WORKING PAPERS IN RESPONSIBLE BANKING & FINANCE

Financial Performance, Costs, and Active Management of U.S. Socially Responsible Investment Funds

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WP Nº 16-011

3rd Quarter 2016

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Abstract

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Keywords

Socially responsible investing; Investment funds; Fund performance; Cost of investing. Active versus Passive; US.

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G11, G23, M14

1. Introduction

With socially responsible investment (SRI), investment opportunities are screened on the basis of environmental, ethical, social, and corporate governance (hereafter labelled as ESG) criteria (Renneboog et al., 2008a). SRI has experienced unprecedented growth over the last two decades: According to the Global Sustainable Investment Alliance (2014), global SRI assets reached $21.4 trillion at year-end 2013, representing more than 30% of total professionally managed assets. Hence, SRI has grown from a niche investment strategy to a major investment theme that is widely adopted by the investment community. In recent years, passively managed funds have come to the SRI scene, which had been traditionally dominated by active mutual funds (Bauer et al., 2005). The emergence of these passive SRI funds raises the question of how responsible investors should manage their investment: actively or passively. The essence of this question lies in the ability of active SRI fund managers to deliver superior performance in order to justify the higher expense ratios charged (see In et al., 2014). So far, the extant academic literature on SRI focuses mainly on the financial performance of SRI investments and compares their risk-adjusted returns to those of conventional investments (see Revelli and Viviani, 2015). However, the empirical findings obtained from these studies do not shed light on the value of active in relation to passive management of SRI funds, which is the specific purpose of our study.

The active versus passive fund management debate has been central to the investment management literature since the pioneering study of Jensen (1968). Over the years, scholars have acquired mixed evidence regarding the value of active fund management. The current consensus is that while there is evidence of skill and persistence for a subset of mutual fund managers, typical active funds do not produce persistent risk-adjusted excess return (i.e. positive alpha) after fees and, hence, average investors will be better off using passive strategies (Busse et al., 2014; Doshi et al., 2015). In recent years, this debate has been

reignited by the spectacular rise of passively managed funds, particularly in the form of index mutual funds and (passive) exchange-traded funds (ETFs). Together, these two fund types account for over $4 trillion in assets under management, constituting over 20% of all professionally managed assets in the US fund market (2015 Investment Company Fact Book). With more and more investors gravitating towards passive funds, academic studies have started to evaluate actively managed funds with reference to passively managed funds. For example, Berk and van Binsbergen (2015) argue that actively managed funds should be benchmarked against the sets of investable index mutual funds available to investors instead of against an after-fee alpha of zero. However, actively managed SRI funds have not been put under the same level of scrutiny. Our aim is to fill this gap in the literature as the findings for conventional funds may not be applicable to SRI funds owing to the fundamental differences between responsible and conventional investing. This especially relates to the production of additional non-financial information in the case of SRI compared to conventional investing (Renneboog et al., 2008).

Next to the more conventional financial analysis of assets, SRI funds also give consideration to non-financial factors (i.e. social, ethical environmental and governance), and employ various norms- and values-based screens for stock selection (Scholtens, 2014). This additional dimension of the financial intermediation process makes it hard to attribute any abnormal fund returns solely to superior managerial skills as they also could be the result of more extensive screening. This might have been the main reason as to why the academic literature so far did not ask the 'active versus passive management' question within the context of SRI. However, we think this question should be asked as, as we will show, passive SRI funds are highly similar to active SRI funds. Therefore, in our perspective, they provide an ideal set-up to discern whether active SRI fund managers possess any skills over the supposedly unskilful passive SRI fund managers.

The value of active management has been thoroughly examined in the investment literature. The academic opinion on this issue revolves around the evidence incorporating either new data or improved measurement technology (Busse et al., 2010). The more dominant view is that the typical actively managed fund underperforms the benchmark return, and is costly net of fees and expenses, leading to the conclusion that investors are better off with passive investments (see, for example, Gruber, 1996; Carhart, 1997; Malkiel, 2003; Busse et al., 2010; French, 2008; Fama and French, 2010; Busse et al., 2014). However, researchers usually come to this conclusion without explicitly considering passively managed funds. They assume that passive funds are available and ignore the cost of passive investing. More recent studies seek to remedy this by pooling both active and passive funds for empirical analysis. As such, Dyck et al. (2013) find that active management underperforms passive management in the US but that it does outperform outside the US, specifically in emerging markets. Del Guercio and Reuter (2014) show that actively managed funds sold through brokers underperform index funds but those sold directly to investors do not.

Despite the ample findings for conventional funds, the value of active management has not been a contentious issue for SRI funds so far. Most SRI fund studies to date have been devoted to the comparison between SRI funds and conventional funds (Capelle-Blancard and Monjon, 2012). In this respect, most studies establish that SRI funds do not perform worse than their conventional counterparts (Hamilton et al., 1993; Statman, 2000; Bauer et al., 2005; Kreander et al., 2005; Bello, 2005; Derwall and Koedijk, 2009). By showing that the pursuit of non-financial goals does not compromise financial performance, these studies provide assurance to existing investors of SRI funds and also make a strong case for prospective investors to steer their capital towards SRI. But these findings give no indication as to whether active SRI managers actually possess skills. This is because the performance analysis conducted in these studies jointly tests the performance of the SRI assets and the quality of

the fund management. Therefore, one cannot effectively separate the role of SRI themes and the skills of fund managers in achieving the documented performance. To address this issue, studies have used SRI indices (e.g. Schröder, 2007) or hypothetical portfolios (e.g. Kempf and Osthoff, 2007) to show performance differences between SRI and conventional investments (if any). However, passively managed SRI funds were not featured in these studies.

The issue of active versus passive management is of interest to investors and has important implications for the competitive landscape of the SRI fund industry (see In et al., 2014): Active SRI funds do not only charge higher management fees than passive SRI funds but also than otherwise similar active conventional funds. Between active SRI funds and active conventional funds, the higher management fees of active SRI funds usually are being justified on the basis of the additional costs of implementing SRI strategies. However, if the portfolio holdings between the two types of funds are not clearly distinguishable, SRI funds are simply conventional funds in disguise and there would be no economic rationale for any difference in their fees. This issue was highlighted by Bello (2005) who finds that SRI funds do not significantly differ from conventional funds in terms of assets held, portfolio diversification, and investment performance. Van Duuren et al. (2016) also contend that responsible investing is highly similar to fundamental investing as it is characterized by a strong need for company specific information. Nitsche and Schröder (2015) oppose this perspective by suggesting that SRI funds are not conventional funds in disguise but do actually exhibit a significantly more weight on companies with relatively high ESG ratings.

