PERFORMANCE OF SOCIALLY RESPONSIBLE MUTUAL FUNDS

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ABSTRACT

This study examines the performance of socially responsible mutual funds from 1999 to 2009. To minimize the benchmark error, we apply propensity-score-matching method to identify a most comparable conventional fund for every socially responsible fund based on several key fund characteristics. We find that return of socially responsible mutual funds are lower than conventional funds before applying the propensity-score-matching method. However, comparing to the propensity-score-matched funds, socially responsible mutual funds have a superior return on both average and risk-adjust returns. Further analysis shows that the superior return of socially responsible funds over propensity-score-matched funds only exists in the funds satisfying social and governance screening criteria.

JEL: G11, G23

KEYWORDS: Socially Responsible Investing, Mutual Funds, Propensity-Score-Matching

INTRODUCTION

The Social Investment Forum (SIF) defines Socially Responsible Investing (SRI) as "an investment process that considers the social and environmental consequences of investments, both positive and negative, within the context of rigorous financial analysis." In recent years, SRI has become a dynamic and quickly growing segment of the U.S. investment market. At the beginning of 2010, professionally managed SRI assets (including mutual funds, private and institutional ethically screened portfolios), reaches $3.07 trillion. It represents a rise of more than 380% from $639 billion in 1995. Due to the sheer size, SRI attracts the attention of governments, universities, foundations, public pension funds, as well as mainstream asset managers.

SRI is typically described as an investment in which social and personal values instead of financial considerations are the basis for investment decision making. However, in recent SRI movement, it has been suggested that SRI should be a "profit- seeking" approach that accommodates investors for their traditional financial goals as well. Socially responsible investors want to do well, not merely do good. This argument raises an important question: can SRI have a superior return while follow a restricted investment strategy? We try to answer this question in this paper by examining the performance of socially responsible mutual funds for a ten year period from 1999 to 2009. We first compare the performance of SRI funds to conventional mutual funds on average monthly return. We further compare the risk-adjusted monthly return using rolling regression approach. Our results indicate that SRI funds underperform conventional funds on both returns. To address the concern that the results could be driven by the benchmark selection, we use the propensity-score-matching method to identify a most similar conventional fund for every SRI fund. The propensity score is calculated as the probability of a Logit model based on several key fund characteristics.

After applying the matching method, we find that SRI funds outperform the matched conventional funds on both average and risk-adjusted monthly returns. Our results suggest SRI funds have a superior return than conventional funds with similar fund characteristics. Since SIF screens SRI funds based on four categories, we further test whether the superior return of SRI funds is screening criterion dependent. Our results indicate SRI funds outperform the matched conventional funds only in social and governance categories, but not in environmental and product categories.

This paper proceeds as follows. We conduct literature review and introduce research design in following section. We then describe the data and methodology and discuss the results. The final section concludes.

LITERATURE REVIEW AND RESEARCH DESIGN

Hamilton et al. (1993) propose three alternative hypotheses on the performance of SRI. First, they argue that the SRI should not have any significant impact on fund performance because social responsibility is not priced by the market. Second, SRI would underperform the conventional funds since it restricts an investor's choice set. According to traditional portfolio theory (e.g., Markowitz, 1959), an unconstrained optimization is always better than a constrained optimization. Third, SRI should outperform conventional funds because markets do not correctly price social responsibility. For instance, it could happen when managers and investors consistently underestimate SRI's benefits or overestimate its costs (Fombrun and Shanley, 1990; Brekke and Nyborg, 2005; Fisman, Heal, and Nair, 2006). Literature provides evidence on all three hypotheses. For example, many studies document a non-significant effect of SRI (Kurtz and Dibartolomeo, 1996; Guerard, 1997; Goldreyer and Diltz, 1999; Statman, 2000; Bauer, Koedijk, and Otten, 2005; Bello, 2005; Schroder, 2007; Statman and Glushkov, 2008), while Geczy, Stambaugh and Levin, 2005; Brammer, Brooks and Pavelin, 2006; Renneboog, Ter Horst, and Zhang, (2008) and Hong and Kacperczyk (2009) present an negative impact of SRI screens on funds return using mutual fund data. Moskowitz, 1972; Luck and Pilotte, 1993; Derwall, Koedijk, and Ter Horst (2005) and Kempf and Osthoff (2007) find certain SRI screens improve returns, although these results are based on short time period.

