The Effect of Socially Responsible Investing on Mutual Fund Performance and Fees

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Abstract

This paper reevaluates the effect of socially responsible (SR) investment principles on mutual fund performance. As in previous studies, we follow the approach of comparing SR funds with conventional funds of similar characteristics. There are three novelties, however, with respect to the extant literature. First, we make a distinction between the two components of a mutual fund's net performance: before-fee performance and fees. This distinction enables us to investigate the causes of potential differences in net performance between SR and conventional funds. Second, we apply the matching estimators methodology to a panel data set of fund performance, fees and other characteristics. The matching estimators methodology overcomes the difficulty of the more traditional matched-pair analysis of matching SR funds to conventional funds in the presence of a high-dimensional vector of matching characteristics. The panel data structure permits us to deal with time-varying performance and time-varying matching variables. Finally, we attempt to disentangle the effect on performance of SR investment principles from possible differences in portfolio management skills between managers of SR and conventional funds. Our empirical results for US diversified equity funds in the period 1997-2005 suggest that SR screens do not reduce funds' before-fee performance. On the contrary, SR funds perform significantly better before-fees than comparable conventional funds, when performance is defined as risk-adjusted returns according to Carhart's (1997) four-factor model. At the same time, SR funds are more expensive than comparable conventional funds, although after-fee performance is also significantly higher for SR funds. Further tests suggest that the higher performance of SR funds is not attributable to superior managerial skill, lending support to the existence of a SR effect, although this effect manifests itself mostly in SR funds that belong to management companies with a high fraction of assets in this type of funds.

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Previous research on socially responsible (SR) mutual funds has focused on determining whether SR funds have lower financial performance than conventional funds. In this paper, we attempt to bring clarity to the debate on SR funds' performance by identifying and separately addressing several questions that have been mixed together in previous studies and by using a methodology that overcomes some of the difficulties inherent to the methodology used in previous analyses.

First, we make a distinction between the two main components of mutual fund performance: before-fee performance—which has to do with funds' stock-picking and market-timing ability—and fees. Making this distinction is essential if one wants to address what is perhaps the main question in the study of SR investment, namely whether or not socially responsible investment reduces mutual funds' ability to generate risk-adjusted returns. Standard portfolio choice theory implies that imposing constraints on the set of investment opportunities cannot improve performance. Since one of the defining characteristics of most SR funds is that they exclude companies from sectors such as tobacco, alcohol or gambling from their investment universe, i.e., they impose constraints on the investment opportunity set, it follows that their before-fee risk-adjusted performance should be no higher than the one they could obtain if they lifted those exclusionary restrictions. Investigating before-fee performance enables us to see directly whether or not social responsibility restrictions do in fact reduce the maximum performance attainable by mutual funds, without the potentially confounding effect of fees. Further, by explicitly investigating fees, we are able to address questions that have not received much attention in prior studies. First, while the implicit assumption in most previous work is that differences in performance between SR and conventional funds would be due to differences in SR funds' ability to generate risk-adjusted returns, differences in reported performance (which is net of fund expenses) could as well be due to differences in the fees charged by SR and conventional funds. In other words, investors in SR funds could be paying a price for the ethical value of their investments not in the form of reduced before-fee performance, but in the form of higher fees. Further, focusing on fund fees allows us to shed light on the way in which fund fees are determined and, in particular, on the issue of whether fees simply reflect funds' operating costs or whether, as argued by Christoffersen and Musto (2002) and Gil-Bazo and Ruiz-Verdú (2007), funds adjust their fees to the characteristics of their clientele. This is especially relevant for SR funds, since investors in these funds are likely to differ in important respects from other investors, an issue that has recently been raised by Bollen (2007).

With this paper, we also seek to contribute to the literature on SR investment by proposing empirical methods that we believe are especially suited to addressing the main questions of this literature. First, several previous studies use the so-called matched-pair analysis to estimate performance differences between SR funds and comparable conventional funds. This methodology basically amounts to finding an adequate control group of conventional funds and comparing the performance of the SR funds with the conventional funds in the control group. Controls for each SR fund are determined by the research on the basis of similarity of characteristics that are believed to affect fund performance. In this paper, we use the matching estimators analysis, which improves the matched-pair analysis along several dimensions. First, matching directly on each variable is impractical when matching on a large number of variables since controls with identical values for all the variables are usually impossible to find. Matching estimators overcome this difficulty of the matched-pair analysis. Also, recent advances in the matching estimators methodology enable the researcher to correct for the bias that arises when matches with identical values of the covariates are not found. Finally, inference is conducted based on a rigorous derivation of the asymptotic distribution of the test statistic.[1]

Second, we employ a panel data of performance, fees and other fund characteristics rather than aggregating this information over time as it is usually done in the literature. This way, our methodology overcomes the difficulty of the traditional approach of choosing the moment in which the matching variables should be measured when these variables are time-varying. The panel data approach also deals with cyclical variation in fund performance, which is potentially

[1]See Imbens (2004) for a review of the matching estimator methodology and its relation with other approaches.

important since the periods in which matching conventional funds remain active alive usually differ from those for SR funds given the different attrition rates of both groups. By using a panel data structure we can be sure that performance for SR and conventional funds are measured over the same periods.

Our third contribution is an attempt to disentangle the effect on fund performance of SR investment principles, the SR effect, from possible differences in portfolio management skills between managers of SR and conventional funds of similar characteristics. The importance of this distinction has to do with the consequences that changes in the investment policy have on fund performance. If differential performance is attributable to the quality of management, then a conventional fund that chooses to adopt SR investment principles will not experience changes in performance. If, on the other hand, a true SR effect exists, then a shift to SR investment will impact fund performance.

To obtain our empirical results, we obtain a sample of SR funds from the Social Investment Forum for the period 1997-2005, which we merge with the CRSP Survivor-Bias Free US Mutual Fund Database. Our results indicate that the SR constraint does not reduce funds' before-fee performance. On the contrary, SR funds perform significantly better before-fees than comparable conventional funds, a result that is only partly explained by a lower turnover by SR funds. At the same time, SR funds charge higher expenses and other fees than similar conventional funds. The higher fees of SR funds, however, do not prevent these funds from exhibiting higher after-fee performance than similar conventional funds. Moreover, controlling for proxies for portfolio management skill do not affect these conclusions. Also, SR funds outperform similar conventional funds even if such conventional funds belong to management companies with a strong presence of SR funds. Results therefore lend empirical support to the existence of a SR effect. The SR effect, however, does not seem to be present in management companies where SR funds do not predominate.

Existing empirical literature on SR investing indicates that SR funds perform similarly in comparison to their conventional peers (Statman, 2000; Bauer, Derwall, and Otten 2007; Kreander et al., 2005; Benson, Brailsford, and Humphrey 2006). Geczy et al. (2005) examine the performance of optimal SR portfolios in relation to optimal portfolios constructed with conventional funds. Renneboog et al. (2006) show that SR money chases past returns and that, in contrast to conventional funds' investors, SR investors seem to care less about funds' risks and fees. Bollen (2007) estimates the flow-performance relation and flow volatility of SR and non SR funds and concludes that SR funds exhibited lower flow volatility than non SR. Also, SR investors exhibit a larger response to lagged positive returns and a lower response to lagged negative returns in relation to non SR investors.

The paper is organized as follows. Section 1 describes the fee structure of U.S. mutual funds and the dataset; Section 2 discusses how we estimate risk-adjusted returns. Section 3 describes the matching estimator methodology and presents the matching estimator results of the differences in fees and performance between SR and conventional funds. Section 4 investigates whether the higher performance of SR funds can be explained by superior management skills. Finally, Section 5 offers some concluding remarks.