Between active and passive SRI funds that both achieve the social objectives of investors, the excess management fees imposed by active SRI funds can be regarded as a premium for an active management style. If active management does not deliver better fund performance, rational investors would switch to low-cost passive funds and this process

would ultimately drive down the cost of investing in active SRI funds. In the conventional fund literature, Cremers et al. (2016) find that explicit indexing improves competition in the mutual fund industry. In particular, indexed funds force active funds to be more active and charge lower fees for active management (Cremers et al., 2016). Therefore, we think it is important to conduct a systematic comparison between active and passive SRI funds with regards to expense ratios and active management. To this extent, we specifically will address three questions: 1. Do the financial performance and investment styles of actively managed SRI funds significantly differ from their passively managed counterparts? 2. How do expense ratios differ between actively managed and passively managed SRI funds and what impact do they have on fund performance? 3. To what extent do SRI funds actively manage their portfolios? By answering these questions, we first expand the SRI fund literature by considering passive SRI funds, which seem underresearched in this respect. Second, we accentuate the analytical value of passive SRI funds by comparing them with active SRI funds in a systematic manner. This will help us understand the relative merits between the two groups of SRI funds with contrasting management styles, and will also allow us to assert if active SRI fund managers add value to the investment process. Third, the comparison between active and passive SRI funds informs the wider debate of active versus passive fund management. In all, we hope to complement the financial intermediation literature by investigating how non-financial (ESG) information impacts key aspects of financial intermediation.

We conclude that there is limited evidence that active SRI funds outperform passive SRI funds at both individual and aggregate levels. Only in the case of specialist thematic SRI funds we find that active management significantly outperforms a passive investment strategy. Furthermore, we obtain evidence that some active SRI funds appear to operate as 'closet indexers' with low degrees of active management. These findings suggest that in the US,

passively managed SRI funds can be regarded as proper alternatives for actively managed SRI funds. We highlight the lack of transparency for some of the active funds regarding their SRI strategies and selection criteria. Moreover, we have ground to be sceptical of active SRI funds that benchmark their performance to mainstream non-SRI indices as this practice may not reflect fund performance in an appropriate manner.

The remainder of this paper is structured as follows. Sections 2 introduces the data, develops hypotheses, and describes the research methods used. In Section 3 we present and discuss our results. Section 4 concludes the paper.

2. Material and methods

The SRI funds used for our empirical analysis are identified through the Bloomberg Fund Search Engine and the US Forum for Sustainable and Responsible Investment (US SIF). We take all the SRI mutual funds displayed on the US SIF website as of November 2015 (www.ussif.org) and further augment this fund list by screening US mutual funds and ETFs with the attributes of being ethical, environmental, social, and governance related, socially responsible, religiously responsible, environmentally friendly, or clean energy and clean technology focused from Bloomberg. We limit our fund sample to equity funds, excluding fixed-income balanced, and money market funds for which passive funds do not exist. To mitigate the survivorship bias, we include inactive equity funds in our search. Applying the criteria mentioned above, these two sources combined result in 170 funds in total. We then obtain the month-end closing total return indices for all available share classes of each fund for the period from December 2004 to December 2015 and calculate their monthly returns. The sample period starts a month prior to the launch of the first ever (passive) SRI ETF (i.e. iShares MSCI USA ESG Select ETF) in the US so that the monthly return series covers the

whole operating history of this particular ETF and all the SRI ETFs incepted thereafter. To ensure meaningful regressions, we require the fund to have at least 24 monthly observations to avoid the incubation bias as documented by Evans (2010). This leaves us with 142 funds to analyse. Among these funds, there are 120 actively managed mutual funds, nine index mutual funds, twelve passive ETFs, and one active ETF. As for market status, 109 funds are still active while 33 funds ceased to exist by the end of the sample period.

Given the diversity in the investment strategy and geographic focus of SRI funds, we further arrange the sample funds into several sub-groups. With regards to the investment strategy classification, we split the sample SRI funds into a broad ESG fund group and a specialist thematic fund group. Here, the broad ESG funds are defined as those that derive their holdings from conventional market indices through SRI exclusion (negative screening) and/or best-in-class investing (positive screening). We classify ESG funds, socially responsible funds, environmentally responsible funds, and religiously responsible funds into this broad group. We then create sub-groups for environmentally responsible, religiously responsible, and ESG/socially responsible funds, respectively. Further, the specialist thematic funds have holdings highly biased towards certain industry sectors. As such, the sample funds with focus on renewable energy, clean technology, or climate change are classified as specialist thematic funds. We also recognise the importance of distinguishing between domestic funds and international funds since later in the analysis we find that many funds in the sample display non-trivial levels of foreign exposure. Instead of relying on external sources, we will use the fund's loading on foreign exchange exposure to determine if it should be classified as domestic or international. This approach will be articulated in the analysis in section 2.1. Table 1 gives a summary of the number of funds in each group or sub-group. A list of all sample funds is provided in Appendix A.

Table 1. Number of Active and Passive SRI Funds in the Eight Classified Fund Groups

Fund Group	Active funds	Passive funds
Group 1 – All funds	121	21
Group 2 – All broad ESG funds	114	11
Group 3 – Environmentally responsible funds	16	0
Group 4 – Religiously responsible funds	25	2
Group 5 – ESG and socially responsible funds (all)	73	9
Group 6 – ESG and socially responsible funds (domestic)	50	6
Group 7 – ESG and socially responsible funds (international)	23	3
Group 8 – Specialist thematic funds	7	10

To address the questions set out in the introduction, our research design is divided into three parts: we first analyse the risk-adjusted return of sample funds by controlling for well-known investment styles; second, we compare the expense ratios between active funds and passive funds and examine how they affect fund performance; and, third, we quantify the level of active management and relate this to fund performance and expense ratio. In the remainder of this section, we develop our hypotheses and delineate the research method for each analysis in turn.

2.1. *Risk-Adjusted Return and Investment Styles*

Investors chose active management in anticipation of excess risk-adjusted returns (i.e. positive alpha) on their investments. The success of active management depends crucially on the efficiency of the underlying market. Since our sample SRI funds invest primarily in the highly efficient US markets, there will be few opportunities for active managers to exploit. As such, we expect only a small number of active SRI funds to generate significant positive alphas. Given the theoretical foundations for the underperformance of SRI funds and the overwhelming empirical evidence that SRI funds perform either on par or worse than

conventional funds (Renneboog et al., 2008; Revelli and Viviani, 2015), there may be more SRI funds with negative alphas than with positive alphas if their returns are benchmarked against non-SRI market indices or portfolios. An efficiently managed passive fund should neither outperform nor underperform the passive benchmark return. If the underperformance hypothesis holds for SRI funds, the alpha estimates for passive SRI funds may be either statistically insignificant or slightly negative. Because active management is a zero-sum game (before costs), any positive alphas generated by some funds are balanced by negative alphas of other funds (Fama and French, 2000; Malkiel, 2003). The average alpha of active SRI funds is likely to be similar to that of passive SRI funds but with higher dispersion. With regards to investment styles, on the grounds that both active and passive SRI funds are meant to serve the same broad spectrum of clientele, we do not expect any significant differences in their loadings to well-known investment styles (i.e. size, book-to-market, and momentum).