Clearly, there are many possible reasons to cause the reported conflicting results. In this study, we focus on one possible reason that is the selection of conventional benchmark fund when assessing the relative performance of SRI funds. Ideally, the impact of SRI can be identified if we have two identical funds except that one applies SRI screening in their portfolio and another one does not. Unfortunately, such funds do not exist. The purpose of our paper is to apply propensity-score-matching method to find the mostly similar conventional mutual fund for each SRI fund based on several important fund characteristics as matching variables. Propensity matching is one widely used method in many research areas, including social science, biology, medicine, and engineering, to construct appropriate control groups in non-experimental studies. Recently, it has become an increasingly important method in financial economic research (Drucker and Puri, 2005, Conniffe, Gash, and O'Connell, 2000, among others) because this method does not impose constraints on matching variables. We calculate the propensity score of each fund based on total monthly net asset value, fund flow, management fee, and return variance using a Logit model. Propensity score matching method allows us to identify a matched conventional fund for each SRI fund in each month for the time period 1999 to 2009. Another contribution of our study is that we cover a relatively long time period (from 1999 to 2009) compared to most of previous SRI studies. The long-run return suffers less reverse causality issues and is more directly related to investors' wealth.

SRI has become a wide-spread investment practice across broader universe of investment vehicles (such as mutual funds, ETF's, and other alternative investments). It is difficult to involve all the SRI portfolios in our study. This is because fund data (fund level characteristics) is not easy to obtain especially for those alternative investments (i.e. hedge funds, venture capitals, etc.). Due to our data availability, we restrict our sample to mutual funds that listed in the CRSP survivor-bias-free mutual fund database. Our main sample set includes 321 funds and $243.3 billion total asset under management (as of 2009). We study two returns, the average monthly return and average monthly risk-adjust return. To obtain the monthly risk-adjusted return, we use rolling regression to calculate monthly α in the Fama-French-Carhart four factor model. We compare the two returns between SRI funds and general conventional mutual funds (all mutual funds listed in CRSP dataset excluding SRI funds) and propensity-score-matched conventional funds to study the impact of SRI.

In comparison of average monthly return, our results indicate that SRI funds underperform conventional mutual funds. The average monthly return of general conventional mutual funds over holding period is 0.40%, while it is 0.27% for SRI funds. The average monthly return of propensity-score-matched conventional funds (0.38%) is also higher than SRI funds (0.28%). In comparison of risk-adjusted returns, however, we find that SRI funds outperform conventional funds. SRI funds have monthly α of -0.08%, while general conventional funds' α is -0.35%. The superior risk-adjusted return of SRI funds also present after using propensity-score-matching method. We find α of SRI funds (-0.06%) is higher than matched conventional funds (-0.17%). These results suggest that the superior return of conventional funds on average monthly return are associated with some well-known risk factors and can be explained away by these factors. On the other hand, the superior return of SRI funds on risk-adjusted returns are not correlated with risk factors. It suggests that the SRI has a positive impact on mutual funds return.

We also find the monthly fund flow of general conventional funds is higher than SRI funds (0.34 vs. 0.17). General conventional funds have a lower average monthly total net asset under management than SRI funds (408.81 million vs. 515.00 million). General conventional funds have a lower management fee (0.83%) than SRI funds (1.61%). They have similar variance of past six month returns. We do not find any significant difference between SRI funds and the propensity-score-matched conventional fund except for the management fee. These results are expected since we are matching conventional funds with SRI funds on these four fund characteristics. The results provide supporting evidence that our propensity-score-matching method indeed finds comparable conventional funds for the SRI funds.

To further explore the impact of SRI, we study if SRI return is dependent on its screening criterion. SIF classify a fund as a SRI based on four categories, namely, social, environmental, governance and products. We conduct the comparison analyses between SRI funds and matched conventional funds on each screening category. The results show that SRI funds have a higher risk-adjusted return than matched conventional funds in social and governance category. Risk-adjusted returns on other two categories do not show any significant difference. The average monthly return of matched conventional funds on environmental, products, and governance category are all significantly higher than SRI funds, while there is no significant difference between SRI and conventional funds on social category.

DATA AND METHODOLOGY

We obtain SRI fund data from Social Investment Forum (SIF). SIF applies both positive and negative screens to classify an investment portfolio as a qualified SRI fund. In particular, SRI screens a fund based on four major categories on social, environmental, governance and products. Social criteria include diversity and equal employment opportunity, human rights, and labor relations. Environmental criteria include climate/clean technology, pollutions/toxics, and environment. Governance criteria include board issues and executive pays. Products criteria include animal testing, defense/weapons, gambling, and tobacco. Detailed screening criteria in each category can be found at SIF website (http://charts.ussif.org/mfpc/). SIF publishes the list of SRI funds from 1999 to 2010. However, the number of funds in 2010 is only 156, which is significant less than previous year. The number of funds is also different from other publications of SIF. Therefore, we do not include 2010 data in our study.