1 Data

1.1 Brief overview of the fee structure of U.S. mutual funds

Mutual fund investors pay two kinds of fees to management companies. First, they pay for the so-called fund's *expenses*. These expenses comprise the management fee (typically computed as a fixed percentage of the value of assets under management) and other recurring operating costs—such as custodian, administration, accounting, registration and transfer agent fees. Rather than periodically charging investors an explicit fee or fees to pay for these expenses, funds deduct them on a daily basis from the fund's net assets. Expenses are typically expressed as a percentage of assets under management, a percentage that is known as the fund's *expense ratio*.

The second kind of fees paid by fund investors are one-time fees known as *loads*, which are used to pay distributors. These loads are paid at the time of purchasing (*sales charge on purchases* or *front-end load*) or redeeming fund shares (*deferred sales charge* or *back-end load*) and are computed as a fraction of the amount invested.[2]

Since the 1980s, many funds charge *12b-1 fees*, which are used to pay for marketing and distribution costs and are included in the fund's expense ratio. Since the 1990s, many funds have been offering multiple share classes with different combinations of loads and 12b-1 fees. Among the most common classes are class A shares, which are characterized by high front-end loads and low annual 12b-1 fees, and class B and C shares, which typically have no or low front-end loads but have higher 12b-1 fees and a contingent deferred sales load. This contingent deferred sales load decreases the longer the shares are held and is eventually eliminated (typically after one year for class C shares, and six to seven years for class B shares).

1.2 Sample selection

Our main source of data is the CRSP Survivor-Bias Free US Mutual Fund Database (see Carhart, 1997; Carhart et al., 2002; and Elton et al., 2001, for detailed discussions of the dataset). We obtain monthly information on returns, and yearly information on fees and other fund characteristics for all domestic, diversified, equity mutual funds in the database for the period December 1997-December 2005. We consider that a fund is a domestic, diversified, equity mutual fund if it belongs to any of the following *Standard & Poor's Detailed Objective Codes* as reported by CRSP: *Aggressive Growth, Growth Mid Cap, Growth and Income, Growth, Small Company Growth.*

In the CRSP dataset, different classes of the same fund appear as different funds and there is no common fund identifier until year 2003. To identify classes belonging to the same fund, we extract the fund's name from the class name provided in CRSP.[3] Once the classes belonging to the same fund are identified, we obtain fund-level information for multiple-class funds by averaging (weighting the classes by total net assets) the class-level data provided by CRSP. Since we need each class's total net assets to obtain the fund-level weighted average, we exclude from the sample multiple-class funds that did not have information on total net assets for all their classes. We further exclude from the sample observations with no data on fees or returns or with zero expenses.

We exclude index funds from our sample. Since CRSP has an index identifier only since year 2003, we use funds' names to determine whether they are index funds or not.[4] For SR funds, we double-check the classification manually to make sure that we do not unnecessarily delete SR funds from the sample. We follow a similar procedure to identify institutional classes. Since funds often have both retail and institutional classes, we classify a fund as institutional if more than fifty percent of its assets are in institutional classes. Institutional funds are excluded from the sample.

Our list of SR funds was obtained from information provided by the Social Investment Forum (SIF).[5] Specifically, we used the SIF reports published in 1997, 1999, 2001, 2003 and 2005. Each report brings comprehensive information about SR investing in the U.S. both for the publication year and the preceding one. To build our sample of SR funds, we first label a mutual fund as SR in a given year if it is included in the corresponding SIF report; otherwise the fund is considered a conventional fund that year. Inspection of the sample of SR funds that resulted from this process, however, reveals that some SR funds included in the SIF's early reports no longer appear in the late reports, despite being still alive. Similarly, there are also SR funds in SIF's late reports that were not included in the early reports despite being active. We checked funds' prospectuses to identify whether funds entries to or exits from the

[2] See Mahoney (2004) for a review of mutual fund fee practices and regulation.

[3] We could do this since class names have the form "*Fund's name/Class*", for example "Fidelity Advisor Large Cap/A."

[4] More precisely, we classify a fund as index if its name contains any of the following strings: Index, Idx, Ix, Indx, NASDAQ, Nasdaq, Dow, Mkt, DJ, S&P, 500, BARRA.

[5] We thank Todd Larsen from SIF for providing the reports on which our list of SR funds is based.

list were due to changes in the SR orientation of the funds or to data problems. We found that temporary exclusions from SIF lists were not associated with any significant change in funds' reported investment strategy that could justify the exclusion. Therefore, instead of using the year-by-year list obtained from the SIF reports, we label a fund as SR for the whole sample period if the fund appears at least once in the SIF reports.[6] Table 1 displays the number of SR and conventional funds by year in our sample.

[Table 1 about here.]

An important feature of our sample is that it is free of survivorship bias, since the CRSP dataset contains information on all funds operating during the whole sample period and since we obtained historical lists of SR funds from SIF.

1.3 Descriptive statistics

Table 2 reports descriptive statistics for our sample of actively managed, retail, domestic, U.S., equity mutual funds in the 1997–2005 period for which we have information on, at least, expenses, returns and size. The table shows several differences between SR and conventional funds. First, average and median expense ratios are higher and total loads lower for SR funds, resulting in similar average and median total ownership costs. Second, the size of the management companies that manage SR funds is much lower than the size of the companies managing conventional funds. Third, although SR funds have larger average size (measured as total net assets in millions of dollars) than conventional funds, the median size of conventional funds is larger. It is worth noting that the size distribution of conventional funds has wider support, with the largest (smallest) conventional fund in the sample being much larger (smaller) than the largest (smallest) SR fund. Fourth, the turnover ratio is significantly higher for conventional funds. Regarding returns, Table 2 shows that both the before- and after-fee returns of conventional funds are slightly higher.

[Table 2 about here.]

Descriptive statistics by year are shown in Tables 3 and 4. Some of the differences displayed in Table 2 can be observed in all years of the sample. For example, the average expense ratio and age are higher for SR funds all years, while turnover and management company size are always lower for SR funds. Average size is larger for SR funds all years except for 2001 and 2002. Interestingly, there is no clear pattern in returns (before or after fees), with average returns being greater for SR funds in some years and for conventional funds in others.

[Table 3 about here.]

[Table 4 about here.]

2 Estimation of risk-adjusted returns

Following a long list of studies in the mutual fund performance evaluation literature,[7] we employ Carhart's (1997) four factor model to estimate risk-adjusted performance:

$$r_{it} = \alpha_i + \beta_{rm,i} rm_t + \beta_{smb,i} smb_t + \beta_{hml,i} hml_t + \beta_{pr1y,i} pr1y_t + \varepsilon_{it}, \quad (1)$$

where r_{it} is fund i's before-expense return in month t in excess of the 30-day risk-free interest rate—proxied by Ibbotson's one-month Treasury bill rate;[8] rm_t is the market portfolio return

[6] For instance, the mutual fund *Lutheran Brotherhood Opportunity Growth Fund* was included in SIF reports from 1997 to 2001, but was no longer included in the subsequent reports. Similarly, the fund *Fidelity Select Environmental* was only included in the SIF report of 2005, although it had been operating since 1997. Our inspection of the funds' prospectuses did not reveal any change in the orientation of these funds, so we label them as SR for the entire 1997–2005 period.

[7] Wermers (2000), Kothari and Warner (2001), Kacperczyk et al. (2005) and Kosowsky et al. (2006) are only a few recent examples of papers employing Carhart's model to measure mutual fund performance.

