The Performance of Socially Responsible Investment Funds: A Meta-Analysis

Sebastian Rathner*

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Abstract

For at least twenty years, researchers have been studying the question whether the performance of Socially Responsible Investment (SRI) funds differs from the performance of conventional funds. Empirical studies answer this question with conflicting results. The reasons for the contradictory empirical evidence are largely unexplored. One possibility is that study characteristics (e.g. domicile of the studied funds) influence the results. The aim of this paper is to contribute to the literature in general by giving an overview of relevant studies and in particular by investigating, with the help of a meta-analysis, how selected primary study characteristics influence the probability of a significant under- or outperformance of SRI funds compared with conventional funds. 25 studies with more than 500 observations are included in the meta-analysis. The results of this paper suggest that the consideration of survivorship bias in a study and the domicile of the investigated funds influence the probability of a significant under- and outperformance of SRI funds relative to conventional funds. The consideration of the survivorship bias increases (decreases) the probability of a significant outperformance (underperformance) of SRI funds. The focus on United States (US) SRI funds increases (decreases) the probability of a significant outperformance (underperformance). The time period influences the probability of a significant under- and outperformance of SRI funds as well, but based on the results of this paper, it is not possible to draw general conclusions on this variable.

* Department of Economics and Social Sciences, University of Salzburg, Kapitelgasse 5-7, A-5010 Salzburg, Austria. E-mail: Sebastian.rathner@sbg.ac.at

1   Introduction

Socially Responsible Investment (SRI) is a type of investment process that combines an investor's financial objectives with environmental, social or ethical considerations (Renneboog et al., 2008a; European Sustainable Investment Forum (Eurosif), 2010). This type of investment has seen strong growth over the last decade. For instance, the total SRI assets under management in Europe increased from €2.7 trillion in 2007 to €5 trillion in 2009 (Eurosif, 2010).

One widely studied question is, whether the performance of SRIs differs from the one of conventional investments. This question is addressed in most academic studies by investigating SRI funds and conventional funds. From a theoretical perspective, there are three different hypotheses. The 'underperformance-hypothesis' suggests that SRI funds generate weaker financial performance than conventional funds. The 'outperformance-hypothesis' claims superior returns of SRI funds. The 'no-effect-hypothesis' suggests that there is no significant difference between the returns of SRI and conventional funds (Hamilton et al., 1993; Renneboog et al., 2008b).

Most empirical studies of this extensive body of literature corroborate the 'no-effect-hypothesis', but there is some evidence for the other two hypotheses as well. For example, Bauer et al. (2006) do not find any significant performance difference between Australian SRI and conventional funds during 1992-2003. Renneboog et al. (2008b) report that SRI funds in France, Ireland, Sweden and Japan significantly underperformed their conventional peers by 4%-7% during 1991-2003. Gil-Bazo et al. (2010) show some evidence that US SRI funds outperformed conventional funds during 1997-2005. The reasons for the contradictory evidence are largely unexplored. One possibility is that primary study characteristics (e.g. domicile of the studied funds) influence the results.

Therefore, the aims of this paper are twofold. Firstly, an overview of studies will be given, which compare the performance of SRI funds and conventional funds. Questions that will be dealt with are, for example, how many relevant studies are available? Which results are found by these studies? Funds of which countries are investigated by most researchers? Which sample period is the one that is used most? Secondly, with the help of a meta-regression, it will be shown how selected primary study characteristics (the domicile of the investigated funds, the survivorship bias consideration in a study, the sample period) influence the probability of a significant under- or outperformance of SRI funds compared with conventional funds.

The remainder of this paper is organised as follows: Section 2 develops the hypotheses and section 3 introduces the methods. Section 4 pays attention to the first aim of the paper (overview of relevant studies) by describing the data set. Section 5 presents the empirical results and therefore, focuses on the second aim of the paper by investigating the influence of primary study characteristics on the results. Section 6 provides a conclusion and some suggestions for future research.