In this study, we focus on mutual funds due to the data availability. To obtain the detailed fund level characteristics and performance data, we merge SRI funds with CRSP Survivor-Bias-Free US mutual fund database. Therefore, our sample set only includes US SRI mutual funds listed in CRSP database. The summary statistics of our sample are reported in Table 1 and Table 2. As shown in Table 1, as in 2009, there are 321 mutual funds and 74 fund families (managed by the same financial institution). The mean and median age of these SRI mutual funds are 11.15 and 11 years old. The total assets under management are 243.3 billion dollars.

Table 1. Summary Statistics of SRI Funds in 2009

No. Funds	No. Families	Mean Age	Median age	TNA (Bil)
321	74	11.15	11	243.3

This table shows the summary statistics of SRI funds in 2009

Table 2 reports the time trend of number of funds and total asset managed for SRI mutual funds from 1999 to 2009. As shown in this table, we observe that the number of funds and total net asset under management are increasing over time. It clearly reflects the increasing popularity of SRI in mutual fund industry. We also find that there are two setbacks from 2003 to 2004 and 2004 to 2005.

Table 2. Time Trend of Number of SRI Funds and Total Net Asset Under Management from 1999 to 2009

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
# of company	152	151	187	220	267	234	209	228	273	314	321
Total Net Asset (Bil)	49.6	44.1	101.0	136.7	164.4	127.5	92.3	96.7	133.0	192.7	243.3

This table shows the time trend of SRI funds.

To study the impact of SRI on funds' long run return, we compare return of SRI mutual funds with general conventional funds and with propensity-score-matched conventional funds over long term time period. General conventional funds refer to all the mutual funds listed in CRSP dataset excluding SRI funds. We apply the propensity-score-matching method to identify a benchmark fund for each SRI fund in every month. This econometric method employs fewer restrictions and it is considered to be superior (Drucker and Puri (2005)). Other studies, including Rosenbaum and Rubin (1983), and Conniffe, Gash, and O'Connell (2000), also have suggested this matching approach is more accurate. We first calculate each firm's propensity score, which is the probability that a mutual fund with given characteristics is a SRI fund using a Logit model. For each SRI fund, a matching conventional fund is identified as the fund with the closest propensity score to the SRI fund. The characteristics (matching variables) used in Logit model are: total net asset, fund flow, management fee, and return volatility. The total net asset (monthly) and management fee are retrieved from CRSP mutual fund dataset. Fund flow over month t-1 to t is defined as (Sirri and Tufano, 1998):

$$Fund\ Flow = [TNA_t - (1 + r_t)TNA_{t-1}]/TNA_{t-1} \quad (1)$$

where TNA_t is total net asset at time t, and $r_t$is the return from month t-1 to month t. The return volatility is calculated as the standard deviation of monthly return of past six months. We calculate two returns. The first one is the average of monthly return from 1999 to 2009, which can be readily retrieved from CRSP dataset. The second one is the risk-adjusted return. Following the popular approach in many mutual fund performance evaluation studies, we employ Carhart's (1997) four-factor model to estimate the multi-factor α, which captures a fund's risk-adjusted return. The model can be expressed as:

$$R_{it} - R_{ft} = \alpha_i + \beta_{mt,i}(R_{mt} - R_{ft}) + \beta_{smb,i}smb_t + \beta_{hml,i}hml_t + \beta_{prly,i}mom_t + \varepsilon_{it} \quad (2)$$

where smbt, hmlt, and momt denote the risk factors associated with size, book-to-market, and momentum, respectively. We obtain these risk factors from Prof. French's website (mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html). To calculate the monthly risk-adjusted return, we conduct rolling regression using past 12 month returns to find α of current month.

It is possible that our results are driven by a certain SRI screen criterion. In other words, different screening categories may have different impact on SRI funds return. To study the possible different impacts of different screening categories, we apply the comparison analysis between SRI funds and propensity-score-matched funds on each category separately.

