 2 AND 3]

Concerning SRI funds (table 2), our results show a statistically significant (at the 5% level) tournament behavior in the UK subsample for the (7,5) evaluation period. This seems to indicate that managers of UK SRI funds with low (high) cumulative returns in the first part of the year (January to July), increase (decrease) risk in the final part of the year (August to December). The same phenomenon was observed for UK conventional funds by Acker and Duck (2006), when analyzing UK investment trusts during 1997-2001, and Jans and Otten (2008), focusing on UK equity mutual funds over the period 1989-1996. For the global sample and other subsamples, there are no significant results although, in general, the (high RTN, low RAR) and (low RTN, high RAR) cells contain more than 25 per cent of the data (the CPR is higher than 1 in most cases), which is evidence in favor of the tournament hypothesis initially formulated by Brown *et al.* (1996).

Turning to conventional funds (table 3), there are no significant results for both the global sample, or geographical subsamples. Nevertheless, unlike the SRI subsample, the CPR is inferior to 1 for most of the evaluation periods, what seems to be indicative of the strategic behavior first discussed by Taylor (2003).

In the following section, we will investigate if the regression approach corroborates these results, particularly with respect to the tournament behavior found for UK SRI funds.

5.2 Regression analysis

In this section, we estimate the effect of a fund's ranking (and social factors) on risk variation, controlling as well for some funds' characteristics, namely age, size and expenses. The contingency tables methodology previously used is less flexible than the regression approach, and thus it is mainly used as an exploratory analysis, complementary to regression models. Regression analysis goes beyond categorizing variables in a binary way and testing for their independency and, unlike contingency tables, allows us to quantify the impact of performance rankings and screening features (and other characteristics) on funds' risk exposure.

Accordingly, we start by evaluating whether the ranking obtained by a fund (based on its returns) over the first part of the year has influence on the risk taken by the fund manager

in the second part of the year. For both SRI and conventional subsamples, the results are presented in tables 4 to 8.

[INSERT TABLES 4 TO 8]

For the whole sample (table 4), there is strong evidence of strategic behavior of conventional fund managers. In other words, considering the (6,6), (7,5), and (8,4) evaluation periods, conventional fund managers likely to end up as "winners" ("losers") increase (decrease) the level of risk exposure in the second part of the year. Differently, SRI funds managers exhibit tournament behavior. Specifically, for the (5,7) and (8,4) evaluation periods, there is significant evidence that interim "losers" ("winners") are the ones who increase (decrease) risk the most.

When we focus on the US subsample (table 5), the conclusions are quite similar, except for the fact that for conventional funds there is evidence of management strategic behavior for the (4,8), (5,7), and (7,5) evaluation periods. Considering the European conventional subsample, there is weak evidence (for a significance level of 10%) of the strategic behavior hypothesis for the (6,6) evaluation period. With respect to SRI funds, the evidence is mixed, i.e., there is a positive and significant relationship between funds' ranking and subsequent risk (strategic behavior) for the (4,8) evaluation period, while "losing" funds in the first part of the year increase their risk in the remaining part of the year (tournament behavior) for the (5,7), (6,6) and (8,4) evaluation periods. Excluding the UK, conventional and SRI funds exhibit similar results, although the tournament behavior found for the European SRI subsample only holds for the (8,4) evaluation period. Finally, for UK conventional funds, we find no evidence of tournament or strategic behavior for all time scenarios. The results obtained for the UK SRI subsample reinforce the findings previously obtained when applying the contingency tables approach. Except for the (4,8) evaluation period, we find that managers of funds with below interim performance ranking subsequently increase the risk in the second part of the year.

Concerning the control variables, all three fund characteristics seem to have significant effects on managers' risk adjustment. Size impacts positively the variation in risk of US and UK conventional funds, whilst age has a negative impact for most subsamples. There is no conclusive evidence with respect to the total expense ratio: for both SRI and conventional US subsamples, the expense ratio has a positive effect on risk' variation, while having the opposite effect for the conventional global sample and remaining subsamples.

The results on the influence that social variables have on fund management risk-shifting behavior (equation 6) are presented in tables 9 to 18. Similar to equation (5), we perform the regressions on the global sample, and geographical subsamples (US, Europe, Europe except UK, and UK). Additionally, we estimate the equations employing the total screening intensity or alternatively, the number of sectoral and transversal screens.

[INSERT TABLES 9 TO 18]

When we consider the whole sample (tables 9 and 10), we find weak evidence of management strategic behavior, as there is a positive and statistically significant (at the 10% level) relationship between the funds' ranking and subsequent variation in risk for the (6,6) evaluation period. With regard to screening features, some types of screens (environment, governance, and shareholder engagement) and the positive screening strategy seem to affect the change in risk levels. Particularly, for most of the assessment periods, the types of screens increase the level of risk exposure in the second part of the year, whereas the enforcement of positive screens reduce the risk assumed by the fund manager in the final part of the year for the (6,6) and (7,5) evaluation periods. Moreover, both age and the expense ratio seem to have a negative impact on the variation in risk experienced by a fund. The conclusions are quite similar when we replace the total screening intensity by the number of sectoral and transversal screens. However, it should be mentioned that for the June cut-off the number of sectoral screens has a negative and statistically significant (at the 10% level) effect on risk variation.

Focusing on the US subsample (tables 11 and 12), similar to the global sample, we document the existence of strategic behavior for the (6,6) assessment period, for both total screening intensity, and number of sectoral and transversal screens. Additionally, governance screens and the certification by social labels seem to have a positive impact on changes in funds' risk for most evaluation periods. For European funds (tables 13 and 14), we find a positive and statistically significant (at the 5% level) coefficient associated with the fund ranking for the (4,8) and (7,5) evaluation periods. Also, environmental screens contribute to the increase in the level of risk, whilst the dummy labels reduce the risk assumed by fund managers in the second part of the year (for the April cut-off point). We obtain similar evidence when employing sectoral and transversal screening criteria, and after excluding the UK, with one exception: without considering UK SRI funds, size has a negative impact on changes in fund risk for most evaluation periods. Finally, for the UK subsample (tables 17 and 18), the coefficient associated

with the fund ranking is negative and statistically significant when we consider the July and August cut-offs. In other words, there is evidence of management tournament behavior, which holds for the (8,4) evaluation period after replacing the total number of screens by the number of sectoral and transversal screens. Besides that, we find that social labels contribute negatively to changes in risk exposure for most assessment periods. Concerning the control variables, funds' size and expense ratio exhibit positive coefficients, while age shows a negative one.

In sum, when we introduce the social factors in the analysis of how SRI fund managers manipulate risk in the second part of the year given the fund ranking in the first part of the year, there is some contrasting evidence in comparison to the results of estimating equation (5). Taking into account the social characteristics, the results for the global sample and geographical subsamples (except for the UK), broadly support the strategic behavior hypothesis, suggesting that managers of funds with the highest ranking in the first part of the year are the ones who raise the risk to a greater extent in the final part of the year. For the UK, the results are consistent with those obtained with the contingency tables approach and the regression results without social variables. In particular, UK fund managers that incorporate social criteria and are interim "losers" (i.e., with the worst ranking in the first part of the year) assume a higher risk in the second part of the year. Interestingly, beyond performance ranking, some social features also affect the variation in risk. Environmental, governance, and shareholder engagement screens seem to have a positive effect on changes in risk (for the global sample and certain subsamples), suggesting that these types of screens represent additional sources of risk for SRI funds. However, the number of sectoral screens and the number of positive screens have the opposite effect. Concerning the certification by social labels, there is mixed evidence: we find a positive link between labels and variation in risk for the US subsample, and a negative one for the European (with and without UK) and UK subsamples. Fund age, size and expense ratio also have a significant impact on management risk adjustment behavior: for the global sample and the UK subsample, older funds tend to have lower risk variation, while there are mixed results with regard to size and expense ratio.

5.3 Robustness tests

We perform a series of robustness checks (for both contingency tables and regression approach) to test the sensitivity of our results to the dynamic of risk-shifting behavior over time, the exclusion of the month of December, alternative variables to ranking and risk variation,

and sorting bias.

First, in line with previous empirical studies (e.g., Marco *et al*., 2011), to investigate if the results are consistent during the time horizon of our research, we split the sample into two equal sub-periods: 2003 to 2008, and 2009 to 2014. Whether the dynamics of risk-shifting behavior over time may affect the results for the entire period is an issue that has been raised by several authors. By way of example, Jans and Otten (2008) exhibits evidence for tournament behavior during the first part of the sample period (1989-1996), and evidence for strategic behavior during the second part of the sample period (1997-2003).

Concerning the contingency tables approach, when we divide the sample into two equal sub-periods, some new results emerge for the conventional global sample, and UK subsamples. In particular, there is evidence of strategic behavior for the conventional global sample for the 2003-2008 period, and (7,5) and (8,4) evaluation periods. For the UK conventional subsample, the results are similar to the ones achieved for the global sample but, for the second part of the sample period (2009-2014), we find a significant tournament behavior for the (7,5) evaluation period. With regard to UK SRI funds, our results corroborate and extend those obtained for the whole period. Specifically, we detect a tournament pattern behavior for both sub-periods, and (6,6) (only for 2009 to 2014), (7,5), and (8,4) assessment periods.