2 Hypotheses

This section presents the hypotheses on the following three primary study characteristics, which play a major role in studies on SRI fund performance and may have an impact on the probability of a significant under- or outperformance of SRI funds compared with conventional funds: survivorship-bias consideration, domicile of the investigated funds, sample period.[1]

2.1 Survivorship bias consideration

An interesting characteristic, which separates relevant studies, is whether a study considers survivorship bias or not. A survivorship bias appears, if fund samples (in a study) contain currently active funds only and do not include 'dead' funds. This bias leads to an overestimation of the average fund performance, because the average 'dead' fund performs poorly. There would not be any problem, if the SRI and conventional fund samples (of a study) suffered from survivorship bias to the same degree. Interestingly, there is some empirical evidence which suggests that the attrition rates of SRI and conventional funds are dissimilar and therefore, fund samples suffer from survivorship bias to a different degree. Gregory et al. (2007) find that 29.93% of their conventional fund sample died before the end of the sample period. In contrast, only 12.5% of the SRI fund sample did so. Similarly, Kempf et al. (2007) report an attrition rate of 36% for conventional and 17% for SRI funds. Accordingly, Renneboog et al. (2008b) discover a lower attrition rate for SRI than for conventional funds.

If a study does not consider survivorship bias (does not include dead funds in the samples) and the attrition rate of conventional funds is higher than the attrition rate of SRI funds (and therefore, the performance of conventional funds is biased more upwards than the performance of SRI funds), there should be a higher (lower) probability of a significant underperformance (outperformance) of SRI funds. In contrast, a study, which accounts for survivorship bias should on average have a higher (lower) probability of a significant outperformance (underperformance) of SRI funds (hypothesis 1 (H1)).

2.2 Domicile of the investigated funds

One criterion, which distinguishes funds from each other, is their domicile. Most studies focus on the SRI fund industry of the US, which is by far the oldest SRI fund industry in the world. In 1971 the first modern SRI fund (PAX World Fund) was established in the US (Renneboog et al., 2008a). Due to the age and development of the SRI fund industry and great experience of SRI fund managers, I hypothesise that studies which investigate US SRI funds only tend to have on average a higher (lower) probability of a significant outperformance (underperformance) of SRI funds compared with studies which focus on funds of other countries (H2).

2.3 Sample period

Another widely studied characteristic is the sample period. Several authors divide their period into sub-periods to investigate the influence of study sub-periods on the results (Bauer et al., 2006; Renneboog et al., 2008b; Gil-Bazo et al., 2010). The findings of these

studies 'suggest that different sample periods may lead to different conclusions about the performance of SRI funds relative to that of conventional funds' (Gil-Bazo et al., 2010, p. 253). Several studies find a 'catching up phase' of SRI funds, which means that studies with a newer sample period show better results for SRI funds (Bauer et al., 2005; Bauer et al., 2006). The main reason may be seen in the steady advancement of the SRI fund industry. In accordance with the mentioned studies, I hypothesise that studies with a(n) newer (older) sample period have on average a higher probability of a significant outperformance (underperformance) and a lower (higher) probability of a significant underperformance of SRI funds (H3).

3 Methods

3.1 Search for studies and criteria for inclusion

The starting points for this research were several narrative literature reviews (Chegut et al., 2011; Capelle-Blancard and Monjon, 2010; Hoepner and McMillan, 2009; Renneboog et al., 2008a). Additionally, a computer search in 'ScienceDirect' and 'google scholar', using the keywords 'socially responsible investment' and 'performance' was conducted and the references of included studies were explored. For being included in the meta-analysis a study had to meet the following criteria: First, the study investigated the performance of 'real' SRI funds relative to conventional funds quantitatively (studies which focused on SRI funds or SRI indices only were not included). Second, a study needed to provide information on the significance of the observed effects.

3.2 Variables and empirical specification of the meta-analysis

Primary studies use different measures to compare the performance of SRI funds and conventional funds and hence, it is difficult to compare them directly. Thus, I create the categorical variable *performance comparison* (dependent variable of the meta-regression), which takes value 0 if the SRI funds significantly underperform the conventional funds. Value 1 is taken if there is no significant performance difference, and value 2 if the SRI funds outperform their conventional peers significantly. By using logit-models, it will be tested how the selected primary study characteristics (independent variables of the meta-regression) influence the probability of a significant under- or outperformance of SRI funds compared with conventional funds.