[8] Since fund returns are reported after expenses, we add back annual expenses divided by 12 to reported returns to retrieve monthly before-expense returns.

in excess of the risk-free rate; and smb_t and hml_t denote the return on portfolios that proxy for common risk factors associated with size and book-to-market, respectively. The term $pr1y_t$ is the return difference between stocks with high and low returns in the previous year, and is included to account for passive momentum strategies by mutual funds.[9] The term α_i is usually referred to as the fund's *alpha* and captures the fund's risk-adjusted performance. As explained below, we also consider Fama and French's (1993) three-factor model, which uses only rm_t, smb_t, and hml_t, as well as Jensen's alpha, which uses as single risk factor the market return rm_t.

As in Carhart (1997), Kacperczyk et al. (2005) and Kacperczyk and Seru (2007), we follow a two-stage estimation procedure to obtain a panel of monthly fund risk-adjusted performance estimates. In the first stage, for every month, t, in years 1997-2005, we regress fund excess returns on the risk factors over the previous five years. If less than five years of previous data are available for a specific fund-month, we require that the fund has been in the sample for at least 48 months in the previous five years, and then run the regression with the available data.[10] In the second stage, we estimate a fund's risk-adjusted performance in month t as the difference between the fund's before-expense excess return and the realized risk premium, defined as the vector of betas times the vector of factor realizations in month t.

The average annualized monthly return before expenses in our sample of conventional funds equals 9.53%, subtracting the risk-free rate and the part of fund returns explained by the portfolio's exposure to Fama-French three factors yields an average annualized monthly alpha of -1.27%,, which is further reduced to -1.62% when momentum is taken into account. The corresponding performance measures for SR funds equal 9.42%, -0.98%, and -0.8%, respectively.

3 Differences between SR funds and comparable conventional funds

In order to investigate whether the SR investment constraint imposes a cost in terms of reduced portfolio performance, we would like to conduct the ideal experiment of taking a SR fund and observing what would happen if this constraint were lifted. Unfortunately, we cannot exploit time variation in the SR attribute to measure its effect on fund performance, since there are few instances of changes in the SR status.[11] Most previous studies have, therefore, chosen to approximate the ideal experiment by comparing the performance of SR funds to the performance of a reference or control group of comparable conventional funds, a methodology that is known as matched-pair analysis. Mallin, Saadouni, and Briston 1995 are the first to use this analysis. These authors match each SR fund to a conventional fund on the basis of the date the fund was created and fund size at the beginning of the SR fund's history in the sample. The advantage of the approach is that differences between each SR fund and its conventional match cannot be attributed to fund age or size. The time series of fund returns are then used to estimate and compare the risk-adjusted performance of each SR fund and that of its conventional match. This approach has been followed by a number of studies (see, e.g., Gregory, Matatko, and Luther 1997, Statman 2000 or Kreander, Gray, Power, and Sinclair 2005).

In this paper, we build on this approach and extend it in two directions. First, we employ a related methodology, the matching estimator methodology, to evaluate differences in fees and performance between SR and conventional funds. As in the matched-pair analysis, matching estimators find one or several matches for each SR fund observation and then estimate the difference between SR and conventional funds by averaging the differences between each SR fund and the corresponding matched conventional funds. Matching estimators, however, improve

[9] Data were downloaded from Kenneth French's website, http://mba.tuck.dartmouth.edu /pages/faculty/ken.french/.

[10] To check the robustness of our results, we have also performed our analysis using a three-year estimation period.

[11] See, however, Mill 2006 for a time-series analysis of a UK unit trust that was initially conventional and later shifted to a socially responsible investment objective.

the matched-pair analysis along several dimensions. First, matching estimators overcome the difficulty of finding controls when matching is done on a large number of control variables. In the matched-pair analysis, the researcher tries to find one or more conventional fund with values for the matching variables as close as possible to those of the SR fund. This is impractical when matching is done on a large number of controls since exact or nearly exact matches for all variables and observations are usually impossible to find even in large data sets (Zhao 2004). Due to this curse of dimensionality, it is not surprising that previous studies using the matched-paired analysis have focused on a small number of covariates. For instance, Gregory, Matatko, and Luther (1997) match each SR fund to one conventional fund of the same type (general, growth or income), area of investment and year of formation, which is closest in fund size to the SR fund. Kreander, Gray, Power, and Sinclair (2005) match SR funds to conventional funds with identical country of the management company and geographic investment universe, and similar age and size, although they do not specify the decision rule for choosing the matched pair on the two non-identical covariates. Finally, Statman (2000) matches each SR fund to the two conventional funds that are nearest to it in asset size. Rather than looking for controls with similar values of each one of the covariates, the matching estimators analysis maps the multiple covariates into a scalar through some metric, which measures the distance to the observation to be matched. It then locates the controls with lowest value for that distance. Matching estimators, therefore, make it possible to control for many covariates. This property is desirable since failure to control for some relevant variables may potentially affect conclusions regarding the relative performance of SR and conventional funds. Moreover, recent advances in the matching estimators methodology enable the researcher to correct for the bias that arises when matches with identical values of the covariates are not found. Finally, inference is conducted based on a rigorous derivation of the asymptotic distribution of the test statistic.

In particular, we employ the bias-adjusted matching estimator developed by Abadie and Imbens (2002) and Abadie and Imbens (2006). This estimator first computes the distance between each SR fund and every conventional fund. To account for differences in the units used to measure each matching variable and in the dispersion of these variables, the distance metric employed scales the distance according to each of the matching variables by its variance (a procedure also recently employed by Bollen 2007).[12] Then, for each SR fund, the estimator select as matches the m conventional funds that are closest to the SR fund according to the distance metric, where m is a number chosen by the researcher. The simple matching estimator then computes for each SR fund the difference between the value of the outcome variable of interest (in our case, performance or fees) and the average value of the outcome variable among the corresponding matched conventional funds. The final value of the estimator is the average of the differences between each SR fund and its matches. The bias-adjusted matching estimators of Abadie and Imbens correct the potential bias arising from the difference in the matching variables by explicitly taking into account how the variable of interest (fees or performance in our case) is related to the matching variables. For a more detailed discussion of the matching estimators analysis and a comparison to other methods, see Imbens (2004). For an implementation of the matching estimator used in this paper, see Abadie, Drukker, Herr, and Imbens (2004).

The second novelty of our approach is that we make use of the panel nature of our dataset. Although previous studies typically have several years of data, they compute for each fund a single measure of performance for the whole sample period and use a single value for each of the fund characteristics employed to perform the match (Benson, Brailsford, and Humphrey 2006; Bauer, Derwall, and Otten 2007). Thus, despite the time dimension of the datasets, their analysis is cross-sectional. In contrast, we make use of the whole history of fund characteristics and estimate a time-series of performance measures for each fund. While the units of analysis in previous studies are the funds, our units of analysis are fund-year observations, with yearly

[12] More precisely, if the matching variables are size (s), age (a) and size of the management company (c), the distance between funds A and B would be: $d = \sqrt{\frac{(s_A - s_B)^2}{\sigma_s^2} + \frac{(a_A - a_B)^2}{\sigma_a^2} + \frac{(c_A - c_B)^2}{\sigma_c^2}}$, where σ_k^2 is the sample variance of variable k.