With respect to regression analysis, there are also some differences in comparison to the whole sample period. For the conventional global sample, the results hold for the 2003-2008 period. For the years between 2009 and 2014, the strategic behavior only exists for the (6,6) assessment period. The conclusions for the US conventional funds are mixed, since we find different patterns of management behavior depending on the sub-sample period, and evaluation moments. The European (with and without UK) subsamples exhibit a strategic behavior for the 2003-2008 period for all evaluation periods (with the exception of the August cut-off). For UK funds, we find evidence of strategic behavior for the 2003-2008 period and the July and August cut-offs. Turning to SRI funds, for the global sample, we find similar results to table 4 for the first sample period. Nevertheless, when we consider the 2009-2014 period, conclusions are dual: there is evidence of strategic (tournament) behavior for the (4,8) ((8,4)) evaluation period, for the simple model (equation 5). The results for US and UK SRI funds confirm a tournament pattern behavior for both time periods. Interestingly, for both European subsamples, the conclusions differ when we compare the two sub-periods. There is evidence of tournament behavior for the first part of the sample (2003-2008), while a strategic behavior pattern is uncovered for the 2009-2014 period.

Second, as in Brown *et al.* (1996), Jans and Otten (2008), and Elton *et al.* (2010), among others, we will examine the management risk-taking behavior excluding the month of December. Given that fund managers may use a window dressing strategy at the end of the calendar year in order to improve performance, we alternatively perform our analysis on a data set that excludes the December returns.

Focusing on the contingency tables methodology, after excluding the observations of December, our analysis indicates tournament behavior in the US and UK SRI subsamples and (4,7) evaluation period, besides the result already obtained for UK SRI funds for the (7,5) evaluation period. Applying the regression analysis, for conventional funds, the only significant difference that we should highlight is the disappearance of the strategic behavior previously found for Europe (with and without UK) in the (6,5) assessment period. The results obtained for SRI funds are also consistent with the main analysis. Notwithstanding, we observe that there is now evidence of strategic behavior in the global sample and US subsample for the (7,4) assessment period. Furthermore, whilst the tournament pattern disappears for European SRI funds in the June cut-off, our results suggest strategic behavior in both European subsamples for the (5,6) evaluation period.

Third, like Hallahan *et al.* (2008), we regress the two variables from the contingency tables methodology (i.e., the funds' cumulative returns – RTN – and the risk adjustment ratio – RAR), alternatively to ranking and variation in risk. We find quite similar results for conventional and SRI subsamples.

Finally, in line with Schwarz (2012) and Karoui and Meier (2015), who argue that tournament literature is affected by sorting bias, we introduce the standard deviation over the first part of the year as explanatory variable on equations (5) and (6). With the exception of UK conventional funds, for which there is evidence of strategic behavior in the (4,8), (6,6), and (7,5) evaluation periods, when we consider the effect of the sorting bias, the results are, in general, consistent with previous analysis.

6. Conclusions

Previous studies in Finance evaluate how mutual fund managers adjust risk in the second part of a reporting year as a response to fund relative performance in the first part of the same year. Theoretical arguments and empirical results on the risk-shifting behavior are mixed: some authors claim that the managers with the worst ranking at the end of the first part

of the year (interim "losers") are those who proportionally increase the risk the most – the tournament behavior hypothesis –, while others defend that it is interim "winners" who strategically assume more risk in the second part of the year – the strategic behavior hypothesis.

In this paper, we contend that the mutual fund industry can be seen as a tournament in which the managers compete with each other for new assets (and, hence, higher compensation) based on funds' relative performance, but it is not clear how they manipulate risk in order to achieve their financial goals. Managers may have distinct incentives to change the volatility of their portfolios after an interim performance assessment, not only based on their ranking ("winners" vs. "losers"), but also depending on the type of fund (conventional versus socially responsible) and other financial and social characteristics.

Thus, we analyze the risk-taking behavior of conventional and SRI equity mutual fund managers in response to their relative performance over a period of 12 years (2003 to 2014), and considering five different cut-off points to distinguish the first and the second part of the year, namely April, May, June, July, and August. The empirical study is conducted for the global sample, and four geographical subsamples (US, Europe, Europe except UK, and UK), and we apply two different and complementary methodologies – contingency tables and regression analysis.

In general, for the conventional subsample, our results support the strategic behavior hypothesis. Except for the UK subsample, we find evidence that best performing fund managers are those who increase their risk level, consistent with the prediction of Taylor (2003). This result is observed when we apply the regression approach (there are no significant results when using contingency tables). Regarding the SRI subsample, for the global sample and US subsample, we conclude that subsequent period risk is negatively dependent of the fund ranking, indicating evidence of tournament behavior pattern. However, this pattern is observed only when we regress funds' ranking on risk variation without considering social factors. When we incorporate the screening features in the analysis, the pattern turns out to be of a strategic behavior nature. For Europe (whole and except UK), the empirical results are mixed for the scenario without social variables. After taking into account the social factors, and similar to the global sample and US subsamples, we conclude that managers who are interim "winners" increase the level of risk of their portfolios. Interestingly, we observe a different return/risk reaction profile in UK SRI fund managers. For both contingency tables and regression analysis, we find consistent evidence favorable to the tournament hypothesis first put forward by Brown

et al. (1996). In fact, the only significant result applying the contingency tables approach is found for UK SRI funds in the (7,5) evaluation period.

It is generally recognized that investors and managers are increasingly aware of issues related to corporate governance, emission control, global warming, or community investing, and other important factors which they may use to screen firms from their investment portfolios. Given that these social factors may act as a "shield" in mitigating risk (e.g., Jo and Na, 2012; Bouslah *et al*., 2013, Sun and Cui, 2014), we expect them to have a mediation role concerning managers' risk-taking behavior. The risk of reputational damage and the potential of financial damage which may occur in the sequence of an ESG-related incident may operate as a driver for management risk-taking. Examples like BP and Tepco (on environmental issues), Lonmin and Foxconn (on social issues), or UBS, Lehman Brothers, and GlaxoSmithKline (on governance), clearly illustrate the impact of ignoring such issues (Tinelli, 2016). We find some interesting results with regard to screening characteristics. More specifically, environmental, governance, and shareholder engagement screens seem to have a positive impact on fund risk variation. This means that managers of SRI funds that apply these screening types increase their level of risk exposure, a result that is partially consistent with Bouslah *et al.* (2013), who find that S&P500 companies' risk is positively affected by the environmental component of social performance, and corporate governance concerns. Differently, the enforcement of positive and sectoral screening contributes to fund risk reduction. The effect of social labels is conditional on the geographical market: there is a positive effect for US SRI funds, and a negative one for European (with and without UK) and UK SRI subsamples.

Furthermore, focusing on funds' characteristics, our evidence clearly suggests that older conventional and SRI funds have lower risk exposure. With regard to size and expense ratio, the conclusions are mixed.

The robustness tests we performed mainly confirm the consistency of our results. Specially for UK funds, the results hold for both contingency tables and regression analysis when we split the sample between two equal sub-periods (2003-2008 and 2009-2014) and exclude the observations of the month of December, or apply the RTN and RAR measures from contingency tables and correct for sorting bias in the regression approach.

Concerning the methodologies used, we chose a non-parametric (contingency tables) and a parametric (regression analysis) approach, which assumes that all variation in risk derives from the reaction of managers to funds' relative performance. Yet, this is not necessarily the case. In fact, fund managers can alter the risk of their portfolios by adjusting the composition

of the portfolios, depending on the benchmarks' evolution, or the information prospects on companies, industries and countries, among other factors. Future research may integrate these considerations in the analysis.

Inferring the incentives and actions of SRI fund managers is relevant for the financial community, regulators, and policy-makers.The major implication of our findings is that managers of conventional and SRI funds seem to act similarly regarding the manipulation of risk as reaction to funds' interim performance. Although SRI academic literature intensively highlights that SRI funds may differ from their conventional in several ways (e.g., Humphrey *et al*., 2016 argue that SRI managers may possess different personal characteristics from conventional managers, which could have an impact on performance), we conclude that both types of managers strategically increase (decrease) the risk exposure of "winner" ("loser") funds. Notwithstanding, we should emphasize that such a conclusion is only valid when social factors are taking into account, in what we may interpret as the screening process conveying value-relevant information to fund managers' actions. In fact, both SRI and non-SRI managers revise the risk of their portfolios given the relative performance during the first part of the year but, unlike Brown *et al.* (1996) and following papers that provide evidence of management tournament behavior, we cannot state that overall there are adverse incentives for managers to change the risk exposure of a fund in order to boost performance and consequently the managers' compensation.

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Table 1.A. Descriptive statistics of SRI and conventional funds' monthly returns

This table reports the descriptive statistics (mean, maximum, minimum, median and standard deviation) of monthly returns for 253 SRI and 759 conventional funds. The statistics are computed for each of the year covered by our research (2003-2014) and across funds.