In the first approach, which uses binary logit-models, the dependent variable (*performance comparison*) is dichotomised:

outperformance=1 if the SRI funds in a study significantly outperform conventional funds, *outperformance*=0 in all other cases

underperformance=1 if the SRI funds in a study significantly underperform conventional funds, *underperformance*=0 in all other cases

The independent variables are the three discussed primary study characteristics (the survivorship bias consideration in a study, the domicile of the investigated funds and the sample period) and the following additional control variables, which are study characteristics as well:

TABLE I

Independent Variables

Survivorship bias consideration	=	1 if a study considers survivorship bias
US funds	=	1 if a study investigates US SRI funds only
Time period 1981-1990	=	1 if the biggest part of a study's sample period is between 1981-1990
Time period 1991-2000	=	1 if the biggest part of a study's sample period is between 1991-2000
Time period 2001-2008	=	1 if the biggest part of a study's sample period is between 2001-2008
Performance evaluation Jensen's Alpha	=	1 if a study uses a single factor regression model to evaluate fund performance (Jensen's Alpha)
Performance evaluation Carhart's Alpha	=	1 if a study uses a multiple factor regression model to evaluate fund performance (e.g. Carhart's four factor Alpha)
Other performance evaluation	=	1 if a study uses a performance evaluation model model, which cannot be assigned to the other two groups
Conditional performance evaluation	=	1 if a study uses a conditional approach to evaluate fund performance
Matching procedure	=	1 if a study uses a matching procedure to select SRI and conventional funds
Number of authors	=	number of authors
Number of SRI funds	=	number of studied SRI funds
Number of conventional funds	=	number of studied conventional funds

In the second approach, a multinominal logit model is used to conduct a 'robustness check'. Thus, the dependent variable can be used as originally defined with three outcomes (*performance comparison*). The independent variables stay unchanged.

4   Data

25 studies with 509 results (single studies contain several performance comparisons between SRI and conventional funds; e.g. for funds of different countries) are included in the meta-analysis.[2]

Table II shows the distribution of the dependent variable. Almost 73% of the effects (= comparisons between SRI and conventional fund performance in primary studies) do not show any significant performance difference between SRI and conventional funds. A significant under- and outperformance of SRI funds is virtually found to the same degree. The results of Table II must be treated with caution, because a simple 'vote-counting' approach can often be misleading (Borenstein et al., 2009).

TABLE II

Distribution of the primary studies' results

	Freq.	**Percent**	**Cum.**
Significant underperformance of SRI funds	70	13.75	13.75
No significant performance difference	371	72.89	86.64
Significant outperformance of SRI funds	68	13.36	100.00
Total	509	100.00	

Table III provides information on the sample periods of the effects of primary studies.[3] I create three dummy variables which divide the sample period throughout all 25 primary studies, lasting from 1981-2008, into the three subperiods (almost decades) 1981-1990, 1991-2000 and 2001-2008. A dummy variable takes value 1 if the biggest part of the

sample period of an effect is in this subperiod. Eleven effects investigate funds in the period 1981-1990. This small number seems reasonable because in this early period only some SRI funds existed. All over the world the SRI fund industry has grown strongly since the early 1990s (Renneboog et al., 2008a). As a result, most effects study SRI funds in the periods 1991-2000 and 2001-2008.

TABLE III

Frequency of effects (according to the sample period)

	Freq.	Percent	Cum.
1981-1990	11	2.33	2.33
1991-2000	287	60.68	63.00
2001-2008	175	37.00	100.00
Total	473	100.00	

Table IV shows how often individual countries/regions are investigated. US funds are by far studied the most. This is consistent with, for example, Cortez et al. (2009), who suggest that most studies were conducted in the US market. It is remarkable that four Anglo-Saxon countries, namely, the US, Canada, the UK and Australia are considered most in this research stream, although Europe has the largest share of the global SRI market (Eurosif, 2010).