We will want to employ the Carhart (1997) four-factor regression model as the primary tool to investigate the risk-adjusted return and investment styles of sample funds. This is in line with other impactful SRI studies (e.g. Bauer et al., 2005; Kempf and Osthoff, 2007; Renneboog et al., 2008b) that favour the Carhart model over CAPM and Fama-French three-factor models. Further, as many of our funds also invest outside the US, their risk exposure to foreign equities needs to be captured. To this extent, and following Elton et al. (1993), we augment the standard Carhart model with a foreign factor that is the orthogonalized international equity market return from the US market return. The model specification is given as:

$$r_{p,t} - r_{f,t} = \alpha_p + \beta_{mkt}(r_{m,t} - r_{f,t}) + \beta_{intl}or_{intl,t} + \beta_{smb}r_{smb,t} + \beta_{hml}r_{hml,t} + \beta_{mom}r_{mom,t} + \varepsilon_{p,t} \qquad (1)$$

where $r_{p,t} - r_{f,t}$ is the excess return of the fund over the risk-free rate (i.e. the one-month Treasury bill rate) in month t, $r_{m,t} - r_{f,t}$ is the excess return on the US market, $or_{glo,t}$ is the

orthogonalized global market return, $r_{smb,t}$, $r_{hml,t}$, and $r_{mom,t}$ are the size, book-to-market and momentum factors; the factors and risk-free rate are taken from Kenneth French's website. α_p is the risk-adjusted return; β_{mkt}, β_{glo}, β_{smb}, β_{hml}, and β_{mom} are the factor loadings on the market premium, the orthogonalized global market return, size, book-to-market, and momentum factors, respectively; ε_p represents the idiosyncratic return.

Cremers et al. (2012) show that standard Fama-French and Carhart models produce economically and statistically significant nonzero alphas even for passive benchmark indices. Therefore, as a matter of robustness, we will also use the factor model proposed by Cremers et al. (2012), which uses common market indices (we will refer to it as the Cremers model hereafter). The index-based factors are constructed as per the definitions provided on Antti Petajisto's website and the index total returns are downloaded from Bloomberg. This alternative model reduces alphas for passive funds and yields less tracking error volatility when used to explain actively managed mutual fund returns. The regression results at the fund level should provide us with a general impression of SRI funds' financial performance and their preferred investment styles. We hypothesize that active SRI funds will display more significant alphas in either direction than passive ones, but that they will be rather similar in terms of their investment styles.

2.2. *Expense Ratio and Fund Performance*

The expense ratio measures the annual operating costs of running a fund as a percentage of the fund's net assets. The cost of investing is a crucial factor to consider in making any investment decision as it impacts the net return on investment. The costs of investing in active SRI funds can be divided into the universe selection costs and the costs of active management. The universe selection costs are higher for SRI than with conventional investing due to the lack of organised, standardised and verified information systems for ESG

characteristics of companies (Scholtens, 2014). Therefore, SRI funds are subject to higher expense ratios than otherwise similar conventional funds.

Active funds have higher expense ratios than passive funds and SRI funds are no exception to this. Investors of active funds accept higher expense ratios in their anticipation of managerial skills. The cost of active investing in the US fund market has a.o. been studied by French (2008), who finds investors sacrificed on average 0.67% return per year in their search for superior returns during the period 1980-2006. So far, the premium for investing in active SRI funds over passive ones has not been quantified and whether such premium can be justified by managerial skills is a question we will address in this study.

Given that the fund total returns used in equation (1) are net of expenses, the alpha estimates will be dwarfed by the expense ratio. However, a skilled active fund manager should deliver risk-adjusted returns that partially or fully absorb the management fees and expenses. Passive fund managers are expected to slightly underperform because of fund expenses and the underperformance should be fully explained by the expense ratio. To verify these claims, we conduct two tests. Test 1 is the outperformance test specified as:

H_0: $\alpha_p = -$ *Expense Ratio$_p$/12*

H_1: $\alpha_p > -$ *Expense Ratio$_p$/12*

where α_p is the (monthly) alpha from the factor model for fund p, *Expense Ratio$_p$* is the annual expense ratio for fund p. The rationale behind this test is that if the fund manager has skills, the fund should be able to generate a positive alpha on gross return. The alpha on net return, though it may be negative, should be greater than zero if we add the expense ratio. For active SRI funds, we expect to reject of the null hypothesis. For passive SRI funds, we don't expect doing so. Test 2 is the underperformance test specified as:

$H_0: \alpha_p = - \text{Expense Ratio}_p/12$

$H_1: \alpha_p < - \text{Expense Ratio}_p/12$

For this second test, if the null hypothesis is rejected in favour of the alternative, the fund performs worse than what is expected in the presence of the expense ratio. For active SRI funds, this implies that managers are destroying value. For passive funds, this implies they have not been doing a proper job in tracking the underlying benchmark index. This test will help us to detect underperforming SRI funds.

2.3. Level of Active Management

The level of active management exhibited by a fund is another important consideration for fund selection, as it is closely associated with the costs of investing and, eventual, with performance. Active management requires a higher level of research and/or portfolio turnover that will push up fund expenses. We expect the expense ratio to increase in tandem with the level of active management. The main objective of active management is to achieve higher alpha. Studies have shown that active management helps predict fund performance (Cremers and Petajisto, 2009; Amihud and Goyenko, 2013; Doshi et al., 2015). Despite the different ways being used to measure active management, all these studies demonstrate that higher active management leads to stronger fund performance. While a high level of active management is perceived as a desirable characteristic for actively managed funds, it is interpreted as a sign of poor index tracking ability for passively managed funds. Rather, a good performing passive fund is expected to display a minimal level of active management.

As the issue of active management has not been examined for SRI funds in the academic literature, initiating this line of empirical enquiry may bring a new perspective to the existing SRI literature. It can be argued that active management by SRI funds may not

only be motivated by alpha generation but also by the needs to maintain holdings eligibility to SRI standards. Despite this potential difference compared to conventional funds, we expect to see actively managed SRI funds display higher levels of active management than passively managed SRI funds which should have zero active management.

Basically, there are two types of measures for active management: holding-based and return-based measures. The holding-based measures look directly into the underlying holdings of the actual portfolio and quantify any holding difference between the actual portfolio and a reference portfolio. Examples of holding-based measures include the active share of Cremers and Petajisto (2009) and the active weight of Doshi et al. (2015). The return-based measures do not directly examine the underlying holdings but assume that any difference in the holdings between the actual and benchmark portfolios should be reflected in the return patterns. Examples of return-based measures include traditional tracking error measures, and the R^2 advocated by Amihud and Goyenko (2013), as developed by a.o. Miller (2005). To verify our conjecture that actively managed SRI funds have a higher level of active management than passive ones, we compute two return-based measures of active management for our sample funds.