			Monthly Returns				
	Year	**Nr. Observations**	**Mean**	**Maximum**	**Minimum**	**Median**	**Standard Deviation**
Socially responsible funds	2003	1,332	0.025177	0.226446	-0.098105	0.022197	0.043733
	2004	1,476	0.012610	0.428841	-0.105069	0.013466	0.034506
	2005	1,560	0.007645	0.131806	-0.110743	0.005566	0.031987
	2006	1,692	0.019360	0.757269	-0.105339	0.02005	0.036176
	2007	1,788	0.009446	0.554226	-0.108971	0.007522	0.036428
	2008	2,124	-0.042728	0.230240	-0.355035	-0.028752	0.092090
	2009	2,508	0.028199	0.284126	-0.177840	0.029944	0.081353
	2010	2,628	0.008849	0.259766	-0.203034	0.008089	0.068075
	2011	2,844	-0.009533	0.197612	-0.300264	-0.003916	0.064516
	2012	3,024	0.013694	2.627437	-0.696749	0.019995	0.084202
	2013	3,036	0.021402	2.411972	-0.155457	0.022303	0.056506
	2014	2,916	-0.000826	0.126074	-0.714677	0.005169	0.040918
Conventional funds	2003	3,792	0.017876	0.205543	-0.128307	0.019240	0.043311
	2004	4,104	0.010336	0.145526	-0.112426	0.01177	0.028923
	2005	4,548	0.015800	0.277444	-0.171433	0.018403	0.034234
	2006	5,316	0.011833	0.224827	-0.140624	0.014219	0.032010
	2007	6,240	0.00566	0.442837	-0.172497	0.007459	0.034130
	2008	6,912	-0.038419	0.203039	-0.493275	-0.022679	0.073073
	2009	7,476	0.025095	0.378698	-0.240679	0.031404	0.066201
	2010	7,908	0.013265	0.229134	-0.271516	0.016990	0.047431
	2011	8,568	-0.006827	0.378099	-0.915996	-0.004933	0.050434
	2012	9,048	0.011333	0.266476	-0.98991	0.014869	0.044421
	2013	8,916	0.016484	4.848619	-0.709361	0.017559	0.068388
	2014	8,748	0.005913	0.153612	-0.162476	0.008813	0.031230

Table 1.B. Descriptive statistics of US SRI and conventional funds' monthly returns

This table reports the descriptive statistics (mean, maximum, minimum, median and standard deviation) of monthly returns for US funds: 80 SRI and 240 conventional funds. The statistics are computed for each of the year covered by our research (2003-2014) and across funds.

			Monthly Returns				
	Year	**Nr. Observations**	**Mean**	**Maximum**	**Minimum**	**Median**	**Standard Deviation**
Socially responsible funds	2003	408	0.021581	0.123821	-0.051339	0.019969	0.032406
	2004	456	0.008899	0.112458	-0.085246	0.008020	0.026697
	2005	480	0.006102	0.089550	-0.060127	-0.000396	0.030227
	2006	564	0.011427	0.140705	-0.065574	0.012183	0.026097
	2007	600	0.005417	0.114627	-0.085973	0.003643	0.030186
	2008	708	-0.034393	0.230240	-0.344986	-0.02351	0.090210
	2009	852	0.027673	0.284126	-0.175897	0.030072	0.082156
	2010	864	0.014092	0.145022	-0.203034	0.024702	0.058438
	2011	900	-0.003537	0.189444	-0.300264	0.005866	0.060620
	2012	948	0.015429	2.627437	-0.696749	0.017145	0.128435
	2013	960	0.025377	2.411972	-0.065829	0.023927	0.084335
	2014	960	-0.000286	0.117737	-0.714677	0.010252	0.049952
Conventional funds	2003	1,524	0.023444	0.205543	-0.081695	0.018857	0.036944
	2004	1,620	0.011193	0.141145	-0.112426	0.013148	0.031128
	2005	1,848	0.009049	0.277444	-0.141119	0.006223	0.034494
	2006	2,316	0.010742	0.212889	-0.131201	0.013513	0.032937
	2007	2,676	0.010218	0.132555	-0.099927	0.011361	0.033240
	2008	2,820	-0.040480	0.197080	-0.493275	-0.026506	0.077941
	2009	2,820	0.027509	0.332521	-0.230105	0.035947	0.065911
	2010	2,820	0.014991	0.229134	-0.271516	0.025650	0.059156
	2011	2,844	-0.002652	0.378099	-0.311195	-0.005644	0.057916
	2012	2,832	0.011494	0.146166	-0.180687	0.017887	0.038985
	2013	2,796	0.021467	0.184339	-0.070117	0.024997	0.028869
	2014	2,772	0.004157	0.153612	-0.162476	0.007231	0.033420

Table 1.C. Descriptive statistics of European SRI and conventional funds' monthly returns

This table reports the descriptive statistics (mean, maximum, minimum, median and standard deviation) of monthly returns for European funds: 173 SRI and 519 conventional funds. The statistics are computed for each of the year covered by our research (2003-2014) and across funds.

			Monthly Returns				
	Year	**Nr. Observations**	**Mean**	**Maximum**	**Minimum**	**Median**	**Standard Deviation**
Socially responsible funds	2003	924	0.026764	0.226446	-0.098105	0.023908	0.047819
	2004	1,020	0.014270	0.428841	-0.105069	0.017106	0.037368
	2005	1,080	0.008330	0.131806	-0.110743	0.009100	0.032729
	2006	1,128	0.023326	0.757269	-0.105339	0.026253	0.039701
	2007	1,188	0.011481	0.554226	-0.108971	0.010409	0.039058
	2008	1,416	-0.046896	0.195863	-0.355035	-0.030981	0.092766
	2009	1,656	0.028469	0.251885	-0.177840	0.02949	0.080960
	2010	1,764	0.006281	0.259766	-0.186597	-0.004774	0.072205
	2011	1,944	-0.012309	0.197612	-0.286799	-0.009694	0.066074
	2012	2,076	0.012901	0.201055	-0.175890	0.020760	0.052904
	2013	2,076	0.019564	0.130998	-0.155457	0.021743	0.037045
	2014	1,956	-0.001091	0.126074	-0.132261	0.003530	0.035669
Conventional funds	2003	2,268	0.014135	0.188049	-0.128307	0.019552	0.046745
	2004	2,484	0.009776	0.145526	-0.111574	0.010805	0.027382
	2005	2,700	0.020420	0.091354	-0.056138	0.024949	0.033281
	2006	3,000	0.012675	0.083424	-0.076416	0.014778	0.031255
	2007	3,564	0.002238	0.074455	-0.073013	0.004165	0.034393
	2008	4,092	-0.036998	0.110938	-0.201689	-0.019917	0.069493
	2009	4,656	0.023634	0.189587	-0.138403	0.028540	0.066341
	2010	5,088	0.012308	0.111750	-0.084746	0.014792	0.039433
	2011	5,724	-0.008902	0.106390	-0.128534	-0.004743	0.046134
	2012	6,216	0.01126	0.103105	-0.097364	0.013808	0.046692
	2013	6,120	0.014208	0.086300	-0.061433	0.014591	0.080105
	2014	5,976	0.006727	0.064556	-0.069659	0.009373	0.030129

Table 2 – Risk-shifting behavior of SRI funds – contingency tables approach

This table reports, for the global sample, and geographical subsamples (Europe, Europe except UK, US, and UK), the 2x2 contingency tables containing the percentage of the number of observations included in each cell. Concerning the assessment period (M,12-M), M represents the evaluation period itself between January and month M, while 12-M represents the residual part of the year. In each cell, we include the pairs of (RTN, RAR), where RTN represents the fund cumulative returns, and RAR is the risk adjustment ratio. The combination of these two variables results in four categories: (high RTN, high RAR), (high RTN, low RAR), (low RTN, high RAR), and (low RTN, low RAR). The sample frequency is calculated for each cell, and the χ^2 statistic is based on the null hypothesis that each cell should contain the same sample frequency (25%). TB is a period where there is evidence of statistically significant tournament behavior, and SB is a period where there is evidence of statistically significant strategic behavior. The sample includes 253 socially responsible funds for the 2003-2014 period. ** p-value < 0.10; ** p-value < 0.05; *** p-value < 0.01*

				Sample frequency (percentage of observations)						
				Low RTN		High RTN				
Countries/Regions	Nr. Funds	Nr. Observations	Assessment period (M,12-M)	Low RAR	High RAR	Low RAR	High RAR	Cross-Product Ratio	χ^2	Behavior (TB/SB)
Global sample	253	2243	(4,8)	24%	25%	26%	25%	1.08	0.0400	-
		2241	(5,7)	22%	27%	28%	23%	1.49	1.0004	-
		2242	(6,6)	24%	26%	26%	24%	1.17	0.1600	-
		2243	(7,5)	26%	24%	24%	26%	0.85	0.1600	-
		2242	(8,4)	25%	25%	25%	25%	1.00	0.0000	-
Europe	173	1517	(4,8)	24%	26%	26%	24%	1.17	0.1600	-
		1518	(5,7)	22%	28%	28%	22%	1.62	1.4400	-
		1518	(6,6)	23%	27%	27%	23%	1.38	0.6400	-
		1517	(7,5)	25%	25%	25%	25%	1.00	0.0000	-
		1518	(8,4)	25%	25%	25%	25%	1.00	0.0000	-
Europe (except UK)	143	1243	(4,8)	25%	25%	25%	25%	1.00	0.0000	-
		1244	(5,7)	23%	28%	27%	22%	1.49	1.0004	-
		1243	(6,6)	23%	27%	27%	23%	1.38	0.6400	-
		1244	(7,5)	26%	24%	24%	26%	0.85	0.1600	-
		1246	(8,4)	26%	24%	24%	26%	0.85	0.1600	-
US	80	725	(4,8)	24%	25%	26%	25%	1.08	0.0400	-
		724	(5,7)	25%	25%	25%	25%	1.00	0.0000	-
		723	(6,6)	25%	24%	25%	26%	0.92	0.0400	-
		725	(7,5)	26%	24%	24%	26%	0.85	0.1600	-
		725	(8,4)	24%	25%	26%	25%	1.08	0.0400	-
UK	30	272	(4,8)	24%	26%	26%	24%	1.17	0.1600	-
		273	(5,7)	22%	28%	28%	22%	1.62	1.4400	-
		271	(6,6)	22%	29%	28%	21%	1.76	1.9608	-
		273	(7,5)	18%	32%	32%	18%	3.16	7.8400	TB**
		273	(8,4)	21%	30%	29%	20%	2.07	3.2413	-