performance computed as the arithmetic mean of monthly abnormal returns in the year.[13] This enables us to overcome several problems associated with previous matched-paired studies, which have been the object of debate in the literature. The first problem with a cross-sectional analysis is that, even though the matching variables are time-varying, the researcher must choose a time at which the covariate is measured. As noted by Kreander, Gray, Power, and Sinclair 2005, matching by fund size at the beginning of the sample leads to significant divergences in size between SR and their controls at the end of the sample. Kreander, Gray, Power, and Sinclair 2005 propose to match by fund size in the middle of the SR fund's history, which they find to lead to a better correspondence of the fund sizes. Using a panel eliminates this problem since matching is done on fund size and other time-varying control variables every year. A second problem with the cross-sectional approach is the fact that matched conventional funds may not have the same life span as the SR funds with which they are matched. The difference between the life spans of SR and matched funds, in turn, can generate several biases. First, suppose that the match is done using conventional funds alive the first year of the sample. These matched conventional funds may disappear from the sample before the SR fund they are matched with or may, on the contrary, outlive that fund. Depending on the reasons behind fund attrition, this may cause different distortions. Suppose, for example, that the attrition rate is lower for SR funds and that conventional funds are terminated more frequently than SR funds because management companies are less tolerant of underperformance for conventional funds. In this case, the performance of SR funds relative to conventional funds will appear to be worse than it really is, since relatively bad conventional funds will disappear from the sample, while underperforming SR funds will persist. This draw-back of the matched-pair analysis has been recently recognized by Gregory and Whittaker 2007. Further, differences in time spans may also introduce biases because estimated average performance is time-varying, a fact often overlooked in the literature. For instance, Lynch, Wachter, and Boudry 2004 have recently shown that conditional mutual fund performance moves with the business cycle, with all fund types except growth funds performing better in downturns than in peaks. Apparent differences in performance could thus arise simply because the time periods in which the performance of SR and conventional funds is measured do not coincide. The impact of time-varying performance on the results from this type of analysis is unclear a priori. It is worth noting that selecting matched funds with the same or similar life span as the SR fund with which they are matched (as proposed, for example, by Bollen 2007) may not solve the problem, as we discuss in Section 4 below, and may generate others. In particular, requiring that funds have similar life spans may reduce the quality of the matching along the other dimensions.

In contrast to the cross-sectional approach of previous studies, we exploit the panel structure of the data to find each year a different set of control conventional funds for each SR fund. Doing this ensures that the performance of SR funds and conventional funds is measured in the same period and that the matching variables are also evaluated in the same period. Further, it ameliorates the kind of survivorship bias described above having to do with different attrition rates for SR and conventional funds.

To find a match for each SR fund-year observation, we look for fund-year observations among conventional funds that belong to the same investment objective and calendar year as the SR fund-year observation. Among funds from the same year and investment objective, we determine the matches by fund size, the size of the management company that manages the fund (both measured as the natural logarithm of total net assets under management) and fund age (also in logs). We use these variables to form the matches given their potential role as determinants of both before-fee performance and fees.

We report results for simple and biased-adjusted estimators estimated using one and four matches per SR fund. We report results obtained using only one match, because the one-match procedure is the one that most closely approximates the matched-pair methodology used in previous studies. Further, although using only one match reduces the sample size, it maximizes the quality of the matches. We report results for four matches, because Abadie, Drukker,

[13] We require that at least 10 months of return data are available for each fund and year.

Herr, and Imbens (2004) indicate that in their simulations this number of matches achieve the best trade-off between sample size and match quality. We have also estimated the differences between SR and conventional funds using two and three matches, obtaining similar results.

3.1 Differences in before-fee performance

Table 5 reports our estimates of the difference in before-fee performance between SR and conventional funds.[14] The table shows that SR funds earn higher raw before-fee returns (i.e., returns not adjusted for risk) for all specifications, although the difference is not statistically significant. Table 5 reports differences in risk-adjusted performance, estimated using the four-factor alpha, described in Section 2. The results are striking. In all specifications, SR funds earn higher risk-adjusted returns than matched conventional funds. Further, the difference is highly significant both statistically and economically. To appreciate the economic significance of the estimated differences, Table 5 also displays the average four-factor alphas of SR funds.

For comparison with previous studies, we also report estimated differences in risk-adjusted returns measured as one-factor alphas. SR funds again earn higher alphas in all specifications, although now differences are not statistically significant

[Table 5 about here.]

We can extract two important conclusions from Table 5. The first one is that the financial characteristics of SR funds do not seem to be equal to those of comparable conventional funds. On the one hand, SR and conventional funds differ in their ability to generate risk-adjusted returns. On the other hand, the fact that performance differences are greater when we control for exposure to different risk factors also shows that SR and conventional funds differ in their exposure to those risk factors. Therefore, SR and conventional funds seem to be following different investment strategies.

The second conclusion we can draw from Table 5 is that not only do SR funds not earn lower before-fee returns than comparable conventional funds, but they actually earn significantly higher risk-adjusted before-fee returns. This result is at odds with the predictions that would follow from standard portfolio choice theory. As discussed in the introduction, restricting the choice of investment alternatives available to a portfolio manager cannot increase the maximum risk-adjusted returns that the portfolio manager can obtain. It is important to remark again that an explanation of the observed differences in terms of performance differences between socially responsible and non socially responsible *firms* is not valid or, at least, not sufficient: if socially responsible firms yielded higher risk-adjusted returns, conventional funds could obtain returns as high as those of SR funds by investing in SR firms. After all, conventional funds are not restricted to invest in firms that are not socially responsible.[15] Therefore, our results indicate that portfolio managers (at least those of conventional funds) are not maximizing risk-adjusted returns. We consider two possible explanations for the observed results, based on two different types of reasons why portfolio managers may not maximize risk-adjusted returns.

The first potential explanation for the performance advantage of SR funds has to do with cognitive limitations on the side of fund managers. Fund managers can invest in thousands of companies. The size of the investment universe implies that even the largest fund management teams with the help of the most advanced information processing technologies cannot carry out a comprehensive analysis of all possible securities to determine their expected joint distribution of returns. Fund managers must therefore make choices about the breadth and depth of their analysis. In this setting, restricting the investment universe may prove optimal if depth is

[14] Reported results are for the whole sample of SR funds. It turns out, however, that for funds whose investment objective is categorized by CRSP as "Environmental", there are only two fund-year observations in the final sample that are not SR. Therefore, we cannot find matches for SR funds in the Environmental investment objective that belong to the same year and investment objective. We have reestimated all differences excluding these funds from the sample, obtaining identical results.

[15] There are, however, some exceptional cases that do exclude SR firms. A notable case is the Vice Fund, which focuses on firms in the alcohol, gambling, tobacco and military sectors.

relatively more profitable than breadth (see Nieuwerburgh and Veldkamp 2005). Recent evidence showing that fund families following more focused investment strategies (Nanda, Wang, and Zheng 2004) and mutual funds holding portfolios concentrated in specific industries tend to perform better (Kacperczyk, Sialm, and Zheng 2005) provides support for this hypothesis. Mutual funds' preference for investing in firms with headquarters located near those of the management company (Coval and Moskowitz 1999; Coval and Moskowitz 2001) also provides support for the idea that restricting the set of investments may be an optimal policy. Further, to the extent that part of the performance advantage of more focused funds stems from their ability to pick the right investments within their focus group (Kacperczyk, Sialm, and Zheng 2005) and that learning about firms within a group takes time, focused funds may maintain their performance advantage for relatively long periods. Thus, the performance premium of SR funds could in fact stem from the gains from specialization induced by their investment restrictions.

Ethical constraints could also have a positive impact on performance if limiting the set of investment opportunities also has the effect of reducing excessive trading. Trading involves transaction costs (mainly in the form of brokerage commissions) which are directly deduced from funds' assets (transaction costs are not part of fund expenses) and thus have a direct effect on before-fee returns. Excessive trading will thus have a negative impact on performance, so any factor that reduces excessive trading will, other things equal, have a positive impact on performance. To explore this possibility, we estimate the difference between the turnover of SR and conventional funds. The results, reported in Table 5, are unambiguous: SR funds have a lower turnover than comparable conventional funds, with the difference being both statistically and economically significant. However, the large difference in turnover cannot explain the performance difference between SR and conventional funds, as shown in Table 5, which report the estimated differences in before-fee (but net of transaction costs) performance between SR and conventional funds when turnover is used as a matching variable on top of the variables employed so far. Even after controlling for turnover, SR funds have a higher before-fee risk-adjusted performance.[16]

While the above explanations have to do with cognitive limitations on the side of fund managers, information processing constraints on the side of investors could also help explain the performance advantage of SR funds. The relatively small size of the SR segment of the mutual fund market could make it less costly for investors to monitor the relative performance of SR funds. Therefore, investors in SR funds may be more responsive to differences in performance, as reported by Bollen (2007). The greater sensitivity to performance could, in turn, mean a stronger competitive pressure for SR funds, leading to a higher performance.