SIF surveys a fund on all these criteria. If a fund seeks positive investment/avoids poor performance/excludes investment in a criterion, SRI classifies it as a SRI fund. Because a fund usually adopts many criteira at the same time, the funds in each category are highly overlapped. In order to increase the distinguishing power, we apply a more restrict standard in this study. We require a firm must adopt at least 50% of criteria in a category to be classified as a SRI fund in this category. Using this standard, we are able to obtain 121 funds as SRI funds in environmental category, 126 in social category, 100 in governance category, and 141 in product category. We use propensity-score matching-method to identify the matched conventional fund for each SRI fund in every month. We then compare average monthly return and risk-adjusted return between SRI and matched conventional funds in each category using the paired t test.

RESULTS AND DISCUSSION

Table 3 presents mean values and differences with corresponding t values on various measures for general conventional funds and SRI funds. We use Welch's t test to compare the difference between conventional and SRI funds. The main reason of choosing Welch's t test over Student's t test is because general conventional funds and SRI funds have possibly unequal variances. In addition, the sample size of conventional fund (in thousands each year) is hugely different from the sample size of SRI funds (in hundreds each year).

Table 3: The Comparison between General Conventional Funds and SRI Funds on Various Measures

Variable	Conventional	SRI	Difference (t value)
Alpha (%)	-0.35	-0.08	-0.43(-17.25)***
Mret (%)	0.40	0.27	0.13(2.14)**
Mtna (mil)	408.81	515.00	-106.19(-2.67)***
Fundflow	0.34	0.17	0.17(3.59)***
Stdmret (%)	3.49	4.05	-0.56(-0.58)
mgmt_fee (%)	0.83	1.61	-0.74(-6.58)***

*This table shows the comparison between general conventional funds and SRI funds on various measures. Alpha presents α from Fama-French-Carhart Model. Mret is the average monthly return. Mtna is monthly total net asset. Fundflow is the fund flow. Stdmret is the standard deviation of past six month returns. Mgmt_fee is average monthly management fee. Conventional stands for the general conventional funds (i.e. all mutual funds listed in CRSP excluding SRI funds). t value is from Welch's t test. *, **, and *** indicate 10%, 5%, and 1% significant level, respectively.*

As Table 3 shows, conventional funds are found to outperform SRI funds in average monthly return. The average monthly return of conventional funds is 0.40%, while average monthly return of SRI fund is only 0.27%. The difference is 0.13% per month and it is significant at 5%. However, the risk-adjusted return presents an opposite result. The results show that risk-adjusted return of conventional funds is lower than SRI funds and the difference (-0.43%) is significant at 1% level.

Table 3 also presents some interesting findings on other fund level measures. First, the average monthly fund flow of conventional funds is twice of SRI funds, which indicates there is more capital flow into conventional funds than SRI funds. In other words, conventional funds attract more investment than SRI funds in general. Second, we find that on average conventional funds manage less money than SRI funds (408.81 mil vs. 515.00 mil). Third, the volatility of conventional and SRI funds is similar (3.49% for

conventional and 4.05% for SRI). Fourth, SRI has a higher management fee (1.61%) than conventional funds (0.83%).

After analyzing the average monthly return of SRI funds with general conventional mutual funds, we apply propensity-score-matching method to avoid the problem of comparing funds with significant different fundamentals. Table 4 presents the results of various comparisons between a SRI fund and its matching conventional fund.

Table 4: The Comparison between Propensity-Score-Matched Conventional Funds and SRI Funds on Various Measures

Variable	Matched	SRI	Difference (t value)
Alpha (%)	-0.17	-0.06	-0.11(-2.08)**
Mret (%)	0.38	0.28	0.10(2.93)***
Mtna (mil)	489.56	537.21	-47.65(-1.04)
Fundflow	0.16	0.15	0.01(1.21)
Stdmret (%)	3.52	4.05	-0.53(-0.91)
Mgmt_fee (%)	0.94	1.53	-0.49 (-1.88)*

*This table shows the comparison between propensity-score-matched conventional funds and SRI funds on various measures. Alpha presents α from Fama-French-Carhart Model. Mret is the average monthly return. Avg6mret is the average return of past 6 month. Mtna is monthly total net asset. Fundflow is the fund flow. Stdmret is the standard deviation of past six month returns. Mgmt_fee is average monthly management fee. Matched stands for the propensity-score-matched conventional funds. t value is from a paired t test. *, **, and *** indicate 10%, 5%, and 1% significant level, respectively.*

Our propensity-score-matching method is able to identify a matched conventional fund for over 95% SRI funds through every month in 1999 to 2009. Therefore, the results of SRI funds in Table 3 are very close to the results in Table 4, but they are not identical due to the sample size difference. In Table 4, we observe that average alpha for matched conventional funds -0.17% and -0.06% for SRI funds. The difference -0.11% is significant at 5%. This result is consistent with the comparison to general conventional funds as shown in Table 3. The average monthly return over the time period of SRI funds is 0.28%, while the average for matched conventional funds is 0.38%. The difference of 0.10% is significant at 1% level. It suggests that conventional funds with similar firm characteristics have a higher average monthly return than SRI funds. This finding is also consistent with the results in Table 3.