Table 3 – Risk-shifting behavior of conventional funds – contingency tables

This table reports, for the global sample, and geographical subsamples (Europe, Europe except UK, US, and UK), the 2x2 contingency tables containing the percentage of the number of observations included in each cell. Concerning the assessment period (M,12-M), M represents the evaluation period itself between January and month M, while 12-M represents the residual part of the year. In each cell, we include the pairs of (RTN, RAR), where RTN represents the fund cumulative returns, and RAR is the risk adjustment ratio. The combination of these two variables results in four categories: (high RTN, high RAR), (high RTN, low RAR), (low RTN, high RAR), and (low RTN, low RAR). The sample frequency is calculated for each cell, and the χ^2 statistic is based on the null hypothesis that each cell should contain the same sample frequency (25%). TB is a period where there is evidence of statistically significant tournament behavior, and SB is a period where there is evidence of statistically significant strategic behavior. The sample includes 759 conventional funds for the 2003-2014 period. ** p-value < 0.10; ** p-value < 0.05; *** p-value < 0.01*

				Sample frequency (percentage of observations)						
				Low RTN		High RTN				
Countries/Regions	Nr. Funds	Nr. Observations	Assessment period (M,12-M)	Low RAR	High RAR	Low RAR	High RAR	Cross-Product Ratio	χ^2	Behavior (TB/SB)
Global sample	759	6795	(4,8)	26%	24%	24%	26%	0.85	0.1600	-
		6795	(5,7)	25%	25%	25%	25%	1.00	0.0000	-
		6797	(6,6)	26%	24%	24%	26%	0.85	0.1600	-
		6796	(7,5)	28%	22%	22%	28%	0.62	1.4400	-
		6796	(8,4)	27%	23%	23%	27%	0.73	0.6400	-
Europe	519	4323	(4,8)	26%	24%	24%	26%	0.85	0.1600	-
		4321	(5,7)	25%	25%	25%	25%	1.00	0.0000	-
		4321	(6,6)	25%	25%	25%	25%	1.00	0.0000	-
		4321	(7,5)	27%	23%	23%	27%	0.73	0.6400	-
		4322	(8,4)	25%	25%	25%	25%	1.00	0.0000	-
Europe (except UK)	429	3524	(4,8)	26%	24%	24%	26%	0.85	0.1600	-
		3525	(5,7)	25%	25%	25%	25%	1.00	0.0000	-
		3524	(6,6)	25%	26%	25%	24%	1.08	0.0400	-
		3526	(7,5)	27%	23%	23%	27%	0.73	0.6400	-
		3527	(8,4)	25%	25%	25%	25%	1.00	0.0000	-
US	240	2474	(4,8)	24%	25%	26%	25%	1.08	0.0400	-
		2471	(5,7)	27%	23%	23%	27%	0.73	0.6400	-
		2471	(6,6)	26%	24%	24%	26%	0.85	0.1600	-
		2474	(7,5)	28%	22%	22%	28%	0.62	1.4400	-
		2474	(8,4)	27%	23%	23%	27%	0.73	0.6400	-
UK	90	796	(4,8)	27%	24%	23%	26%	0.79	0.3601	-
		797	(5,7)	26%	24%	24%	26%	0.85	0.1600	-
		796	(6,6)	26%	24%	24%	26%	0.85	0.1600	-
		797	(7,5)	24%	26%	26%	24%	1.17	0.1600	-
		796	(8,4)	25%	25%	25%	25%	1.00	0.0000	-

Table 4 – Risk-shifting behavior of conventional and SRI funds – global sample

This table reports the results of panel data regressions for the management risk-shifting behavior for SRI and non-SRI funds. The dependent variable is the variation in risk experienced by a fund between the second and first part of the year ($\Delta\sigma$). The independent variable is the ranking obtained by a fund by the end of the first part of the year (RANK). Control variables are: lagged logarithm of the variable Size, measured by fund's total net assets in million US dollars (L_SIZE); lagged logarithm of the variable Age, measured as the number of months since the fund's inception (L_AGE); and Total Expense Ratio, in percentage (TER). The model is estimated using random effects with standard errors robust for autocorrelation and heteroskedasticity. The sample includes 253 socially responsible funds and 759 conventional funds for the 2003-2014 period with five cut-off points for each year: April (4,8), May (5,7), June (6,6), July (7,5), and August (8,4). t-statistics are shown in parentheses. ** p-value < 0.10; ** p-value < 0.05; *** p-value < 0.01*

	Conventional Funds					**SRI Funds**				
	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)
Ranking (RANK)	0.010551 (1.24)	0.002749 (0.28)	0.015190*** (2.86)	0.020040*** (3.03)	0.021137*** (3.39)	0.014409 (1.33)	-0.013351* (-1.84)	-0.005241 (-0.55)	-0.000282 (-0.03)	-0.019986*** (-3.62)
Size (L_SIZE)	0.001724 (1.10)	0.002387 (1.41)	0.001718 (1.48)	0.001144 (0.85)	0.001082 (0.94)	0.000503 (0.20)	-0.000565 (-0.19)	0.001047 (0.82)	0.002574 (1.64)	0.000865 (0.97)
Age (L_AGE)	-0.006053 (-1.48)	-0.005438 (-1.27)	-0.004692 (-1.41)	-0.003998 (-1.09)	-0.005253 (-1.50)	-0.016081 (-1.05)	-0.016545 (-1.01)	-0.010178 (-1.53)	-0.014913* (-1.83)	-0.006423** (-2.45)
Total expense ratio (TER)	-0.003357*** (-2.82)	-0.000480 (-0.40)	-0.003261*** (-4.38)	-0.008384*** (-7.47)	-0.007032*** (-7.72)	-0.003164 (-0.44)	-0.006619 (-0.93)	-0.004016 (-1.03)	-0.003065 (-0.73)	0.002812 (1.29)
Observations	5,540	5,540	5,540	5,540	5,540	2,086	2,086	2,086	2,086	2,086
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included

Table 5 – Risk-shifting behavior of conventional and SRI funds – US subsample

This table reports the results of panel data regressions for the management risk-shifting behavior for SRI and non-SRI funds. The dependent variable is the variation in risk experienced by a fund between the second and first part of the year ($\Delta\sigma$). The independent variable is the ranking obtained by a fund by the end of the first part of the year (RANK). Control variables are: lagged logarithm of the variable Size, measured by fund's total net assets in million US dollars (L_SIZE); lagged logarithm of the variable Age, measured as the number of months since the fund's inception (L_AGE); and Total Expense Ratio, in percentage (TER). The model is estimated using random effects with standard errors robust for autocorrelation and heteroskedasticity. The sample includes 80 socially responsible funds and 240 conventional funds for the 2003-2014 period with five cut-off points for each year: April (4,8), May (5,7), June (6,6), July (7,5), and August (8,4). t-statistics are shown in parentheses. ** p-value < 0.10; ** p-value < 0.05; *** p-value < 0.01*

	Conventional Funds					**SRI Funds**				
	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)
Ranking (RANK)	0.011103*** (2.63)	0.014449*** (4.31)	0.003405 (1.04)	0.017562*** (4.47)	-0.001579 (-0.38)	0.012280 (0.57)	-0.022286*** (-3.23)	-0.013210 (-1.07)	-0.007050 (-0.57)	-0.046037** (-2.41)
Size (L_SIZE)	0.00109** (2.36)	0.000424 (0.86)	0.000470 (1.05)	0.001126** (2.42)	0.001855*** (3.39)	-0.008856 (-0.92)	-0.010999 (-1.03)	-0.002298 (-1.38)	-0.003815 (-1.64)	-0.000263 (-0.16)
Age (L_AGE)	-0.002317* (-1.66)	0.001456 (1.06)	-0.000054 (-0.04)	-0.001098 (-0.79)	-0.005441*** (-3.30)	-0.030957 (-1.02)	-0.028597 (-0.91)	-0.010092 (-0.76)	-0.011411 (-0.71)	0.001337 (0.40)
Total expense ratio (TER)	0.845036*** (3.80)	0.477372** (2.26)	0.520945** (2.52)	0.573750*** (3.27)	0.672392*** (3.14)	-0.033084 (-0.62)	-0.041982 (-0.75)	-0.007170 (-0.34)	-0.013741 (-0.56)	0.015118*** (3.95)
Observations	2,315	2,315	2,315	2,315	2,315	725	725	725	725	725
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included

Table 6 – Risk-shifting behavior of conventional and SRI funds – European subsample

This table reports the results of panel data regressions for the management risk-shifting behavior for SRI and non-SRI funds. The dependent variable is the variation in risk experienced by a fund between the second and first part of the year ($\Delta\sigma$). The independent variable is the ranking obtained by a fund by the end of the first part of the year (RANK). Control variables are: lagged logarithm of the variable Size, measured by fund's total net assets in million US dollars (L_SIZE); lagged logarithm of the variable Age, measured as the number of months since the fund's inception (L_AGE); and Total Expense Ratio, in percentage (TER). The model is estimated using random effects with standard errors robust for autocorrelation and heteroskedasticity. The sample includes 173 socially responsible funds and 519 conventional funds for the 2003-2014 period with five cut-off points for each year: April (4,8), May (5,7), June (6,6), July (7,5), and August (8,4). t-statistics are shown in parentheses. ** p-value < 0.10; ** p-value < 0.05; *** p-value < 0.01*