A different kind of explanation for the performance advantage of SR funds has to do with differences between conventional and SR mutual funds in the severity of the conflict of interest between investors and fund managers. As in any agency relationship, the interests of mutual fund managers (who want to maximize fee revenues net of management costs) may not be perfectly aligned with those of investors (who seek high risk-adjusted returns). Although competition among mutual funds forces fund managers to seek high performance levels, the managers of funds with relatively low performance may not exert enough effort, since the sensitivity of money flows to performance is low for low-performing funds (Sirri and Tufano 1998). Further, mutual fund management companies may want to favor affiliated or related companies in their stock transactions, even if doing so has a negative effect on performance. For example, a fund manager may prefer to carry out transactions using brokers with whom they have some special relation even if they are not the cheapest, or may delegate portfolio management to an affiliated subadviser even if it is not the least costly or the best suited for the job. If SR mutual funds are less prone to engage in behavior contrary to the interests of their shareholders (because their focus on socially responsible investments is associated with greater social responsibility in the conduct of their relation with shareholders) and if agency problems have a significant effect on performance, then differences in the severity of the agency

[16]To allow for the possibility that turnover may be the main determinant of performance, we also estimate the differences using turnover as the only matching variable, obtaining similar results.

problem between investors and fund managers could help explain the performance advantage of SR funds.

A final explanation for our results is that the constraints that determine whether a fund is considered as socially responsible have little bite, in the sense that they impose only minor restrictions on fund managers' investment strategies. As explained in Section 1, the requirements that a fund has to fulfil to be included in the SIF's listing of SR funds are rather weak. For example, a fund could qualify to be on the list just by imposing a screen on companies with interests in the tobacco business. If the constraints that social responsibility (at least as defined in our dataset) imposes on fund managers are minor, the performance of SR mutual funds should not be expected to be lower of that of conventional funds. In such case, the influence of some of the above factors or mere sampling error could explain our results. In a recent paper, Hong and Kacperczyk (2007) analyze the performance of "sin" stocks, that is of stocks in the tobacco, alcohol and gambling industries. In their study, they identify only 193 distinct "sin" companies, out of a universe of thousands of companies in their 1926-2004 sample of U.S. companies. Therefore, it may be that at least part of our sample of SR mutual funds faces in practice only minor restrictions on their investment policies. It is worth noting, however, that the fraction of "sin" companies among large U.S. companies is not negligible. Thus, Statman (2005) reports that of the companies in the S&P 500 index, twenty companies (almost five percent) have interests in tobacco, alcohol or gambling. If we also included firms in the military, nuclear or firearms sectors as susceptible of being excluded from the group of socially responsible investments, a total of seventy, or fourteen percent, of the S&P 500 firms would not pass a set of relatively common SR screens. Further, leaving out "sin" companies may have a relatively large cost, since Hong and Kacperczyk (2007) report that these companies outperformed comparable ones in their sample.

3.2 Differences in fees

The results in the previous section show that restricting mutual funds' investment strategies to be in accordance with social responsibility principles does not impose a cost on investors. Investors in SR funds, however, could still pay a price for their funds' social responsibility constraints if they paid higher fees than comparable conventional funds. In fact, there are reasons to expect the fees of SR funds to be higher. First, some SR do not only apply screens to their investment policies but also actively engage with the firms in which they invest to encourage them to pursue social responsibility goals. Such active monitoring is likely to be costly and at least part of those costs are likely to be passed on to investors in the form of higher expenses. Second, while investors unconcerned about social responsibility are unlikely to prefer a conventional fund over an otherwise identical SR fund, investors concerned about social responsibility will be willing to pay a premium for the social responsibility attribute. Therefore, if there are enough investors concerned about social responsibility issues, SR funds should be able to command higher fees than otherwise identical conventional funds. Further, investors in SR funds may differ from other investors in their sensitivity to financial performance. It is a well known fact that investors chase past performance, but investor sensitivity to differences in performance differs across funds. For example, it is well known that investors react greatly to differences in performance among top-performing funds, but are not responsive to differences in performance among low performers (Sirri and Tufano 1998). Further, Christoffersen and Musto (2002) and Gil-Bazo and Ruiz-Verdú (2007) show that funds adjust their fees to the performance-sensitivity of their investors, with funds facing less performance-sensitive investors charging higher fees. Therefore, if an interest in social responsibility issues signaled a reduced concern for financial performance and if SR funds exploited this smaller concern, we would expect them to charge higher fees, other things equal. On the other hand, as discussed in the previous section, the managers of SR funds may not be as willing as the managers of conventional funds to act against the interest of their investors and may, thus, not raise fees beyond the level that guarantees them an adequate return. Further, the presumption that SR investors are less sensitive to financial performance may not be true. In fact, in a recent paper,

Bollen (2007) shows that, at least for funds with positive performance, investors in SR funds seem to be more sensitive to differences in performance. Finally, results in the previous section suggest another reason why SR funds may charge higher fees, namely that they provide higher before-fee performance. We postpone discussion of this last possibility to the next section.

Table 6 contains the matching estimators for the difference in fund expenses between SR and conventional funds. The table shows that SR funds charge higher expenses than those of similar conventional funds. Further, the difference in expenses between SR and conventional funds is highly significant, both statistically and economically. Further, the result is robust to the estimation method: the difference between the expenses of SR and conventional funds is positive and statistically significant for all specifications reported in Table 6.

[Table 6 about here.]

From the above results, however, one cannot conclude that SR funds are more expensive than conventional funds. The reason is that, as discussed in Section 1, on top of the expenses that are charged on a daily basis, mutual funds often charge loads to mutual fund investors at the time they purchase or redeem fund shares. Therefore, if there is substitutability between fees, the differences in expenses could be compensated by differences in fees.[17] To address this issue and provide a better description of the cost difference for investors between SR and conventional funds, we follow three different routes. First, when comparing the expenses of SR and conventional funds we require that SR funds that charge (do not charge) loads are matched with similar conventional funds that also charge (do not charge) loads. The results, reported in Table 6 show that controlling for whether or not funds charge loads does not affect the results: both load and no-load SR funds charge higher expenses than comparable conventional funds.

As a second way to evaluate the influence of loads on the costs of holding shares of SR funds, Table 6 also reports differences in loads between SR and conventional funds. Loads are higher for SR funds, although the difference is not statistically significant in all specifications. This difference could be due either to the fact that SR funds charge higher loads or to a different incidence of loads among the two types of funds (with SR funds being more likely to charge loads). To disentangle the two effects, we also report matching estimator results when the sample is restricted to funds that charge positive loads. The fact that differences are larger and more statistically significant when we restrict the sample to load funds indicates both that load SR funds charge higher loads and that loads are less frequent among SR funds. The last fact is also confirmed by looking at the fraction of funds charging loads among SR and conventional funds: while 57.64 percent of conventional funds in the sample charge loads, only 51.61 percent of SR funds do so.

Finally, to evaluate the differences in the total cost for investors of owning the shares of SR and conventional funds, we aggregate all the costs incurred by fund shareholders using the total ownership cost (TOC) measure introduced by Sirri and Tufano (1998) and adopted by the *Investment Company Institute* (Rea and Reid 1998). To obtain this measure, we annuitize the total load by dividing it by the number of years that investors are expected to hold the mutual fund shares. We assume, following Sirri and Tufano (1998) that this expected number is seven, and, therefore, we define total ownership cost as TOC = expense ratio + (total load/7). As reported in Table 6, SR funds have a higher total ownership cost than conventional funds.