TABLE IV

Frequency of effects (according to the domicile of the funds)

	Freq.	Percent	Cum.
Australia	27	5.30	5.30
Belgium	14	2.75	8.06
Canada	49	9.63	17.68
Europe	14	2.75	20.43
France	8	1.57	22.00
Germany	14	2.75	24.75
Germany/Austria/Switzerland	6	1.18	25.93
International	3	0.59	26.52
Ireland	8	1.57	28.09
Italy	7	1.38	29.47
Japan	8	1.57	31.04
Luxembourg	7	1.38	32.42
Malaysia	8	1.57	33.99
Netherlands	8	1.57	35.56
Norway	7	1.38	36.94
Singapore	7	1.38	38.31
Sweden	9	1.77	40.08
Switzerland	8	1.57	41.65
UK	33	6.48	48.13
UK/Sweden/Germany/Netherlands	4	0.79	48.92
US	260	51.08	100.00
Total	509	100.00	

5   Results

As mentioned above, in the first approach the dependent variable is dichotomised. The dummy variables *outperformance* and *underperformance* represent a significant

outperformance, respectively underperformance, of SRI funds compared with conventional funds.

Table V and VI present the results of the logit models with *underperformance* and *outperformance* as dependent variables and the independent variables as stated in Table I. In each case the first models do not include the variables on the number of funds in the primary studies because their inclusion reduces the number of the meta-regression observations strongly. The second models include all independent variables.

TABLE V

Results of the meta-regression with the dependent variable *underperformance* (logit model)

	(1)		(2)	
	Coef.	Std. Err.	Coef.	Std. Err.
Performance evaluation Jensen's Alpha	-0.007	0.048	-0.025	0.033
Performance evaluation Carhart's Alpha	0.002	0.047	-0.033	0.035
Conditional performance evaluation	-0.054	0.036	-0.026	0.029
Matching procedure	-0.047*	0.025	-0.093***	0.016
Number of authors	-0.054**	0.023	-0.076***	0.020
Survivorship bias consideration	-0.066***	0.024	-0.086***	0.013
US funds	-0.110***	0.023	-0.259***	0.015
Time period 1981-2000	-0.037	0.023	-0.023	0.027
Number of SRI funds			0.001***	0.000
Number of conventional funds			0.000***	0.000
Obs	470		369	
Log likelihood	-170.388		-96.126	
Pseudo R2	0.061		0.276	

This table shows the average marginal effects of the independent variables in decimal notation and the according standard errors. The dependent variable is *underperformance*, which takes the value 1 if the SRI funds in a study significantly underperform the conventional funds, *underperformance*=0 in all other cases.
* Coefficient is statistically significant at the 10% level.
** Coefficient is statistically significant at the 5% level.
*** Coefficient is statistically significant at the 1% level.

The results of Table V concerning the consideration of survivorship bias are consistent with H1. Model (1) and (2) find a (significant) lower probability of a significant underperformance of SRI funds if a study accounts for survivorship bias. The probability of a significant underperformance is on average approximately 7% (model (1)) and 9% (model (2)) smaller if a study considers the survivorship bias in comparison to not considering this bias (everything else being equal). Accordingly, Table VI shows a (significant) higher probability of a significant outperformance of SRI funds if a study accounts for survivorship bias.

The results of Table V and VI support H2. Effects, which investigate US SRI funds only, have a significant higher (lower) probability of a significant outperformance (underperformance) of SRI funds compared with effects that focus on funds of other countries.

Regarding H3, mixed evidence is found. The variable *time period 2001-2008* was chosen to be the benchmark category.[4] As can be observed from Table V, model (1) and (2) do not show a significant difference in the average probability of an underperformance between effects which have the biggest part of their sample period in 1981-2000 compared with effects that investigate the period 2001-2008. In contrast, Table VI shows significant differences. The average probability of a significant

outperformance of SRI funds is 9%, respectively 11% lower for effects that have the biggest part of their sample period in 1981-2000 compared with effects that have the biggest part of their sample period in 2001-2008. The results of Table VI are consistent with H3. However, the results of Table V are not. In order to support H3, Table V should show a significant higher probability of an underperformance of SRI funds for effects with an older sample period.