	Conventional Funds					**SRI Funds**				
	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)
Ranking (RANK)	0.002174 (0.14)	-0.007187 (-0.41)	0.015548* (1.79)	0.001117 (0.10)	0.004497 (0.45)	0.012186** (2.53)	-0.008144* (-1.80)	-0.009866** (-2.08)	-0.006307 (-1.10)	-0.017138*** (-2.80)
Size (L_SIZE)	0.001974 (0.91)	0.003053 (1.30)	0.002143 (1.44)	0.001231 (0.67)	0.001426 (0.95)	-0.000284 (-0.41)	-0.000440 (-0.54)	-0.000176 (-0.20)	0.000076 (0.09)	0.000554 (0.61)
Age (L_AGE)	-0.008061 (-1.64)	-0.005921 (-1.16)	-0.006050 (-1.57)	-0.007679* (-1.74)	-0.007867* (-1.89)	-0.003721 (-1.37)	-0.003936 (-1.37)	-0.006899** (-2.22)	-0.009773*** (-2.85)	-0.010594*** (-2.87)
Total expense ratio (TER)	-0.004311 (-1.42)	-0.005725* (-1.93)	-0.003089 (-1.46)	-0.003582 (-1.42)	-0.002147 (-1.01)	0.002134 (1.05)	0.002031 (0.96)	0.001157 (0.50)	0.003935 (1.52)	0.001544 (0.56)
Observations	3,225	3,225	3,225	3,225	3,225	1,361	1,361	1,361	1,361	1,361
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included

Table 7 – Risk-shifting behavior of conventional and SRI funds – European (except UK) subsample

This table reports the results of panel data regressions for the management risk-shifting behavior for SRI and non-SRI funds. The dependent variable is the variation in risk experienced by a fund between the second and first part of the year ($\Delta\sigma$). The independent variable is the ranking obtained by a fund by the end of the first part of the year (RANK). Control variables are: lagged logarithm of the variable Size, measured by fund's total net assets in million US dollars (L_SIZE); lagged logarithm of the variable Age, measured as the number of months since the fund's inception (L_AGE); and Total Expense Ratio, in percentage (TER). The model is estimated using random effects with standard errors robust for autocorrelation and heteroskedasticity. The sample includes 143 socially responsible funds and 429 conventional funds for the 2003-2014 period with five cut-off points for each year: April (4,8), May (5,7), June (6,6), July (7,5), and August (8,4). t-statistics are shown in parentheses. ** p-value < 0.10; ** p-value < 0.05; *** p-value < 0.01*

	Conventional Funds					**SRI Funds**				
	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)
Ranking (RANK)	0.000588 (0.03)	-0.007290 (-0.35)	0.016940* (1.91)	0.002413 (0.18)	0.002848 (0.27)	0.014124** (2.46)	-0.007465 (-1.45)	-0.007652 (-1.44)	-0.002181 (-0.33)	-0.013953* (-1.91)
Size (L_SIZE)	0.001687 (0.70)	0.002890 (1.09)	0.001940 (1.20)	0.001305 (0.63)	0.001517 (0.92)	-0.000027 (-0.03)	-0.000569 (-0.81)	-0.000702 (-0.85)	0.000133 (0.15)	0.000220 (0.26)
Age (L_AGE)	-0.009597* (-1.74)	-0.006810 (-1.20)	-0.006569 (-1.53)	-0.007876 (-1.59)	-0.008779* (-1.91)	-0.004982 (-1.48)	-0.003288 (-0.97)	-0.006248* (-1.70)	-0.012378*** (-2.90)	-0.010886** (-2.51)
Total expense ratio (TER)	-0.004492 (-1.40)	-0.005707* (-1.80)	-0.002700 (-1.21)	-0.002894 (-1.07)	-0.001666 (-0.74)	0.001681 (0.70)	0.000878 (0.40)	-0.000344 (-0.15)	0.004612 (1.47)	0.000098 (0.03)
Observations	2,883	2,883	2,883	2,883	2,883	1,105	1,105	1,105	1,105	1,105
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included

Table 8 – Risk-shifting behavior of conventional and SRI funds – UK subsample

This table reports the results of panel data regressions for the management risk-shifting behavior for SRI and non-SRI funds. The dependent variable is the variation in risk experienced by a fund between the second and first part of the year ($\Delta\sigma$). The independent variable is the ranking obtained by a fund by the end of the first part of the year (RANK). Control variables are: lagged logarithm of the variable Size, measured by fund's total net assets in million US dollars (L_SIZE); lagged logarithm of the variable Age, measured as the number of months since the fund's inception (L_AGE); and Total Expense Ratio, in percentage (TER). The model is estimated using random effects with standard errors robust for autocorrelation and heteroskedasticity. The sample includes 30 socially responsible funds and 90 conventional funds for 2003-2014 period with five cut-off points for each year: April (4,8), May (5,7), June (6,6), July (7,5), and August (8,4). t-statistics are shown in parentheses. ** p-value < 0.10; ** p-value < 0.05; *** p-value < 0.01*

	Conventional Funds					**SRI Funds**				
	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)
Ranking (RANK)	0.009725 (1.41)	0.006615 (1.14)	0.01003 (1.57)	0.006861 (0.79)	0.014672 (1.58)	0.002047 (0.31)	-0.013150* (-1.78)	-0.021528*** (-3.03)	-0.028563*** (-4.12)	-0.031714*** (-3.93)
Size (L_SIZE)	0.002931*** (5.28)	0.003112*** (4.22)	0.003131*** (3.43)	0.001159 (1.37)	0.001301** (2.21)	-0.000049 (-0.04)	0.000392 (0.18)	0.001548 (0.78)	0.001781 (1.07)	0.002373 (1.09)
Age (L_AGE)	-0.001024 (-0.30)	0.001696 (0.50)	-0.002291 (-0.56)	-0.005086 (-1.32)	-0.002886 (-0.90)	-0.004444** (-1.98)	-0.005904* (-1.81)	-0.005785* (-1.70)	-0.007810** (-2.31)	-0.009886** (-2.51)
Total expense ratio (TER)	0.000480 (0.11)	-0.006232* (-1.88)	-0.007339** (-2.37)	-0.004571 (-1.35)	-0.001311 (-0.41)	0.004487 (1.08)	0.007282 (1.50)	0.005522 (1.26)	0.004677 (1.13)	0.008173 (1.41)
Observations	342	342	342	342	342	256	256	256	256	256
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included

Table 9 – Risk-shifting behavior and screening characteristics – global sample

This table reports the results of panel data regressions for the management risk-shifting behavior for SRI funds. The dependent variable is the variation in risk experienced by a fund between the second and first part of the year ($\Delta\sigma$). The independent variables include: the ranking obtained by a fund by the end of the first part of the year (RANK), the total number of screens employed by each fund (SI), the types of screens applied by each fund (Environment – ENV; Social – SOC; Governance – GOV; Products – PROD; and Shareholder Engagement – SHENG), the number of positive screens enforced by each fund (PSCR), and a dummy variable that assumes the value of 1 if the fund has been certified with at least one social label, and 0 otherwise (LAB). Control variables are: lagged logarithm of the variable Size, measured by fund's total net assets in million US dollars (L_SIZE); lagged logarithm of the variable Age, measured as the number of months since the fund's inception (L_AGE); and Total Expense Ratio, in percentage (TER). The model is estimated using between effects. The sample includes 253 socially responsible funds for the 2003-2014 period with five cut-off points for each year: April (4,8), May (5,7), June (6,6), July (7,5), and August (8,4). t-statistics are shown in parentheses. * *p-value < 0.10;* ** *p-value < 0.05;* *** *p-value < 0.01*

	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)
Ranking (RANK)	0.015735 (0.21)	-0.084036 (-1.10)	0.062300* (1.95)	0.052458 (1.39)	0.011158 (0.86)
SI	-0.002853 (-0.55)	-0.003067 (-0.54)	-0.002902 (-1.20)	-0.002607 (-0.88)	-0.001422 (-1.42)
ENV	0.025047 (0.91)	0.030484 (1.01)	0.021856* (1.70)	0.027149* (1.72)	0.017277*** (3.26)
SOC	0.016850 (0.73)	0.017680 (0.69)	0.009145 (0.85)	0.011521 (0.87)	0.002627 (0.59)
GOV	0.083475* (1.83)	0.099613** (1.99)	0.037314* (1.76)	0.038593 (1.48)	-0.003486 (-0.40)
PROD	-0.023731 (-0.83)	-0.027375 (-0.87)	-0.009014 (-0.68)	-0.010133 (-0.62)	0.005410 (0.98)
SHENG	0.044743 (1.07)	0.041763 (0.91)	0.032134* (1.66)	0.042078* (1.77)	0.020259** (2.52)
PSCR	-0.008515 (-1.62)	-0.009360 (-1.62)	-0.004305* (-1.76)	-0.005347* (-1.78)	-0.001314 (-1.30)
LAB	0.017352 (1.00)	0.022028 (1.15)	0.010151 (1.25)	0.008311 (0.82)	-0.000317 (-0.09)
L_SIZE	-0.001042 (-0.22)	-0.001458 (-0.28)	-0.001036 (-0.46)	-0.001189 (-0.43)	-0.000641 (-0.69)
L_AGE	-0.024129 (-1.37)	-0.023417 (-1.22)	-0.016406** (-2.05)	-0.019114* (-1.93)	-0.003407 (-1.02)
TER	-0.020286 (-1.48)	-0.025046* (-1.66)	-0.005303 (-0.83)	-0.008180 (-1.04)	0.003041 (1.14)
Observations	2,086	2,086	2,086	2,086	2,086
Year dummies	Included	Included	Included	Included	Included

Table 10 – Risk-shifting behavior and screening characteristics (sectoral and transversal screens) – global sample