The first active management measure used in this study is the tracking error (denoted *TE*) which is defined as the time-series standard deviation of $\varepsilon_{p,t}$ from the regression below:

$$r_{p,t} - r_{f,t} = \alpha_p + \beta_p\left(r_{b,t} - r_{f,t}\right) + \varepsilon_{p,t} \tag{2}$$

where $R_{p,t} - R_{f,t}$ is the excess fund return, $R_{b,t} - R_{f,t}$ is the excess return of the fund's benchmark index. This 'continuous' version of the tracking error focuses on the volatility of the difference between the fund return and its benchmark index return while controlling for any β_p deviation from unity. The second measure is simply the R^2 of regression (2).

According to Amihud and Goyenko (2013), $1 - R^2$ measures selectivity by the fund manager, and lower R^2 significantly predicts better performance (see also Miller, 2005). This measure of active management has the advantage of being intuitive and easily calculable while bypassing the complexity of examining portfolio holdings of the fund and its benchmark index (see Cremers and Petajisto, 2009). We expect passive funds to have very low tracking errors and R^2's that are close to 1. Further, we expect active funds to have relatively high tracking errors and low R^2's.

3. Empirical Analysis

This section presents and discusses the empirical results obtained from the approaches delineated in the previous section, and is divided into three parts. The first part interprets the alpha and beta estimates from the Carhart and the Cremers model for individual funds and for portfolios of classified fund groups. Further, comparisons are made between active and passive SRI funds. The second part investigates the outperformance and underperformance estimations. The third part analyses the measures of active management.

3.1. *Risk-Adjusted Return and Investment Styles*

We begin the empirical analysis by estimating the modified Carhart model and the alternative Cremers model on each fund's total return. We use Newey and West standard errors that are robust to heteroscedasticity and autocorrelation. For funds with multiple share classes which typically differ only in the fee structure and the target clientele (i.e. retail and institutional investors), we calculate the total net assets (TNA) weighted average returns across fund classes.

The regression results at the fund level should give us a general impression of SRI funds' financial performance and their preferred investment styles. Regardless of which model is

used, we hypothesized active SRI funds to display more significant alphas in either direction than passive SRI funds. Further, we hypothesized the two groups to be broadly similar in terms of their investment styles. Due to the large number of funds, we do not tabulate the regression results for each individual fund (the detailed regression results are available upon request). We focus on the summary statistics for the alpha and factor loadings which are obtained from both the Carhart and Cremers models and are displayed in Table 2.

Table 2. Comparison of Factor Loadings from the Carhart and the Cremers Models

Factor	Model	Mean	Min.	1st Quartile	Median	3rd Quartile	Max.
α	Carhart	-0.398	-3.614	-0.427	-0.241	-0.145	0.509
	Cremers	-0.264	-2.973	-0.302	-0.123	-0.017	0.843
β_{mkt}	Carhart	1.073	0.541	0.962	1.025	1.112	2.197
	Cremers	1.049	0.560	0.936	1.000	1.118	2.159
β_{glo}	Carhart	0.340	-0.262	0.028	0.151	0.643	1.790
	Cremers	0.334	-0.216	0.018	0.149	0.653	1.713
β_{smb}	Carhart	0.250	-0.230	-0.002	0.128	0.449	1.310
	Cremers	0.341	-0.121	0.095	0.216	0.529	1.284
β_{hml}	Carhart	-0.058	-0.626	-0.195	-0.036	0.062	0.580
	Cremers	-0.183	-1.269	-0.370	-0.135	-0.025	0.481
β_{mom}	Carhart	0.005	-0.415	-0.039	0.015	0.044	0.327
	Cremers	-0.018	-0.284	-0.051	-0.010	0.030	0.263
R^2	Carhart	0.905	0.623	0.879	0.930	0.958	0.993
	Cremers	0.912	0.678	0.892	0.933	0.960	0.995

Notes: the summary statistics are calculated based on factor loadings from all sample funds.

The factor loadings in Table 2 show that both factor models produce broadly similar market beta (β_{mkt}) and foreign market exposure (β_{glo}). The sample funds appear to have average market betas of approximately one and moderate exposure to foreign equities (i.e. an average factor loading of about 0.33 for β_{glo}). The discrepancies between the two models relate to the other factors in that the alpha (α) and the size premium (β_{smb}) from the Carhart model is systematically downward biased compared to those of the Cremers model and that the reverse pattern is found for the value premium (β_{hml}) and the momentum factor (β_{mom}).

Despite these differences in the magnitude of factor loadings, the two models arrive at quite similar conclusions about the investment styles adopted by the SRI funds. It appears these funds are predominantly oriented towards small-cap companies, despite the fact that a number of funds label themselves as large-cap funds. Less than one third of the funds have positive exposure to the book-to-market factor, many of which are explicit value funds. This is consistent with existing empirical evidence that SRI funds are gravitated more towards growth stocks and that they are less value-oriented (Bauer et al., 2005). There is no evidence that SRI funds load heavily on the momentum strategy. In terms of the model goodness of fit, the average R^2 produced by both models is above 0.90.

To compare active and passive SRI funds, we now sort the sample funds into four groups on the basis of their management style (i.e. active or passive) and their investment theme (i.e. broad ESG or specialist thematic, see Table 1). Table 3 reports the performance and risk loadings for these four classified fund groups – Panel A presents the summary statistics of the alphas and Panel B shows the average factor loadings from both Carhart and the Cremers models. As stated before, we expect active SRI funds to produce alphas of higher magnitudes in both directions than passive SRI funds, but the average alpha generated by the two types of funds should be similar. This claim is verified by comparing the mean and standard deviation of the alpha for the passive and active funds. In terms of investment styles, we expect similar loadings on the risk factors (i.e. betas) between the passive and active fund groups.

Table 3. Factor Loadings for Active and Passive / Broad ESG and Specialist Thematic SRI Funds

| | Broad ESG | | | | Specialist Thematic | | | |
| | Active | | Passive | | Active | | Passive | |
	Carhart	Cremers	Carhart	Cremers	Carhart	Cremers	Carhart	Cremers
Panel A: Summary Statistics for α								
Minimum	-1.366	-0.745	-0.443	-0.374	-1.629	-1.407	-3.614	-2.973
Median	-0.227	-0.103	-0.240	-0.102	-1.196	-0.971	-1.461	-1.201
Maximum	0.509	0.843	-0.054	0.040	-0.164	-0.120	-0.526	-0.413
Mean	-0.252	-0.116	-0.265	-0.131	-0.991	-0.806	-1.788	-1.490
Std. Dev.	0.250	0.225	0.130	0.111	0.561	0.480	1.070	0.868
No. of funds	114		11		7		10	
No. of positive α								
At 10%	1	5	0	0	0	0	0	0
At 5%	1	4	0	0	0	0	0	0
At 1%	0	1	0	0	0	0	0	0
No. of negative α								
At 10%	57	28	10	5	5	5	9	9
At 5%	43	20	9	4	5	4	9	8
At 1%	27	9	7	1	4	3	4	3
Panel B: Mean Factor Loadings for βs and R^2								
β_{mkt}	1.016	0.991	1.044	1.033	1.230	1.211	1.649	1.615
β_{glo}	0.255	0.252	0.250	0.247	0.751	0.747	1.156	1.104
β_{smb}	0.225	0.322	-0.043	0.083	0.418	0.415	0.762	0.799
β_{hml}	-0.033	-0.144	0.000	-0.096	-0.190	-0.279	-0.291	-0.618
β_{mom}	0.003	-0.022	-0.029	-0.040	0.052	0.041	0.033	0.010
R^2	0.917	0.923	0.963	0.971	0.821	0.834	0.760	0.778

Notes: Panel A presents the summary statistics for the alpha estimates generated by the Carhart and the Cremers models for the four labelled groups of funds; Panel B presents the average beta estimates for the four groups of funds.