Therefore, we can conclude that, on average, investors in SR funds incur higher expenses, higher loads, and a higher total ownership cost than investors in comparable conventional funds.

3.3 Differences in after-fee performance

Table 7 shows the results of estimating the difference in after-fee performance between SR and comparable conventional funds. Our estimates indicate that the after-fee performance of SR funds was better than the one of comparable conventional mutual funds. This result suggests

[17] In fact, for the years in the sample we expect loads and expenses to be, at least partly, substitutes. The reason is that since the 1980s, mutual funds can charge distribution-related fees either through loads or through 12b-1 fees, which are included in the expense ratio.

that in our sample, the SR attribute has not reduced the net performance of a mutual fund relative to otherwise similar conventional funds but, instead, it appears to have been associated with higher performance.

[Table 7 about here.]

4 SR effect or differences in skill?

In the previous section, we show that SR funds are associated with higher before and after-fee risk-adjusted performance and are more expensive than conventional funds in the same investment objective that are comparable in terms of their size, age and the size of their management company. The justification for comparing SR funds with conventional funds with similar characteristics is that by doing so we attempt to disentangle the effect of the SR attribute on fund performance from that of other observable characteristics. Our results, however, do not allow us to conclude unambigously that the estimated differences are due to some funds applying SR screens to their investments. The reason is that differences in fund alphas across funds are not only due to differences in observable characteristics and the SR nature of some funds, but also to differences in skill across individual portfolio managers. SR funds could therefore outperform similar conventional funds not because of the their investment policy, but simply because they have better managers. This distinction is important. If differential performance is attributable to the quality of management, then a conventional fund that chooses to adopt SR investment principles will not improve its performance. If, on the other hand, a true SR effect exists, then a shift to SR investment will tend to have a positive impact on performance.

If managerial ability were observable, then we could distinguish the effect of the SR attribute on fund performance from that of skill. Alternatively, if skill were unobservable but, conditional on fund characteristics, the average skill of individual fund managers for SR and conventional funds were the same, then differences in alphas between the two groups could be solely attributed to the SR effect. Both the previous analysis and the extant literature implicitly assume that the latter condition holds. However, average managerial skill conditional on fund characteristics may not necessarily be the same for SR and conventional funds. To see this, assume, for instance, that investors can observe different noisy measures of managerial skill, such as past returns, Morningstar ratings, or reports in the financial press. Since investors put their money in funds which are perceived to be managed by more skillful managers, better managed funds will grow larger than worse funds, implying that fund size will be positively related to unobservable ability. Assume further that flows of money to conventional funds are systematically larger than flows of money to SR funds of the same quality, simply due to the larger total size of the conventional market. It follows that if we match a SR fund with a conventional fund of similar size, we are not really comparing two funds with managers of similar ability but one SR fund manager with a conventional fund manager of lesser ability. The true SR effect on performance is, therefore, confounded with the effect of the difference in skill between both managers. Consequently, the SR effect appears to be more beneficial or less detrimental for performance than it really is. In other words, since conditional on fund size, the average managerial skill of SR funds is higher than that of conventional funds, our estimator of the SR effect is biased upwards. Note that differences in average skill conditional on the matching variable arise in this example because the matching variable, size, is related both to skill and the SR attribute.[18] Analogously, fund age could be positively related to fund performance as attrition rates are higher for underperforming funds. In addition, if management companies are more willing to maintain an underperforming SR fund than an equally underperforming conventional fund, then age is systematically higher for SR funds than for conventional funds

[18]Technically, the condition that must hold for the matching estimator to identify the effect of SR investing is known as "selection on observables." If we let, for example, $(\alpha_i(SR), \alpha_i(conv))$ be the risk-adjusted returns of fund i in case the fund acted as a SR fund or as a conventional fund, respectively, then "selection on observables" requires that, conditional on the values of the matching variables, $(\alpha_i(SR), \alpha_i(conv))$ be independent of whether the fund is SR or not (Imbens 2004).

of similar skill. In this case, conditional on age, ability is greater for managers of conventional funds, which biases our estimate of the SR effect downwards.

We follow several strategies to circumvent this problem. These strategies also allow us to check the robustness of our results to different specifications of the matching estimator.

As a first strategy, in addition to the matching variables of the previous section, we compute for each fund and year its ranking within funds of the same group (SR or conventional) in that year. Rankings take values between 0 and 1 with 1 corresponding to the fund with the highest values of the covariate. This way, we compare the performance of a SR fund with that of a conventional fund of similar characteristics and ranking in its group in terms of age and size. The idea behind this strategy is that even though a SR fund may capture more money than a conventional fund of similar quality, both will capture a similar share of each segment of the market. Similarly, SR funds may live longer than conventional funds of the same quality, but the relative age of both with respect to their peers will be similar. If these hypotheses our correct, we may control for the effect of size and age on performance while guaranteeing that the selection-on-variables condition holds. Another way to interpret this strategy is that rankings proxy for unobservable managerial skill. As shown in Table 8, results are largely consistent with those of the previous section. As an additional test, in addition to rankings relative to the group of SR and conventional funds, we have computed rankings relative to other SR or conventional funds with the same investment objective. Results do not change substantially.

[Table 8 about here.]

The relative position of a fund's size and age may be a poor proxy for managerial skill. Given the difficulty in identifying management skill at the individual fund level, in our second strategy we try to discern whether SR funds outperform similar conventional funds simply because they happen to belong to better management companies. For instance, managers of SR funds could benefit from advantages in technology or access to higher-quality information that originates at the management companies to which these funds belong. In this case, differences in performance would be associated with the type of management company. Our second strategy builds on this hypothesis and consists of dividing the sample of SR funds into two subsamples: one containing funds managed by companies that specialize in SR funds (i.e. that have more than 75% of their assets in SR funds) and mixed companies (with less than 75% of their assets in SR funds). We then perform the matching estimators analysis separately for each type of management company. If superior performance of a SR fund is due to the type of the management company, a SR fund will not outperform a similar conventional fund if they both belong to management companies with a similar fraction of assets in SR funds. If, on the other hand, a true SR effect exists, then SR funds will have superior performance and higher fees than similar conventional funds regardless of the type of management company. As shown in Tables 9 and 10, when we restrict our attention to specialized SR management companies, differences in performance (gross and net) and fees between SR funds and conventional funds with similar fund-level characteristics are statistically significant, with SR funds being associated with both higher gross and net performance and fees. When we repeat the analysis for mixed companies, however, we find that performance and fees of SR funds do not differ statistically from those of conventional funds. The evidence is therefore consistent with the presence of a SR effect, although this effect only emerges in management companies specialized in SR funds. We further explore this possibility by directly comparing SR funds in specialized and no specialized management companies. We do this by restricting the sample to SR funds and employing the matching estimator methodology to assess differences between SR funds. The differences are remarkable: funds in specialized companies are better (net and gross) and more expensive.

[Table 9 about here.]

[Table 10 about here.]