This table reports the results of panel data regressions for the management risk-shifting behavior for SRI funds. The dependent variable is the variation in risk experienced by a fund between the second and first part of the year ($\Delta\sigma$). The independent variables include: the ranking obtained by a fund by the end of the first part of the year (RANK), the number of sectoral (SECT) and transversal (TRANSV) screens employed by each fund, the types of screens applied by each fund (Environment – ENV; Social – SOC; Governance – GOV; Products – PROD; and Shareholder Engagement – SHENG), the number of positive screens enforced by each fund (PSCR), and a dummy variable that assumes the value of 1 if the fund has been certified with at least one social label, and 0 otherwise (LAB). Control variables are: lagged logarithm of the variable Size, measured by fund's total net assets in million US dollars (L_SIZE); lagged logarithm of the variable Age, measured as the number of months since the fund's inception (L_AGE); and Total Expense Ratio, in percentage (TER). The model is estimated using between effects. The sample includes 253 socially responsible funds for the 2003-2014 period with five cut-off points for each year: April (4,8), May (5,7), June (6,6), July (7,5), and August (8,4). t-statistics are shown in parentheses. * *p-value < 0.10;* ** *p-value < 0.05;* *** *p-value < 0.01*

	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)
Ranking (RANK)	0.022473 (0.30)	-0.073713 (-0.96)	0.067541** (2.10)	0.056495 (1.49)	0.011813 (0.91)
SECT	-0.006377 (-1.02)	-0.006819 (-0.99)	-0.005013* (-1.74)	-0.004672 (-1.31)	-0.001808 (-1.50)
TRANSV	0.010986 (0.66)	0.010729 (0.59)	0.004845 (0.63)	0.004260 (0.45)	-0.000487 (-0.15)
ENV	0.026729 (0.96)	0.032684 (1.07)	0.022978* (1.78)	0.028679* (1.81)	0.017652*** (3.29)
SOC	-0.002180 (-0.07)	-0.001126 (-0.03)	-0.001583 (-0.11)	0.002103 (0.11)	0.001360 (0.22)
GOV	0.070058 (1.62)	0.085702* (1.80)	0.026668 (1.32)	0.029184 (1.18)	-0.007189 (-0.85)
PROD	-0.020595 (-0.71)	-0.023675 (-0.74)	-0.006983 (-0.52)	-0.007824 (-0.47)	0.005964 (1.06)
SHENG	0.041043 (1.03)	0.037976 (0.87)	0.028183 (1.54)	0.038822* (1.72)	0.018367** (2.40)
PSCR	-0.010122* (-1.80)	-0.010975* (-1.78)	-0.005182** (-1.99)	-0.006116* (-1.91)	-0.001404 (-1.30)
LAB	0.017657 (1.01)	0.022367 (1.17)	0.010451 (1.29)	0.008656 (0.86)	-0.000245 (-0.07)
L_SIZE	-0.001366 (-0.28)	-0.001725 (-0.33)	-0.001188 (-0.53)	-0.001338 (-0.48)	-0.000653 (-0.70)
L_AGE	-0.022884 (-1.30)	-0.022348 (-1.16)	-0.015657* (-1.95)	-0.018481* (-1.86)	-0.003316 (-0.98)
TER	-0.018994 (-1.38)	-0.023602 (-1.56)	-0.004438 (-0.69)	-0.007439 (-0.94)	0.003195 (1.19)
Observations	2,086	2,086	2,086	2,086	2,086
Year dummies	Included	Included	Included	Included	Included

Table 11 – Risk-shifting behavior and screening characteristics – US subsample

This table reports the results of panel data regressions for the management risk-shifting behavior for SRI funds. The dependent variable is the variation in risk experienced by a fund between the second and first part of the year ($\Delta\sigma$). The independent variables include: the ranking obtained by a fund by the end of the first part of the year (RANK), the total number of screens employed by each fund (SI), the types of screens applied by each fund (Environment – ENV; Social – SOC; Governance – GOV; Products – PROD; and Shareholder Engagement – SHENG), the number of positive screens enforced by each fund (PSCR), and a dummy variable that assumes the value of 1 if the fund has been certified with at least one social label, and 0 otherwise (LAB). Control variables are: lagged logarithm of the variable Size, measured by fund's total net assets in million US dollars (L_SIZE); lagged logarithm of the variable Age, measured as the number of months since the fund's inception (L_AGE); and Total Expense Ratio, in percentage (TER). The model is estimated using between effects. The sample includes 80 socially responsible funds for the 2003-2014 period with five cut-off points for each year: April (4,8), May (5,7), June (6,6), July (7,5), and August (8,4). t-statistics are shown in parentheses. ** p-value < 0.10; ** p-value < 0.05; *** p-value < 0.01*

	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)
Ranking (RANK)	-0.082228 (-0.32)	-0.279427 (-1.12)	0.192095* (1.89)	0.004307 (0.03)	0.032535 (1.26)
SI	-0.015993 (-1.08)	-0.015215 (-0.93)	-0.006852 (-1.04)	-0.007092 (-0.86)	-0.000781 (-0.49)
ENV	0.017729 (0.20)	0.012958 (0.13)	0.016050 (0.41)	0.011282 (0.23)	0.010236 (1.09)
SOC	-0.001434 (-0.02)	0.005272 (0.06)	-0.011435 (-0.34)	0.000474 (0.01)	0.000602 (0.08)
GOV	0.259725** (2.42)	0.279501** (2.39)	0.095447* (2.00)	0.121004** (2.03)	-0.000809 (-0.07)
PROD	-0.107156 (-1.14)	-0.116367 (-1.13)	-0.053452 (-1.28)	-0.064858 (-1.23)	-0.003319 (-0.33)
SHENG	-0.004900 (-0.05)	-0.028946 (-0.28)	0.018628 (0.45)	0.004052 (0.08)	0.014525 (1.47)
PSCR	-0.006627 (-0.66)	-0.005542 (-0.51)	-0.005287 (-1.22)	-0.004384 (-0.79)	-0.001419 (-1.35)
LAB	0.106125* (1.79)	0.119899* (1.85)	0.039681 (1.50)	0.056172* (1.71)	0.002107 (0.33)
L_SIZE	-0.016603 (-1.01)	-0.020578 (-1.15)	-0.007343 (-1.01)	-0.010113 (-1.11)	-0.000656 (-0.37)
L_AGE	-0.029755 (-0.36)	-0.016754 (-0.18)	-0.021352 (-0.57)	-0.007896 (-0.17)	0.006656 (0.75)
TER	-0.10593 (-1.50)	-0.113952 (-1.47)	-0.043690 (-1.41)	-0.052348 (-1.35)	0.011167 (1.49)
Observations	725	725	725	725	725
Year dummies	Included	Included	Included	Included	Included

Table 12 – Risk-shifting behavior and screening characteristics (sectoral and transversal screens) – US subsample

This table reports the results of panel data regressions for the management risk-shifting behavior for SRI funds. The dependent variable is the variation in risk experienced by a fund between the second and first part of the year ($\Delta\sigma$). The independent variables include: the ranking obtained by a fund by the end of the first part of the year (RANK), the number of sectoral (SECT) and transversal (TRANSV) screens employed by each fund, the types of screens applied by each fund (Environment – ENV; Social – SOC; Governance – GOV; Products – PROD; and Shareholder Engagement – SHENG), the number of positive screens enforced by each fund (PSCR), and a dummy variable that assumes the value of 1 if the fund has been certified with at least one social label, and 0 otherwise (LAB). Control variables are: lagged logarithm of the variable Size, measured by fund's total net assets in million US dollars (L_SIZE); lagged logarithm of the variable Age, measured as the number of months since the fund's inception (L_AGE); and Total Expense Ratio, in percentage (TER). The model is estimated using between effects. The sample includes 80 socially responsible funds for the 2003-2014 period with five cut-off points for each year: April (4,8), May (5,7), June (6,6), July (7,5), and August (8,4). t-statistics are shown in parentheses. * *p-value < 0.10;* ** *p-value < 0.05;* *** *p-value < 0.01*

	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)
Ranking (RANK)	-0.079779 (-0.31)	-0.267666 (-1.07)	0.190377* (1.87)	0.008447 (0.05)	0.033381 (1.29)
SECT	-0.034313 (-1.52)	-0.035541 (-1.43)	-0.014341 (-1.43)	-0.016304 (-1.30)	-0.000498 (-0.21)
TRANSV	0.022675 (0.41)	0.031057 (0.51)	0.006869 (0.28)	0.011238 (0.36)	-0.004650 (-0.78)
ENV	0.034396 (0.38)	0.029889 (0.30)	0.024108 (0.61)	0.020682 (0.41)	0.011879 (1.24)
SOC	-0.065339 (-0.58)	-0.070845 (-0.58)	-0.034254 (-0.69)	-0.030076 (-0.48)	0.006421 (0.54)
GOV	0.222519** (2.39)	0.241549** (2.39)	0.081155* (1.96)	0.105154** (2.04)	-0.000370 (-0.04)
PROD	-0.076631 (-0.78)	-0.084074 (-0.79)	-0.039892 (-0.92)	-0.048828 (-0.89)	-0.002332 (-0.22)
SHENG	-0.012817 (-0.15)	-0.034792 (-0.36)	0.015290 (0.39)	0.001724 (0.04)	0.014271 (1.53)
PSCR	-0.008151 (-0.79)	-0.007516 (-0.67)	-0.005777 (-1.29)	-0.005123 (-0.90)	-0.001235 (-1.14)
LAB	0.098584 (1.66)	0.111485* (1.71)	0.036515 (1.37)	0.052243 (1.58)	0.002019 (0.32)
L_SIZE	-0.017372 (-1.06)	-0.021337 (-1.19)	-0.007699 (-1.06)	-0.010519 (-1.15)	-0.000685 (-0.39)
L_AGE	-0.028886 (-0.35)	-0.015410 (-0.17)	-0.021505 (-0.57)	-0.008102 (-0.17)	0.005597 (0.62)
TER	-0.107471 (-1.52)	-0.115350 (-1.49)	-0.044738 (-1.44)	-0.053355 (-1.37)	0.010477 (1.39)
Observations	725	725	725	725	725
Year dummies	Included	Included	Included	Included	Included