Table 3 shows that for broad ESG funds, the difference in average alphas for active and passive funds is almost unnoticeable, yet the standard deviation of the alphas for the active funds is twice as large as that for the passive ones. Such high dispersion of alpha implies that an investor will take higher risk in the pursuit of superior performance if she randomly selects an active broad ESG fund to invest in. The bottom portion of Panel A reveals that only five active funds yield positive alphas at a 10% significance level using the Cremers model, and that this number is reduced to one if the Carhart model is used. As expected, none of the passive funds were able to produce positive alphas. Much to our surprise is the high

proportion of both active and passive SRI funds with significantly negative alphas: Half of the active broad ESG funds and nearly all passive broad ESG funds significantly underperform the benchmarks at a 10% level under the Carhart model and these proportions are halved if the Cremers model is considered. As to the risk factors, it appears that active funds and passive funds have almost identical average loadings on all factors except that passive funds are more neutral to size factor as opposed to active funds that tend to load more heavily on small-cap stocks. The average R^2 is understandably higher for passive funds due to their index mimicking nature.

However, a completely different picture emerges for the specialist thematic funds. Here, the average performance of passive funds trails behind active funds by a sizable margin while having much higher exposure to market beta (β_{mkt}), foreign equities (β_{glo}), small-cap stocks (β_{smb}), and growth stocks (β_{hml}). All specialist thematic funds in the sample, whether actively or passively managed, fail to produce positive alpha. Moreover, the dispersion of negative alphas of the passive funds is double that of the active funds. In addition, the passive specialist thematic funds have lower R^2 compared to active ones. One possible explanation is that these passive funds are ETFs focusing on a single source of renewable energy, such as solar and wind energy, whereas their active mutual fund counterparts are much more diversified within the broader renewable energy and clean technology sector. Therefore, the two factor models employed may not be able to provide an adequate representation of funds with an inherent bias towards niche energy sectors. This issue will be revisited when we consider the tracking error (in Section 3.3). By comparing the average performance of active and passive SRI funds, we conclude that the risk-averse investor should not choose a random active broad ESG fund over a random passive one. Further, we may conclude that although there are no comparable conventional funds featured in our analysis, the sheer number of SRI

funds with negative alphas and the extent to which they underperform supports the underperformance hypothesis of Renneboog et al. (2008b).

Next, we form pairs of equal-weighted portfolios of comparable active and passive SRI funds according to the fund group classification outlined in Table 1. This allows us to examine whether active SRI funds in aggregate outperform their passive counterparts. As mentioned earlier, we rely on the foreign factor loading to determine if a fund qualifies as a domestic or as an international fund. We require the magnitude of the foreign factor (i.e. β_{glo}) to be 0.20 or higher. This threshold value is close to the minimal factor loading we observe for most of the self-claimed international SRI funds in the sample while being well above the median value for sample funds. Applying this rule results in 65 funds with significant foreign exposure, with several funds with the label 'domestic' are being re-classified as international funds and vice versa (see Appendix A). Furthermore, we find that all specialist thematic funds, and the majority of environmentally responsible funds have significant foreign exposure. ESG/socially responsible and religiously responsible fund groups have balanced mix of domestic and international funds. Further, due to the absence of passive environmentally responsible funds, we have to discard this Group 3. This leaves us with seven matched pairs of portfolios to be compared. In line with previous studies (Bauer et al., 2005; Renneboog et al., 2008b), we compute the factor loadings for the return differences between actively and passively managed funds. The factor loadings from the Cremers model are presented in Table 4 (we also performed the estimations for the Carhart models, but these are qualitatively similar to those of the Cremers model and therefore not reported here; they are available upon request).

Table 4. Performance Comparison between Active and Passive SRI Fund Portfolios

		α	β_{mkt}	β_{glo}	β_{smb}	β_{hml}	β_{mom}	R^2
Group 1	Active	-0.173***	1.007***	0.248***	0.314***	-0.187***	-0.028***	0.992
	Passive	-0.764***	1.302***	0.579***	0.367***	-0.353***	-0.041	0.920
	Difference	0.591***	-0.295***	-0.331***	-0.053	0.166*	0.014	0.488
Group 2	Active	-0.142***	0.993***	0.219***	0.308***	-0.177***	-0.031***	0.994
	Passive	-0.190***	1.023***	0.158***	0.083***	-0.111***	-0.056***	0.991
	Difference	0.048	-0.030**	0.061**	0.225***	-0.066*	0.025*	0.553
Group 3	Active	-0.092**	0.940***	0.172***	0.338***	-0.193***	-0.010	0.987
	Passive	-0.204**	1.102***	0.406***	0.060	-0.095*	-0.063***	0.961
	Difference	0.111	-0.162***	-0.234***	0.277***	-0.098	0.053***	0.542
Group 5	Active	-0.138***	0.994***	0.195***	0.298***	-0.130***	-0.043***	0.993
	Passive	-0.196***	1.003***	0.091***	0.086***	-0.118***	-0.057***	0.989
	Difference	0.057	-0.009	0.104***	0.212***	-0.012	0.013	0.550
Group 6	Active	-0.098***	0.962***	0.014	0.349***	-0.130***	-0.047***	0.991
	Passive	-0.074***	0.995***	-0.062***	0.094***	-0.075***	-0.054***	0.991
	Difference	-0.023	-0.033**	0.076***	0.255***	-0.055	0.006	0.575
Group 7	Active	-0.147***	1.066***	0.649***	0.204***	-0.069***	-0.013	0.989
	Passive	-0.217**	1.029***	0.641***	0.071**	-0.132*	-0.013	0.972
	Difference	0.169*	0.039	0.022***	0.122	0.089	0.002	0.219
Group 8	Active	-0.500**	1.198***	0.730***	0.449***	-0.319***	0.029	0.879
	Passive	-1.359***	1.624***	1.274***	0.956***	-0.619***	0.061	0.808
	Difference	0.858***	-0.421***	-0.538***	-0.506***	0.306*	-0.029	0.490

Notes: this table presents alpha and beta estimates from the Cremers model for equally weighted active and passive SRI fund portfolios formed based on the group classification outlined in Table 1. Alpha and beta estimates are also reported for the return difference between the pair of comparable active and passive SRI portfolios. ***, **, and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 4 shows that the alphas are significantly negative for all portfolios and those for the passive fund portfolios are more negative than those for the active fund portfolios in six out of seven cases (Group 6 – domestic ESG and socially responsible funds being the exception). As such, this confirms the idea that active management adds value compared to passive management. However, our differentiation along the various SRI fund types shows that the differences in alphas are statistically indistinguishable from zero except those for Groups 1 and 8, and just marginally so for Group 7. In Group 8, the active specialist thematic fund portfolio significantly outperforms its passive counterpart. This outperformance is transmitted to Group 1, which pools broad ESG and specialist thematic funds. In Group 7, there is some evidence that the active international broad ESG fund portfolio outperforms the passive one. The result for Group 8 is consistent with the findings from the conventional fund

literature that active management tends to outperform passive management when the degree of market efficiency is not very high (Dyck et al., 2013). It suggests that liquidity and risk in the niche markets like solar, wind, biotechnology, etc. is quite different from that in mainstream markets and that the role of information is much more important.