Our final strategy departs from the two previous strategies in that instead of trying to identify managerial skill at the fund or the management company level, we attempt to mitigate the bias due to the use of covariates that are caused themselves by fund performance. In particular, we select as covariates the total net assets of the management company in logs, the number of funds in the management company and the asset-weighted average age of the management company in logs. These variables potentially capture the effect of economies of scale, learning economies and other fund characteristics on fund performance. However, since these variables are not likely to be strongly affected by the return history of each individual fund, there are no evident reasons to believe that a SR fund will have a more skilled manager than a conventional fund with similar values for those variables. As shown in Table **??**, when we match on the total net assets of the management company in logs, the number of funds in the management company and the asset-weighted average age of the management company in logs, in addition to the year and investment objective variables, differences in gross and net performance are very similar to those when matching is done of fund-level variables if each SR fund is matched to a single conventional fund, and even larger and more statistically significant when four matches are used. Conclusions about differences in fees between SR and conventional funds are also unchanged when matching is done on company level characteristics instead of on fund level variables.

[Table 11 about here.]

The results of this section are therefore consistent with the existence of a positive SR effect on fund performance and fees rather than with differential skill between managers of SR funds relative to those of conventional funds, although the presence of the SR effect appears to depend on the degree of specialization of the management company in this type of funds.

5 Concluding Remarks

In this paper, we have revisited the question of whether mutual funds constrained by a socially responsible investment strategy underperform mutual funds not subject to that constraint. The extant literature has dealt with this issue using different approaches. While, some studies have compared the performance of the universe of SR funds to that of the universe of conventional funds, others have compared the performance of SR funds to that of otherwise similar conventional funds, and a final type of studies has evaluated the performance of theoretically optimal portfolios of SR and conventional funds.

Despite the interest of previous research, none of it has provided an answer to the following questions. First, do investors in SR funds pay a price for the SR attribute in the form of lower financial before-fee performance, in the form of higher fees, or both? Second, can differences in performance between SR and conventional funds be unambigously attributed to the nature of SR investments or can it be explained by differences in the portfolio management skills of managers?

To answer the first question, we use the matching estimator analysis for the first time in this literature and find that the SR attribute is not associated with lower before-fee performance. In fact, SR funds outperform before fees a control group of conventional funds within the same investment objective and similar size, age and size of the management company. This result is consistent with different explanations. For instance, portfolio managers may benefit rather than be negatively affected by a reduced investment opportunity set given the difficulties of dealing with a large universe of target companies or because a smaller investment set induces less excessive trading. Also, it may be the case that the ethical nature of these funds mitigates the agency problem in delegated portfolio management. Interestingly, SR funds are also associated with higher fees but despite such higher fees, they also outperform conventional funds net of expenses.

The fact that SR funds outperform comparable conventional funds, however, does not imply that a conventional fund choosing to adopt SR investment principles will experience an improvement in performance. The reason is that, conditional on fund characteristics, the average skill

of SR and conventional fund managers need not be the same. Proxies for managerial skill at the individual fund level or the company level, however, do not explain the higher performance of SR funds. The SR effect, however, is evident only in management companies with a large fraction of managed assets in SR funds.

Taken together, our results add new evidence that SR investors do not pay a price in terms of lower net performance, but, in fact, receive a premium. The results, also pose new questions related to the origin of the before-fee performance advantage of SR funds relative to comparable conventional funds, and, perhaps more importantly, whether it is possible for investors—either ethically inclined or not—to exploit it.

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Tables

	SR Funds	Conventional Funds	Total
1997	50	1,069	1,119
1998	62	1,204	1,266
1999	65	1,379	1,444
2000	66	1,405	1,471
2001	78	1,502	1,580
2002	81	1,538	1,619
2003	73	1,496	1,569
2004	77	1,558	1,635
2005	77	1,538	1,615

Table 1: **Number of SR and conventional funds per year**

	Socially Responsible Funds				Conventional Funds			
	Obs.	Mean	S.D.	Median	Obs.	Mean	S.D.	Median
Expenses	629	1.38%	0.46%	1.40%	12,689	1.35%	0.48%	1.30%
Total loads	621	1.92%	2.38%	0.00%	12,627	2.05%	2.29%	0.90%
Total ownership cost	621	1.65%	0.61%	1.54%	12,627	1.64%	0.68%	1.50%
T.N.A., funds	629	1,424	6,396	154	12,689	1,145	4,373	176
T.N.A., mgmt.co.	629	14,222	50,373	1,555	12,689	27,960	77,813	4,287
Age	629	11.7	13.6	8.0	12,689	10.9	12.6	7.0
Turnover	620	0.69	1.15	0.50	12,372	1.0	2.7	0.7
Net returns	629	8.04%	19.58%	9.17%	12,689	8.19%	20.42%	9.77%
Gross returns	629	9.42%	19.59%	10.55%	12,689	9.53%	20.42%	11.07%

Table 2: **Descriptive statistics**

	Expenses	Total loads	T.O.C.	TNA	TNA mgmt co	Age	Turnover
1997							
SR	1.33%	1.99%	1.61%	1,822	15,800	12.3	0.57
Conventional	1.29%	1.85%	1.56%	1,023	19,400	11.0	0.88
1998							
SR	1.37%	2.01%	1.66%	1,829	16,823	10.9	0.57
Conventional	1.32%	1.89%	1.59%	1,147	21,975	10.4	0.92
1999							
SR	1.36%	1.74%	1.61%	1,816	12,919	11.3	0.66
Conventional	1.35%	1.96%	1.63%	1,361	28,878	10.2	0.94
2000							
SR	1.42%	1.75%	1.67%	1,539	18,280	11.4	0.59
Conventional	1.32%	1.95%	1.60%	1,297	26,724	10.7	1.25
2001							
SR	1.37%	1.76%	1.63%	724	12,197	11.0	0.62
Conventional	1.35%	2.03%	1.64%	1,066	24,193	10.5	1.16
2002							
SR	1.41%	1.73%	1.66%	467	7,576	11.0	0.96
Conventional	1.40%	2.02%	1.69%	803	20,702	11.0	1.12
2003							
SR	1.42%	1.99%	1.69%	1,470	13,733	12.1	0.79
Conventional	1.39%	2.11%	1.69%	1,083	27,306	11.3	1.14
2004							
SR	1.40%	1.82%	1.65%	1,623	15,243	11.6	0.68
Conventional	1.37%	2.22%	1.68%	1,211	36,716	11.4	1.05
2005							
SR	1.32%	2.54%	1.68%	1,884	17,207	13.4	0.67
Conventional	1.31%	2.34%	1.64%	1,306	41,604	11.6	0.84

Table 3: **Averages by year**

	N. return	G. Return
1997		
SR	24.04%	25.36%
Conventional	22.75%	24.04%
1998		
SR	14.67%	16.03%
Conventional	15.42%	16.73%
1999		
SR	23.20%	24.56%
Conventional	24.80%	26.15%
2000		
SR	1.07%	2.49%
Conventional	1.03%	2.35%
2001		
SR	-4.29%	-2.91%
Conventional	-8.59%	-7.23%
2002		
SR	-21.91%	-20.50%
Conventional	-23.27%	-21.87%
2003		
SR	28.19%	29.62%
Conventional	29.55%	30.94%
2004		
SR	12.12%	13.53%
Conventional	11.94%	13.31%
2005		
SR	6.30%	7.63%
Conventional	7.30%	8.61%

Table 4: **Averages by year. Returns.**

	Gross Return			Gross Alpha, 1 factor		
	Coeff.	S.e.	Mean	Coeff.	S.e.	Mean
Simple						
1 match	0.009	0.007	0.097	0.009	0.007	0.022
4 matches	0.005	0.006	0.097	0.005	0.006	0.022
Bias-corrected						
1 match	0.009	0.007	0.097	0.009	0.007	0.022
4 matches	0.005	0.006	0.097	0.005	0.006	0.022
	Gross Alpha, 4 factors			Turnover		
	Coeff.	S.e.	Mean	Coeff.	S.e.	Mean
Simple						
1 match	0.015***	0.006	0.006	-0.221***	0.046	0.662
4 matches	0.011**	0.005	0.006	-0.197***	0.037	0.662
Bias-corrected						
1 match	0.015***	0.006	0.006	-0.218***	0.047	0.662
4 matches	0.011**	0.005	0.006	-0.190***	0.037	0.662
	Gross Alpha, 4 factors (matching for turnover)					
	Coeff.	S.e.	Mean			
Simple						
1 match	0.017***	0.006	0.006			
4 matches	0.01**	0.005	0.006			
Bias-corrected						
1 match	0.016***	0.006	0.006			
4 matches	0.01**	0.005	0.006			

Table 5: **Matching estimator analysis for before-fee performance and fund turnover.** This table shows the matching estimator results (coefficient, standard error and variable mean for the SR group). Matching variables include year, fund age (in logs), investment objective, funds' total net assets (in logs), and management companies' total net assets (in logs).