We also report the comparisons between other firm characteristics. The monthly total net asset, fund flow, and standard deviation of past six month returns are quiet close between SRI and matched funds. However, the management fee of SRI is still higher than matched conventional funds by 0.49% at 10% significant level. These results are expected because the propensity-matching-method is match SRI and conventional funds on these categories. The results provide evidence that our propensity matching method indeed identifies the similar conventional funds. It assures our results are robust.

As mentioned in the introduction, different SRI screening criteria may have different impacts on SRI funds returns. To address this concern, we conduct the comparison analyses for each screening category. Table 5 reports the results of abnormal return and average monthly return for both SRI and propensity-score-matched conventional funds for social, environmental, products, and governance category.

Risk-adjusted return (α), average monthly return (Mret), the difference and associated t value (paired t test) are presented in Table 5. For risk-adjusted returns, we find that SRI funds outperform matched conventional funds by 0.09% in social category and it is significant at 1% level. The risk-adjusted returns (α) are similar between SRI and matched conventional funds in environmental and products category. The SRI funds also outperform matched conventional funds in governance category by 0.05% at 10% significant level (close

to 5%). In the comparison of average monthly return, matched conventional funds outperform SRI funds with on three screening criteria, namely, products (by 0.18% at 1% level), governance (0.05% at 10% level), and environmental (by 0.18% at 1% level).

Table 5: The Comparison between Propensity-Score-Matched Conventional Funds and SRI Funds on Fund Returns for Different Screening Criteria

		Social	Environmental	Products	Governance
Alpha	SRI	-0.07	-0.05	-0.06	-0.13
	Conventional	-0.16	-0.12	-0.14	-0.18
	Difference	0.09***	0.07	-0.08	0.05*
	(t value)	(2.78)	(1.44)	(-1.01)	(1.94)
Mret	SRI	0.34	0.20	0.35	0.25
	Conventional	0.37	0.38	0.51	0.30
	Difference	-0.03	-0.18***	-0.16**	-0.05*
	(t value)	(-0.56)	(-3.05)	(-2.13)	(-1.78)

*This table shows the comparison between propensity-score-matched conventional funds and SRI funds on fund returns for different screening criteria. Alpha presents α from Fama-French-Carhart Model. Mret is the average monthly return. Matched stands for the propensity-score-matched conventional funds. t value is from a paired t test. *, **, and *** indicate 10%, 5%, and 1% significant level, respectively.*

CONCLUDING COMMENTS

This paper studies the impact of social responsible investing on mutual fund performance. In this study, we apply propensity-score-matching method to identify the most comparable conventional fund to each SRI fund based on several important fund level characteristics. This method is able to minimize the errors due to comparison among firms with significantly different fund fundamentals. Our study produces mixed results. First, we find evidences to support the hypotheses that SRI funds would underperform conventional funds. Our results show that SRI funds have a lower average monthly return compared to either general conventional funds or propensity-score-matched conventional funds. Second, the risk-adjusted return of SRI funds is found to outperform general conventional funds and propensity matched conventional funds.

We further analyze the impact of different screening criteria on SRI funds return. We find that the superior performance of conventional funds on average monthly return is found in the funds screened using criteria in environmental, products, and governance category, while the superior risk-adjusted return of SRI funds is found in the funds with social and governance screening category.

Overall, our results suggest that the impact of SRI on fund returns depends how the return is measured. The results suggest that the superior performance of conventional funds can be largely explained by these well-known risk factors. After adjusted for these risk factors, SRI funds show a superior return performance. We also find that the impact of SRI on fund returns is dependent on screening criteria. This paper contributes to the literature by examining the effect of socially responsible investing on fund returns in a long time period (1999 to 2009) using the more elaborated multi-factor model. In addition, we apply the popular propensity-score-matching method to ensure our study more robust. Our results would provide valuable information for market participants and researchers who are interested in socially responsible investments. We would suggest the further directions on this topic to explore other types of SRI investments and include more controls, such as transaction cost, etc., for a more comprehensive study when data are available.

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