Overall, active funds tend to outperform passive ones, but the performance differences between active and passive portfolios for SRI funds are subtle. This suggests that, for most SRI fund types, responsible investors would not be able to achieve significantly higher risk-adjusted returns by allocating their wealth equally across active SRI funds than if they were to do the same across passive SRI funds. However, this is clearly not the case with the specialist thematic funds where active management outperforms. To conclude, it appears that the more substantial differences between active and passive SRI investing relate to market exposure and investment style. Specifically, we find that actively managed fund portfolios tend to under-load market beta but to over-load the size factor relative to their passively managed counterparts.

3.2. *Expense Ratio and Fund Performance*

Recall that the regression results obtained in Section 3.1 are generated using fund returns net of expenses. We also want to understand how much expense ratios eat into fund returns and eventually impact risk-adjust performance. Given that institutional investors and retail investors face quite different expense ratios even for the same (mutual) fund, a fund may achieve its financial objective for one type of investors but not for another. We therefore have to treat the institutional investor share class and the retail investor share class of the same fund as separate funds. For mutual funds with multiple share classes, we select Class A share or Investor share to represent retail investor share class. Class I or Y share or

institutional class is used to represent institutional investor share class. This does not apply to ETFs, which do not operate multiple share classes and can be accessed by both institutional and retail investors for the same expense ratio. A comparison of average expense ratios for fund of different classifications is provided in Table 5.

Table 5. Comparison of Average Expense Ratios for SRI Funds

Fund Theme	Active Funds			Passive Funds		
	Institutional	Retail	ETF	Institutional	Retail	ETF
Broad ESG	0.944	1.352	0.950	0.497	0.862	0.500
	(82)	(92)	(1)	(9)	(9)	(2)
Specialist	1.298	1.481	–	–	–	0.652
Thematic	(4)	(7)				(10)

Notes: this table presents the average (annual) expense ratio for active and passive funds of two different SRI themes, namely, broad ESG and specialist thematic. The average expense ratios for the institutional and retail mutual fund classes are presented separately. Expense ratios are the last recorded expense ratios by the end of 2015. Numbers in parentheses are the number of funds used for calculation.

Table 5 suggests, first, that investors face much higher expense ratios if they choose actively managed SRI funds over passive funds. The differences amount to more than 0.40% per annum, which is in line with the findings of French (2008). Second, institutional mutual fund share classes on average have substantially lower expense ratios than retail ones. There are 74 mutual funds that operate both institutional and retail share classes in our sample, and the difference in expense ratio between the two share classes averages to 0.31%. Third, the expense ratios for ETFs seem to be highly identical with those for institutional mutual fund share classes, however, we only have a very small sample on which this comparison is based.

To examine the impact of the expense ratio on the fund's ability to achieve its financial objective, we re-estimate the factor models for each fund share class and then conduct the testing of the outperformance and the underperformance hypothesis as outlined in Section 2.2. The test results are summarised in Table 6.

Table 6. Summary of the Outperformance and Underperformance Hypothesis Tests

Fund Theme		Active Funds			Passive Funds		
		Institutional	Retail	ETF	Institutional	Retail	ETF
Broad ESG	Test 1	5	12	0	1	0	0
		(82)	(92)	(1)	(9)	(9)	(2)
	Test 2	11	13	0	2	2	0
		(82)	(92)	(1)	(9)	(9)	(2)
Specialist Thematic	Test 1	0	0	–	–	–	0
		(4)	(7)				(10)
	Test 2	4	4	–	–	–	7
		(4)	(7)				(10)

Notes: the number on top is the number of funds for which the null hypothesis of Test 1 or Test 2 is rejected at 5% level of significance (i.e. number of outperforming funds or underperforming funds); numbers in the parentheses are the total number of funds considered for the hypothesis tests; hypothesis tests are performed based on the alphas obtained from the Cremers model.

Turning first to broad ESG funds, Test 2 (underperformance) is rejected more often than Test 1 (outperformance) for active mutual funds, suggesting that there are more SRI funds underachieving their investment objectives than overachieving them. But the majority of active SRI mutual funds neither significantly underperform nor outperform the factor model after fees. As such, there is no strong evidence to suggest that retail investor share classes would perform any differently than institutional investor share classes. Out of nine passive funds, we find one rejection of Test 1 (outperformance) and two rejections of Test 2 (underperformance). None of the specialist thematic funds produces risk-adjusted returns net of the expense ratio. We find that the number of underperforming funds is disproportionately large for both active and passive specialist thematic funds compared to broad ESG funds. Regarding the findings for these performance tests, we are especially surprised about the lack of outperforming funds from the active fund pool. If the majority of the active SRI funds only manages to keep up with the expense ratio or even trails behind it, there is little justification to invest in these funds if investors do not hold any further insights into the capabilities of the fund's management.

3.3.   Level of Active Management

So far, we failed to gather persuasive evidence to support the superiority of active SRI funds over their passive counterparts as far as financial performance is concerned. Given the strong link between fund performance and active management documented in the conventional fund literature, this somewhat unsatisfactory performance of active SRI funds could be a result of inactive management. Therefore, we now turn our focus to the level of active management displayed by SRI funds.

Our two measures of active management are derived from the tracking error model specified in equation (2), which regresses the fund's excess return against its benchmark index's excess return. Appendix B present the results of this active management analysis for all funds and the summary statistics of these measures is provided in Table 7.

Table 7. Summary Statistics of Active Management Measures

Fund Theme		Active Funds				Passive Funds			
		Mean	Min.	Median	Max.	Mean	Min.	Median	Max.
Broad ESG	TE	1.518	0.143	1.384	3.982	0.868	0.297	0.800	1.638
	R^2	0.889	0.414	0.912	0.999	0.967	0.928	0.971	0.992
Specialist	TE	3.318	2.240	3.102	5.024	1.120	0.607	0.995	2.877
Thematic	R^2	0.776	0.570	0.788	0.933	0.986	0.962	0.990	0.996

Notes: this table presents the summary statistics of the two measures of the degree of active management (i.e. TE and R^2) calculated for the four groups of SRI funds.