	Expenses			Expenses (matching for loads)		
	Coeff.	S.e.	Mean	Coeff.	S.e.	Mean
Simple						
1 match	6.877***	2.371	137.851	6.372***	2.221	137.452
4 matches	6.214***	1.883	137.851	6.332***	1.829	137.452
Bias-corrected						
1 match	6.700***	2.362	137.851	6.036***	2.207	137.452
4 matches	6.144***	1.878	137.851	6.215***	1.804	137.452
	T.O.C.			T.O.C. (matching for loads)		
	Coeff.	S.e.	Mean	Coeff.	S.e.	Mean
Simple						
1 match	10.203***	3.759	167.144	8.878***	2.768	167.144
4 matches	7.685**	3.032	167.144	9.374***	2.302	167.144
Bias-corrected						
1 match	10.376***	3.757	167.144	8.787***	2.753	167.144
4 matches	8.117***	3.022	167.144	9.497***	2.280	167.144
	Total Loads					
	Coeff.	S.e.	Mean			
Simple						
1 match	27.074*	14.949	207.847			
4 matches	14.341	12.032	207.847			
Bias-corrected						
1 match	29.022*	14.998	207.847			
4 matches	17.231	12.009	207.847			

Table 6: **Matching estimator analysis for fees.**
This table shows the matching estimator results (coefficient, standard error and variable mean for the SR group). Matching variables include year, fund age (in logs), investment objective, funds' total net assets (in logs), and management companies' total net assets (in logs).

	Net Alpha, 1 Factor			Net Alpha, 4 factors		
	Coeff.	S.e.	Mean	Coeff.	S.e.	Mean
Simple						
1 match	0.008	0.007	0.008	0.015***	0.006	-0.008
4 matches	0.005	0.006	0.008	0.01**	0.005	-0.008
Bias-corrected						
1 match	0.008	0.007	0.008	0.014***	0.006	-0.008
4 matches	0.004	0.006	0.008	0.01**	0.005	-0.008

Table 7: **Matching estimator analysis for after-fee performance**
This table shows the matching estimator results (coefficient, standard error and variable mean for the SR group). Matching variables include year, fund age (in logs), investment objective, funds' total net assets (in logs), and management companies' total net assets (in logs).

	Gross Alpha, 4 factors		
	Coeff.	S.e.	Mean
1 match	0.0130**	0.0055	0.006
4 matches, bias corrected	0.015*	0.0045	0.006
	Net Alpha, 4 factors		
	Coeff.	S.e.	Mean
1 match	0.0125**	0.0055	(-0.008)
4 matches, bias corrected	0.0142*	0.0045	(-0.008)
	T.O.C		
	Coeff.	S.e.	Mean
1 match	7.699**	3.638	167.144
4 matches, bias corrected	4.743	3.016	167.144

*** 10% sig.; ** 5% sig.; * 1% sig.

Table 8: **Matching estimator analysis using rankings.**
This table shows the matching estimator analysis (coefficient, standard error and variable mean for the SR group) when a funds' rankings based on age and size within funds of the same group (SR or conventional) in that year, are used as matching variables. Other matching variables are year, investment objective, funds' age in logs, funds' total net assets in logs and management companies' total net assets in logs.

	Gross Alpha, 4 factors		
	Coeff.	S.e.	Mean
1 match	-0.0061	0.0071	-0.0160
4 matches (bias corrected)	-0.0006	0.0061	-0.0160

	Net Alpha, 4 factors		
	Coeff.	S.e.	Mean
1 match	-0.0058	0.0071	-0.0284
4 matches (bias corrected)	-0.0002	.0061	-0.0284

	T.O.C		
	Coeff.	S.e.	Mean
1 match	-3.076	8.638	149.918
4 matches (bias corrected)	-0.9924	7.282	149.918

*** 10% sig.; ** 5% sig.; * 1% sig.

Table 9: **Matching estimator analysis for mixed SR management companies.** This table shows the matching estimator results (coefficient, standard error and variable mean for the SR group) for SR funds belonging to mixed management companies, defined as those in which less than 75% of assets belong to SR funds. Matching variables include year, fund age (in logs), investment objective, funds' total net assets (in logs), and management companies' total net assets (in logs).

	Gross Alpha, 4 factors		
	Coeff.	S.e.	Mean
1 match	0.0221*	0.0071	0.0128
4 matches (bias corrected)	0.0164*	0.0058	0.0128
	Net Alpha, 4 factors		
	Coeff.	S.e.	Mean
1 match	0.0209*	0.0070	-0.0016
4 matches (bias corrected)	0.0153*	0.0058	-0.0016
	T.O.C		
	Coeff.	S.e.	Mean
1 match	13.353	3.880	170.872
4 matches (bias corrected)	12.782	3.221	170.872

*** 10% sig.; ** 5% sig.; * 1% sig.

Table 10: **Matching estimator analysis for specialized SR management companies.** This table shows the matching estimator results (coefficient, standard error and variable mean for the SR group) for SR funds belonging to specialized management companies, defined as those in which more than 75% of assets belong to SR funds. Matching variables include year, fund age (in logs), investment objective, funds' total net assets (in logs), and management companies' total net assets (in logs).

	Gross Alpha, 4 factors		
	Coeff.	S.e.	Mean
Simple			
1 match	0.0145*	0.0056	0.006
4 matches	0.0130*	0.0046	0.006
Bias corrected			
1 match	0.0147*	0.0056	0.006
4 matches	0.0131*	0.0046	0.006
	Net Alpha, 4 factors		
	Coeff.	S.e.	Mean
Simple			
1 match	0.0137*	0.0056	-0.008
4 matches	0.0125*	0.0046	-0.008
Bias corrected			
1 match	0.0138*	0.0056	-0.008
4 matches	0.0126*	0.0046	-0.008
	Expenses		
	Coeff.	S.e.	Mean
Simple			
1 match	7.711*	2.387	137.851
4 matches	5.089*	1.982	137.851
Bias corrected			
1 match	7.711*	2.390	137.851
4 matches	5.320*	1.975	137.851
	Total Loads		
	Coeff.	S.e.	Mean
Simple			
1 match	22.821	14.961	207.847
4 matches	22.197***	12.021	207.847
Bias corrected			
1 match	23.470	14.881	207.847
4 matches	24.791**	11.953	207.847
	T.O.C.		
	Coeff.	S.e.	Mean
Simple			
1 match	10.586*	3.677	167.144
4 matches	7.971*	3.033	167.144
Bias corrected			
1 match	10.713*	3.669	167.144
4 matches	8.730*	3.022	167.144

*** 10% sig.; ** 5% sig.; * 1% sig.

Table 11: **Matching estimator analysis with management company characteristics.** This table shows the matching estimator analysis results (coefficient, standard error and variable mean for the SR group) when matching variables are management company characteristics. Specifically, we use as matching variables the total net assets of the management company in logs, the number of funds in the management company and the asset-weighted average age of the management company in logs, in addition to the year and investment objective variables.