TABLE VI

Results of the meta-regression with the dependent variable *outperformance* (logit model)

| | (1) | | (2) | |
	Coef.	Std. Err.	Coef.	Std. Err.
Performance evaluation Jensen's Alpha	-0.012	0.053	-0.014	0.042
Performance evaluation Carhart's Alpha	0.027	0.049	0.060	0.043
Conditional performance evaluation	0.088	0.087	0.239***	0.091
Matching procedure	0.102**	0.046	0.047	0.047
Number of authors	-0.064**	0.028	-0.102***	0.026
Survivorship bias consideration	0.159**	0.073	0.162***	0.048
US funds	0.131**	0.054	0.252***	0.098
Time period 1981-2000	-0.086***	0.017	-0.108***	0.016
Number of SRI funds			0.001**	0.000
Number of conventional funds			-0.000**	0.000
Obs	470		369	
Log likelihood	-149.939		-104.854	
Pseudo R^2	0.221		0.333	

This table shows the average marginal effects of the independent variables in decimal notation and the according standard errors. The dependent variable is *outperformance*, which takes the value 1 if the SRI funds in a study significantly outperform the conventional funds, *outperformance*=0 in all other cases.
* Coefficient is statistically significant at the 10% level.
** Coefficient is statistically significant at the 5% level.
*** Coefficient is statistically significant at the 1% level.

The second approach, which can be seen as a 'robustness check', uses the dependent variable in its original form. Value 0 is taken if the SRI funds significantly underperform the conventional funds. Value 1 is taken if there is no significant performance difference, and value 2 if the SRI funds outperform their conventional peers significantly. Table VII shows the results of the multinominal logit model for the outcomes significant under- and outperformance of SRI funds.[5] Once again, the first model does not include the variables on the number of funds in the primary studies because their inclusion reduces the number of the meta-regression observations strongly. The second model includes all independent variables. The results regarding the survivorship bias consideration (H1) and domicile of the funds (H2) are absolutely in accordance with the results of the logit models. There is mixed evidence in the logit models concerning H3. The 'robustness check' does not reveal clear evidence in favour of H3 as well. There is not any significant higher probability of an underperformance of SRI funds for effects with a sample period between 1981-2000 compared with the benchmark category. In contrast, the probability of an underperformance of SRI funds for effects with an older sample period is on average significantly smaller than for effects with a newer sample period (first model). There is not any significant difference in the second model. This is clearly at odds with H3.

TABLE VII

Results of the meta-regression with the dependent variable *performance comparison* (multinominal logit model)

	(1)		(2)	
	Coef.	**Std. Err.**	**Coef.**	**Std. Err.**
underperformance				
Performance evaluation Jensen's Alpha	-0.004	0.049	-0.028	0.033
Performance evaluation Carhart's Alpha	0.003	0.047	-0.040	0.034
Conditional performance evaluation	-0.058*	0.034	-0.042	0.028
Matching procedure	-0.044*	0.026	-0.094***	0.015
Number of authors	-0.047**	0.023	-0.077***	0.020
Survivorship bias consideration	-0.067***	0.023	-0.087***	0.013
US funds	-0.107***	0.024	-0.262***	0.016
Time period 1981-2000	-0.040*	0.023	-0.022	0.027
Number of SRI funds			0.001***	0.000
Number of conventional funds			0.000***	0.000
outperformance				
Performance evaluation Jensen's Alpha	-0.011	0.053	-0.016	0.042
Performance evaluation Carhart's Alpha	0.028	0.049	0.062	0.044
Conditional performance evaluation	0.086	0.087	0.223**	0.090
Matching procedure	0.103**	0.046	0.069	0.049
Number of authors	-0.066**	0.028	-0.104***	0.025
Survivorship bias consideration	0.150**	0.073	0.171***	0.049
US funds	0.128**	0.054	0.231**	0.093
Time period 1981-2000	-0.088***	0.017	-0.113***	0.015
Number of SRI funds			0.001**	0.000
Number of conventional funds			-0.000*	0.000
Obs	470		369	
Log likelihood	-312.802		-197.473	
Pseudo R2	0.140		0.301	