Table 7 shows, as expected, that active SRI funds on average demonstrate higher levels of active management. In terms of mean tracking error volatility (*TE*), active funds almost doubled passive funds for the broad ESG fund category, and tripled them for the specialist thematic fund category. The R^2*'s* for all passive funds are understandably very close to 1, and

even the lowest is well above 0.90. The average R^2's for active funds are substantially lower, indicating greater selectivity. Further, the betas for passive SRI funds are invariably very close to unity. In contrast, there are a number of active funds whose betas deviate from unity in both directions and the deviations can be as large as ±0.50. The average alpha under the tracking error model becomes less negative and is only half the magnitude of the average alpha under the Cremers model and one third of that under the Carhart model. Despite the progressive shift in alpha, only eleven funds manage to beat their respective benchmark indices, evidenced by a statistically significant positive alpha. A further 28 funds significantly underperform the benchmark indices, with only two of these being passively managed funds. In light of the high variation in beta coupled with the lack of significantly positive alpha of active SRI funds, we infer that some active funds seem to have sought to increase nominal fund returns by persistently allocating fund capital to high-beta or low-beta stocks without adding any superior stock selection skills. For the specialist thematic funds, it is worth noting that the R^2's as well as the alphas of those that are passively managed improve substantially under the tracking error model. But such improvement does not necessarily hold true for active specialist thematic funds. This lends support to our earlier explanation of why multi-factor models do not do a better job explaining actively managed specialist thematic fund returns than passive ones. This seems to be due to the fact that active specialist thematic funds along with their benchmark indices are more diversified and less concentrated on a single sub-sector (e.g. solar or wind energy), with the result that they bear more resemblance with the factors in the Cremers and Carhart models.

Although there are noticeable differences in the level of active management between active SRI funds and passive SRI funds, the degree to which active SRI funds actively manage their portfolios may be overstated due to the methodology that has been employed. The accuracy of the tracking error for actively managed funds depends especially on the

identification of the benchmark index. An important issue arising from this feature is that many active SRI fund managers use mainstream non-SRI indices (e.g. S&P 500, Russell and MSCI family indices) to benchmark their performance, whereas most passive SRI funds by design are benchmarked to SRI indices. Please be reminded, as shown in the last column of Appendix A, that there are a total of 22 funds benchmarked to SRI indices. More specifically, eight out of 121 active SRI funds are benchmarked to SRI benchmark indices. For passive SRI funds, all twelve passive ETFs, and only two out of nine index funds are benchmarked to SRI indices.

For SRI funds benchmarked to conventional indices, the tracking errors are artificially higher as the funds often invest in a subset of their respective conventional indices due to screening. In this sense, a proportion of the active management measure may be attributed to passive screening strategies employed by SRI funds because passive screening will always lead to a difference in holdings between the fund portfolio and the (conventional) benchmark index, which would in turn manifest in the return-based measures of active management. Therefore, the 'true' level of active management by SRI funds tends to be overestimated. Active SRI funds may cite this overestimated level of active management to justify the higher expense ratios charged to investors. This is less of a problem for investors of passive SRI funds as high active management is a sign of poor tracking ability – a key measure of passive fund performance. Hence, it would be a better practice if active SRI funds benchmark their performance against comparable SRI indices. This will provide more accountability to investors as it will allow them to better gauge the value and skills added by the fund manager.

Another interesting finding is that 20 active funds in the sample display R^2's higher than the 75 percentile value (0.961) and 26 active funds have TE's lower than the 25 percentile value (0.946). Among the latter there are fourteen overlapping funds (these funds

are listed in Appendix C). In this respect, it might be the argued that these active funds are so-called 'closet indexers', which operate like index tracking (passive) funds but claim to be active. The expense ratios of these fourteen suspected 'closet' index funds averages to just above 1% for retail investors and to 0.6% for institutional investors, which both is lower compared to the averages for all active funds, but these ratios are higher compared to what passive funds charge their investors (see also Table 5). Furthemore, we find that the performance of these funds is very much on par with other explicit passive SRI funds in the sample. If the potential 'closet indexers' also happen to track non-SRI indices, there would be virtually no difference between the portfolio holdings of these funds and those of conventional funds. This issue has already been highlighted by Bello (2005), who finds SRI funds and conventional funds quite comparable in terms of performance and many other attributes including assets held, portfolio diversification, and stock picking ability, etc. As such, investors may be over-paying for active management and SRI strategies where none is actually being implemented by the fund manager. This finding echoes the claim by Schwartz (2003) that the ethical mutual fund industry is not always acting in a very ethical manner in this respect.

To further assess the potential linkage between the degree of active management and fund performance, we compute the cross correlations between TE, R^2, the alpha estimate from the Cremers model and its absolute value. In general, there are two potential interpretations of these correlations. First, active management is a necessary but not sufficient condition for a fund to outperform the benchmark return. However, unsuccessful active management will result in underperformance. In this sense, active management could affect fund performance in two different ways. First, the active management measures should be strongly correlated with the absolute value of alpha. Alternatively, it can be argued that incompetent active fund managers may revert to follow a benchmark index to avoid registering negative alpha. If this

is the case, we should see a positive correlation between active management and the nominal value of alpha. The results are presented in Table 8.

Table 8. Correlation between Active Management Measures and Alpha Estimates

	TE	R^2	α	$|\alpha|$
TE	–	-0.75	-0.20	0.53
R^2	-0.75	–	-0.14	-0.32
α	-0.39	0.04	–	–
$|\alpha|$	0.57	-0.24	–	–

Notes: this table presents the cross correlation between tracking error volatility (TE), R^2 of Eq.(2), and alpha estimate from Eq.(1). The figures reported in the top-right portion of the table are based on all sample SRI funds while the those reported in the lower-left portion of the table are based on active SRI funds only.

Table 8 shows that the two measures of active management share a correlation of -0.75, which implies that a fund with low tracking error volatility (*TE*) is likely to have a high R^2 or, phrased otherwise, has low selectivity. However, unlike some previous studies (Cremers et al., 2009; Amihud and Goyenko, 2013), we do not find a strong association between active management and fund performance. The correlation between *TE* and the absolute alpha amounts to a moderate 0.53, and the correlation between R^2 and $|\alpha|$ only stands at -0.32. Nominal alphas share weak negative correlation with both active management measures for all SRI funds. This correlation pattern does not vary if we only consider active SRI funds as shown in the lower left portion of Table 8.

One possible explanation for the weak relation is that SRI fund managers simply lack skills to deliver abnormal performance. Alternatively, one could argue that SRI fund managers engage in a high level of active management to keep their investments in line with the SRI criteria (i.e. non-financial performance) rather than to enhance financial return. However, SRI fund managers in fact hardly report about their ESG performance (Scholtens,

2014). Further, this alternative explanation is not in line with previous studies (Capelle-Blancard and Monjon, 2014).