Table 13 – Risk-shifting behavior and screening characteristics – European subsample

This table reports the results of panel data regressions for the management risk-shifting behavior for SRI funds. The dependent variable is the variation in risk experienced by a fund between the second and first part of the year ($\Delta\sigma$). The independent variables include: the ranking obtained by a fund by the end of the first part of the year (RANK), the total number of screens employed by each fund (SI), the types of screens applied by each fund (Environment – ENV; Social – SOC; Governance – GOV; Products – PROD; and Shareholder Engagement – SHENG), the number of positive screens enforced by each fund (PSCR), and a dummy variable that assumes the value of 1 if the fund has been certified with at least one social label, and 0 otherwise (LAB). Control variables are: lagged logarithm of the variable Size, measured by fund's total net assets in million US dollars (L_SIZE); lagged logarithm of the variable Age, measured as the number of months since the fund's inception (L_AGE); and Total Expense Ratio, in percentage (TER). The model is estimated using between effects. The sample includes 173 socially responsible funds for the 2003-2014 period with five cut-off points for each year: April (4,8), May (5,7), June (6,6), July (7,5), and August (8,4). t-statistics are shown in parentheses. * p-value < 0.10; ** p-value < 0.05; *** p-value < 0.01

	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)
Ranking (RANK)	0.029052**	0.010767	0.010142	0.034212**	0.011661
	(2.22)	(0.85)	(0.76)	(2.45)	(0.78)
SI	0.001624	0.000116	-0.001184	0.000367	-0.000612
	(1.23)	(0.09)	(-0.85)	(0.23)	(-0.38)
ENV	0.002384	0.009623	0.014203**	0.018259**	0.011544
	(0.38)	(1.54)	(2.17)	(2.51)	(1.53)
SOC	-0.007990	-0.005466	-0.001534	-0.002908	-0.004669
	(-1.52)	(-1.05)	(-0.28)	(-0.48)	(-0.74)
GOV	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
PROD	-0.002719	-0.002487	0.002131	0.001057	0.002177
	(-0.48)	(-0.44)	(0.36)	(0.16)	(0.32)
SHENG	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
PSCR	-0.000267	-0.000736	-0.000364	-0.002021	0.000905
	(-0.11)	(-0.30)	(-0.14)	(-0.70)	(0.30)
LAB	-0.007092*	-0.003804	0.002139	-0.002591	-0.000977
	(-1.89)	(-1.02)	(0.55)	(-0.59)	(-0.22)
L_SIZE	-0.001467	-0.001467	-0.001438	-0.001571	-0.001077
	(-1.51)	(-1.54)	(-1.45)	(-1.41)	(-0.94)
L_AGE	-0.001526	-0.002806	-0.004413	-0.005489	-0.003525
	(-0.46)	(-0.85)	(-1.28)	(-1.41)	(-0.87)
TER	0.001387	0.002703	0.002157	0.002810	0.001227
	(0.55)	(1.07)	(0.83)	(0.97)	(0.41)
Observations	1,361	1,361	1,361	1,361	1,361
Year dummies	Included	Included	Included	Included	Included

Table 14 – Risk-shifting behavior and screening characteristics (sectoral and transversal screens) – European subsample

This table reports the results of panel data regressions for the management risk-shifting behavior for SRI funds. The dependent variable is the variation in risk experienced by a fund between the second and first part of the year ($\Delta\sigma$). The independent variables include: the ranking obtained by a fund by the end of the first part of the year (RANK), the number of sectoral (SECT) and transversal (TRANSV) screens employed by each fund, the types of screens applied by each fund (Environment – ENV; Social – SOC; Governance – GOV; Products – PROD; and Shareholder Engagement – SHENG), the number of positive screens enforced by each fund (PSCR), and a dummy variable that assumes the value of 1 if the fund has been certified with at least one social label, and 0 otherwise (LAB). Control variables are: lagged logarithm of the variable Size, measured by fund's total net assets in million US dollars (L_SIZE); lagged logarithm of the variable Age, measured as the number of months since the fund's inception (L_AGE); and Total Expense Ratio, in percentage (TER). The model is estimated using between effects. The sample includes 173 socially responsible funds for the 2003-2014 period with five cut-off points for each year: April (4,8), May (5,7), June (6,6), July (7,5), and August (8,4). t-statistics are shown in parentheses. * p-value < 0.10; ** p-value < 0.05; *** p-value < 0.01

	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)
Ranking (RANK)	0.029032**	0.010494	0.009935	0.034225**	0.011667
	(2.22)	(0.83)	(0.74)	(2.45)	(0.78)
SECT	0.001646	0.000140	-0.001166	0.000384	-0.000614
	(1.24)	(0.10)	(-0.84)	(0.24)	(-0.38)
TRANSV	-0.001362	-0.002369	-0.003057	-0.002100	-0.000405
	(-0.28)	(-0.50)	(-0.62)	(-0.38)	(-0.07)
ENV	0.000538	0.008096	0.013056*	0.016734**	0.011672
	(0.08)	(1.18)	(1.82)	(2.09)	(1.41)
SOC	-0.005993	-0.003801	-0.000275	-0.001259	-0.004808
	(-0.98)	(-0.63)	(-0.04)	(-0.18)	(-0.66)
GOV	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
PROD	-0.002089	-0.001970	0.002523	0.001578	0.002133
	(-0.36)	(-0.34)	(0.42)	(0.24)	(0.31)
SHENG	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
PSCR	0.001450	0.000685	0.000707	-0.000603	0.000786
	(0.40)	(0.19)	(0.19)	(-0.14)	(0.18)
LAB	-0.007028*	-0.003754	0.002177	-0.002537	-0.000981
	(-1.87)	(-1.01)	(0.56)	(-0.58)	(-0.22)
L_SIZE	-0.001453	-0.001454	-0.001429	-0.001560	-0.001078
	(-1.49)	(-1.52)	(-1.44)	(-1.39)	(-0.93)
L_AGE	-0.001488	-0.002762	-0.004379	-0.005459	-0.003528
	(-0.44)	(-0.83)	(-1.26)	(-1.40)	(-0.86)
TER	0.001377	0.002682	0.002144	0.002802	0.001228
	(0.54)	(1.06)	(0.82)	(0.96)	(0.41)
Observations	1,361	1,361	1,361	1,361	1,361
Year dummies	Included	Included	Included	Included	Included

Table 15 – Risk-shifting behavior and screening characteristics – European (except UK) subsample

This table reports the results of panel data regressions for the management risk-shifting behavior for SRI funds. The dependent variable is the variation in risk experienced by a fund between the second and first part of the year ($\Delta\sigma$). The independent variables include: the ranking obtained by a fund by the end of the first part of the year (RANK), the total number of screens employed by each fund (SI), the types of screens applied by each fund (Environment – ENV; Social – SOC; Governance – GOV; Products – PROD; and Shareholder Engagement – SHENG), the number of positive screens enforced by each fund (PSCR), and a dummy variable that assumes the value of 1 if the fund has been certified with at least one social label, and 0 otherwise (LAB). Control variables are: lagged logarithm of the variable Size, measured by fund's total net assets in million US dollars (L_SIZE); lagged logarithm of the variable Age, measured as the number of months since the fund's inception (L_AGE); and Total Expense Ratio, in percentage (TER). The model is estimated using between effects. The sample includes 143 socially responsible funds for the 2003-2014 period with five cut-off points for each year: April (4,8), May (5,7), June (6,6), July (7,5), and August (8,4). t-statistics are shown in parentheses. * p-value < 0.10; ** p-value < 0.05; *** p-value < 0.01

	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)
Ranking (RANK)	0.030377**	0.009200	0.008506	0.038252**	0.019639
	(2.06)	(0.65)	(0.57)	(2.46)	(1.19)
SI	0.000687	-0.000609	-0.001467	-0.000564	-0.000850
	(0.45)	(-0.40)	(-0.91)	(-0.31)	(-0.47)
ENV	0.005929	0.015937**	0.020248**	0.025708***	0.020308**
	(0.76)	(2.09)	(2.46)	(2.87)	(2.25)
SOC	-0.006271	-0.002546	0.001881	0.002676	0.001512
	(-0.96)	(-0.40)	(0.28)	(0.36)	(0.20)
GOV	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
PROD	0.000652	0.002937	0.005399	0.006350	0.007034
	(0.10)	(0.47)	(0.81)	(0.87)	(0.95)
SHENG	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
PSCR	0.000345	-0.001413	-0.001828	-0.002937	-0.001510
	(0.11)	(-0.47)	(-0.56)	(-0.83)	(-0.42)
LAB	-0.007923*	-0.004007	0.000157	-0.004484	-0.003095
	(-1.87)	(-0.97)	(0.04)	(-0.91)	(-0.63)
L_SIZE	-0.001393	-0.001914*	-0.002353**	-0.002371*	-0.002352*
	(-1.24)	(-1.77)	(-2.03)	(-1.85)	(-1.82)
L_AGE	0.001030	0.002176	-0.000693	-0.002740	0.000616
	(0.25)	(0.54)	(-0.16)	(-0.57)	(0.13)
TER	0.002324	0.001340	-0.000084	0.0013	-0.001917
	(0.81)	(0.47)	(-0.03)	(0.40)	(-0.58)
Observations	1,105	1,105	1,105	1,105	1,105
Year dummies	Included	Included	Included	Included	Included