This table shows the average marginal effects of the independent variables in decimal notation and the according
standard errors. The dependent variable is used in its original form (*performance comparison*) as described in the text.
* Coefficient is statistically significant at the 10% level.
** Coefficient is statistically significant at the 5% level.
*** Coefficient is statistically significant at the 1% level.

6   Conclusion

The aims of this paper are to give an overview of studies that compare SRI and conventional fund performance and to investigate the influence of selected primary study characteristics on the observed results (meta-regression).

Almost 75% of the performance comparisons (SRI with conventional funds) do not find any significant performance difference. A significant out- and underperformance is virtually found to the same degree. Furthermore, the most studied time period is 1991-2000. Additionally, most effects investigate funds of the US.

Significant evidence is found that the consideration of survivorship bias increases (decreases) the probability of a significant outperformance (underperformance) of SRI funds. Further evidence reveals that effects, which investigate US SRI funds only, have a higher (lower) probability of an outperformance (underperformance). The results of primary studies are sensitive to the time period of an effect but based on the results of this paper it is difficult to draw general conclusions on this variable.

Regarding the meta-level, future research might explore the influence of additional study characteristics. On the level of single studies, it may be reasonable for future studies to investigate funds of non-US countries because the number of effects, which

focus on single non-US countries, is small. This could be particularly interesting for European countries, as they have the largest share of the global SRI market (Eurosif, 2010). A further interesting topic could be the dissimilar attrition rates of SRI and conventional funds. To the best of my knowledge there has not been any study investigating this issue so far.

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[1] The domicile of the funds is explicitly considered, for example, by Renneboog et al. (2008b), who analyse funds of 17 countries. Survivorship bias is considered, for instance, by Bauer et al., who add back funds to their samples that were closed during their sample period. Sample period is studied, for example, in Gil-Bazo et al. (2010), who split the sample period in two subperiods and investigate if their results are driven by one part of their sample period.

[2] Basic information on the included studies can be found in the appendix. All 25 studies are included in the references.

[3] Unfortunately, not every study provides information on the sample period of all effects.

[4] For the empirical estimation, the dummy variables *time period 1981-1990* and *time period 1991-2000* are taken together because there are only eight observations in the first subperiod with information on all variables of the logit models. All of these observations have the identical outcome in the dependent variable, which would lead to a perfect collinearity with the intercepts of the regressions.

[5] The results of the outcome 'no performance difference' are not reported, but can be obtained from the author upon request.

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Appendix

Basic information on the included studies

Authors	Number of Effects	Publication year
Bauer, Derwall, Otten	6	2007
Bauer, Koedijk, Otten	30	2005
Bauer, Otten, Rad	11	2006
Bello	7	2005
Benson, Brailsford, Humphrey	42	2006
Bollen	15	2007
Chang, Witte	26	2010
Derwall, Koedijk	32	2009
Gil-Bazo, Ruiz-Verdu, Santos	97	2010
Goldreyer, Ahmed, Diltz	12	1999
Gregory, Matatko, Luther	6	1997
Gregory, Whitaker	6	2007
Hamilton, Jo, Statman	2	1993
Humphrey, Lee	8	2011
Kempf, Osthoff	2	2008
Koellner, Suh, Weber, Moser, Scholz	6	2007
Kreander, Gray, Power, Sinclair	7	2005
Kryzanowski, Ayadi, Ben-Ameur	36	2011
Liedekerke, Moor, Walleghem	6	2007
Mueller	3	1991
Renneboog, Horst, Zhang	132	2008
Sanchez, Sotorrio	8	2009
Spekl	6	2009
Statman	2	2000
Stenström, Thorell	1	2007
Total	509	