Table 16 – Risk-shifting behavior and screening characteristics (sectoral and transversal screens) – European (except UK) subsample

This table reports the results of panel data regressions for the management risk-shifting behavior for SRI funds. The dependent variable is the variation in risk experienced by a fund between the second and first part of the year ($\Delta\sigma$). The independent variables include: the ranking obtained by a fund by the end of the first part of the year (RANK), the number of sectoral (SECT) and transversal (TRANSV) screens employed by each fund, the types of screens applied by each fund (Environment – ENV; Social – SOC; Governance – GOV; Products – PROD; and Shareholder Engagement – SHENG), the number of positive screens enforced by each fund (PSCR), and a dummy variable that assumes the value of 1 if the fund has been certified with at least one social label, and 0 otherwise (LAB). Control variables are: lagged logarithm of the variable Size, measured by fund's total net assets in million US dollars (L_SIZE); lagged logarithm of the variable Age, measured as the number of months since the fund's inception (L_AGE); and Total Expense Ratio, in percentage (TER). The model is estimated using between effects. The sample includes 143 socially responsible funds for the 2003-2014 period with five cut-off points for each year: April (4,8), May (5,7), June (6,6), July (7,5), and August (8,4). t-statistics are shown in parentheses. * p-value < 0.10; ** p-value < 0.05; *** p-value < 0.01

	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)
Ranking (RANK)	0.030286**	0.008616	0.007662	0.037714**	0.019454
	(2.04)	(0.61)	(0.52)	(2.42)	(1.18)
SECT	0.000662	-0.000618	-0.001483	-0.000584	-0.000877
	(0.43)	(-0.41)	(-0.92)	(-0.32)	(-0.49)
TRANSV	-0.002769	-0.003631	-0.006171	-0.005214	-0.004926
	(-0.46)	(-0.63)	(-0.99)	(-0.76)	(-0.71)
ENV	0.003505	0.013847	0.017011*	0.022439**	0.017447*
	(0.40)	(1.62)	(1.85)	(2.22)	(1.71)
SOC	-0.003981	-0.000537	0.005030	0.005761	0.004214
	(-0.53)	(-0.07)	(0.64)	(0.66)	(0.48)
GOV	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
PROD	0.001327	0.003515	0.006310	0.007250	0.007831
	(0.20)	(0.56)	(0.93)	(0.97)	(1.04)
SHENG	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
PSCR	0.002448	0.000411	0.001010	-0.000112	0.000971
	(0.52)	(0.09)	(0.21)	(-0.02)	(0.18)
LAB	-0.007959*	-0.004049	0.000100	-0.004560	-0.003141
	(-1.88)	(-0.98)	(0.02)	(-0.92)	(-0.64)
L_SIZE	-0.001408	-0.001926*	-0.002373**	-0.002388*	-0.002370*
	(-1.25)	(-1.78)	(-2.05)	(-1.85)	(-1.83)
L_AGE	0.001070	0.002242	-0.000592	-0.002657	0.000672
	(0.26)	(0.55)	(-0.14)	(-0.55)	(0.14)
TER	0.002307	0.001295	-0.000136	0.001264	-0.001940
	(0.80)	(0.46)	(-0.05)	(0.39)	(-0.59)
Observations	1,105	1,105	1,105	1,105	1,105
Year dummies	Included	Included	Included	Included	Included

Table 17 – Risk-shifting behavior and screening characteristics – UK subsample

This table reports the results of panel data regressions for the management risk-shifting behavior for SRI funds. The dependent variable is the variation in risk experienced by a fund between the second and first part of the year ($\Delta\sigma$). The independent variables include: the ranking obtained by a fund by the end of the first part of the year (RANK), the total number of screens employed by each fund (SI), the types of screens applied by each fund (Environment – ENV; Social – SOC; Governance – GOV; Products – PROD; and Shareholder Engagement – SHENG), the number of positive screens enforced by each fund (PSCR), and a dummy variable that assumes the value of 1 if the fund has been certified with at least one social label, and 0 otherwise (LAB). Control variables are: lagged logarithm of the variable Size, measured by fund's total net assets in million US dollars (L_SIZE); lagged logarithm of the variable Age, measured as the number of months since the fund's inception (L_AGE); and Total Expense Ratio, in percentage (TER). The model is estimated using between effects. The sample includes 30 socially responsible funds for the 2003-2014 period with five cut-off points for each year: April (4,8), May (5,7), June (6,6), July (7,5), and August (8,4). t-statistics are shown in parentheses. * p-value < 0.10; ** p-value < 0.05; *** p-value < 0.01

	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)
Ranking (RANK)	-0.013594 (-0.35)	-0.065479 (-1.22)	-0.039194 (-1.01)	-0.051922* (-1.91)	-0.100676*** (-4.60)
SI	0.001194 (0.19)	0.005129 (0.78)	0.006140 (1.23)	0.004777 (1.11)	0.002170 (0.58)
ENV	0.001572 (0.08)	0.008193 (0.42)	0.011548 (0.79)	0.009800 (0.74)	0.017771 (1.54)
SOC	-0.007441 (-0.52)	0.002613 (0.17)	0.003441 (0.31)	0.006673 (0.68)	0.005972 (0.71)
GOV	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
PROD	-0.002241 (-0.07)	-0.007225 (-0.21)	-0.002643 (-0.10)	0.005561 (0.24)	0.024208 (1.20)
SHENG	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
PSCR	0.003329 (0.36)	-0.003811 (-0.41)	-0.007468 (-1.07)	-0.004194 (-0.67)	-0.001186 (-0.22)
LAB	0.007462 (0.34)	-0.022008 (-1.02)	-0.033505* (-2.05)	-0.032435* (-2.16)	-0.037877** (-2.97)
L_SIZE	-0.001294 (-0.38)	0.002554 (0.70)	0.004548 (1.62)	0.004774* (2.03)	0.008563*** (4.36)
L_AGE	-0.013689 (-1.06)	-0.023673* (-1.81)	-0.022189* (-2.20)	-0.021253** (-2.40)	-0.031515*** (-4.21)
TER	-0.009005 (-0.76)	0.021259 (1.55)	0.029103** (3.05)	0.035715*** (4.46)	0.035576*** (5.21)
Observations	256	256	256	256	256
Year dummies	Included	Included	Included	Included	Included

Table 18 – Risk-shifting behavior and screening characteristics (sectoral and transversal screens) – UK subsample

This table reports the results of panel data regressions for the management risk-shifting behavior for SRI funds. The dependent variable is the variation in risk experienced by a fund between the second and first part of the year ($\Delta\sigma$). The independent variables include: the ranking obtained by a fund by the end of the first part of the year (RANK), the number of sectoral (SECT) and transversal (TRANSV) screens employed by each fund, the types of screens applied by each fund (Environment – ENV; Social – SOC; Governance – GOV; Products – PROD; and Shareholder Engagement – SHENG), the number of positive screens enforced by each fund (PSCR), and a dummy variable that assumes the value of 1 if the fund has been certified with at least one social label, and 0 otherwise (LAB). Control variables are: lagged logarithm of the variable Size, measured by fund's total net assets in million US dollars (L_SIZE); lagged logarithm of the variable Age, measured as the number of months since the fund's inception (L_AGE); and Total Expense Ratio, in percentage (TER). The model is estimated using between effects. The sample includes 30 socially responsible funds for the 2003-2014 period with five cut-off points for each year: April (4,8), May (5,7), June (6,6), July (7,5), and August (8,4). t-statistics are shown in parentheses. * p-value < 0.10; ** p-value < 0.05; *** p-value < 0.01

	(4,8)	(5,7)	(6,6)	(7,5)	(8,4)
Ranking (RANK)	-0.013802 (-0.34)	-0.066728 (-1.18)	-0.040342 (-1.01)	-0.051807 (-1.81)	-0.100846*** (-4.39)
SECT	-0.000596 (-0.08)	0.006327 (0.79)	0.008153 (1.38)	0.005008 (0.95)	0.001548 (0.34)
TRANSV	0.005894 (0.48)	0.002136 (0.17)	0.00099 (0.11)	0.004167 (0.50)	0.003801 (0.53)
ENV	-0.000284 (-0.01)	0.009406 (0.45)	0.013579 (0.88)	0.010036 (0.71)	0.017138 (1.39)
SOC	-0.008222 (-0.55)	0.003240 (0.20)	0.004389 (0.38)	0.006767 (0.65)	0.005711 (0.64)
GOV	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
PROD	-0.004356 (-0.12)	-0.005861 (-0.16)	-0.000297 (-0.01)	0.005827 (0.24)	0.023492 (1.10)
SHENG	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
PSCR	0.002457 (0.25)	-0.003276 (-0.33)	-0.006516 (-0.89)	-0.004081 (-0.61)	-0.001488 (-0.26)
LAB	0.012538 (0.50)	-0.025265 (-1.00)	-0.039090* (-2.09)	-0.033106* (-1.88)	-0.036107** (-2.42)
L_SIZE	-0.001780 (-0.48)	0.002830 (0.71)	0.005045 (1.70)	0.004839* (1.87)	0.008394*** (3.90)
L_AGE	-0.012122 (-0.87)	-0.024604 (-1.75)	-0.023819* (-2.24)	-0.021463* (-2.23)	-0.030969*** (-3.81)
TER	-0.011411 (-0.85)	0.022987 (1.48)	0.031878** (3.00)	0.036023*** (3.93)	0.034736*** (4.44)
Observations	256	256	256	256	256
Year dummies	Included	Included	Included	Included	Included