Intermediaries that account for non-financial information may have higher agency costs than conventional funds because of the emphasis on screening. Our examination of active management demonstrates the agency problems that active SRI funds are prone to that result from this characteristic: inadequate performance benchmarks, 'closet indexing', and active management that does not enhance financial performance. Besides these problems, we also find that SRI strategies, particularly positive screening criteria, are not articulated by active SRI funds in an explicit and transparent manner to investors. Passive SRI funds are largely immune to these problems thanks to the explicit tracking of SRI indices, straightforward performance evaluation, and better transparency about SRI screening criteria and portfolio holdings. For example, investors can easily access the screening criteria of the SRI indices to which passive SRI funds are benchmarked, whereas such information for active SRI funds may not be publicly available to the same extent. Passive SRI ETFs also disclose their portfolio holdings on a daily basis – a feature that no other SRI mutual fund can rival. These characteristics, combined with their financial performance that is highly similar to active SRI funds, make them a strong competitive force in the SRI fund industry (see also In et al., 2014).

4.   Conclusion

Previous research into the growing socially responsible investment (SRI) fund industry has been concerned with whether SRI funds provide returns that are commensurate with their conventional counterparts (Renneboog et al., 2011; In et al., 2014). Motivated by the lack of attention on passive SRI funds and the ongoing active versus passive management debate, this paper contributes to the literature by comparing active and passive SRI funds in the US. We

investigate a sample of 142 US SRI funds for the period December 2004 – December 2015 with regards to the financial performance and cost of investing between active and passive SRI funds. We try to answer the following questions: Do the financial performance and investment styles of actively managed SRI funds significantly differ from their passively managed counterparts? How do expense ratios differ between actively managed and passively managed SRI funds and what impact do they have on fund performance? To what extent do SRI funds actively manage their portfolios?

We find that although active SRI funds are more expensive to invest in, there is no persuasive evidence of active SRI funds exhibiting superior financial performance over passive SRI funds. But the specialist thematic SRI funds exhibit positive and statistically significant alphas in the period we studied. In general, active and passive SRI funds do not differ in terms of risk-adjusted returns; the differences lie in their loadings for market beta and other investment styles. Under the assumption that responsible investors are able to derive similar levels of non-financial utility from investing in active and passive SRI funds, passive SRI funds would be preferred by risk-averse responsible investors due to their lower cost of investing and almost indistinguishable performance differential in relation to active SRI funds. With regard to fund performance in general, our findings are reminiscent of those claiming that active management does not pay (Fama and French, 2010). The net return alphas to investors are negative for most if not all active SRI funds and only a handful of funds deliver sufficient risk-adjusted returns to survive the expense ratios, which can be viewed as lack of skill of active fund managers.

We establish that active SRI funds in general exhibit much higher level of active management than their passive counterparts. However, a number of active SRI funds are exceptions to this observation and seem to be disguised as 'closet indexers' due to their low

level of active management as shown by low tracking error volatility (*TE*) and high R^2. Given that many of the active funds are benchmarked to conventional market indices, they may not be as different from conventional funds as investors may have assumed.

These findings seem to favour passive SRI funds as a rational choice by average responsible investor. However, it is puzzling that most invested capital in SRI still is in active mutual funds. One potential explanation, as suggested by Renneboog et al. (2011), is that investors of SRI funds are more concerned with ethical or social issues than with fund performance. They also find that (active) SRI funds with dedicated in-house research teams tend to attract more money flows. We establish that SRI funds that engage in high levels of active management do not necessarily produce higher financial performance than those with passive management. Further, disclosure about ESG performance of SRI funds is almost non-existent (Scholtens, 2014). Our findings also question the financial and non-financial fiduciary responsibilities of active SRI fund managers. Passive SRI funds to a large extent alleviate these concerns due to their rather simplistic nature and better transparency.

Our investigations are not without limitations. First, our comparison between active and passive SRI funds hinges on the critical assumption that responsible investors are able to derive similar levels of non-financial utility from investing in active and passive SRI funds. But SRI is a multi-faceted investment theme and responsible investors have various non-financial goals. Therefore, we deem it unlikely that existing passive SRI fund products can satisfy the social needs and preferences of all responsible investors. A possible avenue for future research, when data quality about non-financial performance significantly improves, could be to compare the non-financial attributes and performance for active and passive SRI funds. The results from such a study will complement our findings and shed further light on the substitutability of passive SRI funds for active ones. Further, as our study focuses on the

US, the results may not be easily generalizable to SRI funds residing in other countries. The US market is arguably the most efficient market in the world, which curtails the effectiveness of active management. We showed that they specifically add value in specialized themed funds which operate in more risky and less liquid market segments, which is in line with the findings of Dyck et al. (2013).

SRI is an interesting and noteworthy feature of modern financial intermediation that warrants academic study. Our findings regarding the financial performance, investment costs, and active management make a case for passive SRI funds in the US. We believe they deserve more attention from both responsible investors and SRI researchers. For investors, passive SRI funds represent an alternative means to invest in SRI and have the potential to improve the competition in the SRI fund industry. For researchers, passive SRI funds might serve as a better reference group than conventional funds in understanding the performance and other attributes of active SRI funds.

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Appendices

Appendix A. Operating Details of Sample SRI Funds

Fund Name	Management Style	Fund Type	Fund Classification	Inception Date	Geographic Focus	Benchmark Index
1492 Small Cap Growth Fund	Active	Mutual Fund	ESG	12/2011	U.S.	Russell 2000 Growth
Alger Green Fund	Active	Mutual Fund	Environmentally Responsible	12/2000	U.S.	Russell 3000 Growth
Alger Green Institutional Fund	Active	Mutual Fund	Environmentally Responsible	12/2000	U.S.†	Russell 3000 Growth
Allianz RCM Global EcoTrends Fund	Active	Mutual Fund	Environmentally Responsible	01/2007	International	FTSE Environmental Technology*
AllianzGI Global Water Fund	Active	Mutual Fund	Environmentally Responsible	03/2008	International	MSCI All Country World
Allied Asset Advisors Inc - Iman Fund	Active	Mutual Fund	Religiously Responsible	06/2000	International	Dow Jones Islamic Market US*
Amana Developing World Fund	Active	Mutual Fund	Religiously Responsible	09/2009	International	MSCI Emerging Markets
Amana Growth Fund	Active	Mutual Fund	Religiously Responsible	02/1994	International†	Russell 2000
Amana Income Fund	Active	Mutual Fund	Religiously Responsible	06/1986	International	S&P 500
American Beacon Small Cap Value II Fund	Active	Mutual Fund	ESG	11/2011	International†	Russell 2000 Value
American Century NT Core Equity Plus Fund	Active	Mutual Fund	ESG	12/2011	U.S.	S&P 500
American Israeli Shared Values Capital Appreciation Fund	Active	Mutual Fund	Religiously Responsible	12/2007	International	S&P 500
Appleseed Fund	Active	Mutual Fund	ESG	12/2006	U.S. †	S&P 500
AQR Tax-Managed Small Cap Momentum Style Fund	Active	Mutual Fund	ESG	01/2012	U.S.	Russell 2000
Ariel Appreciation Fund	Active	Mutual Fund	Socially Responsible	12/1989	U.S.	Russell Midcap Value
Ariel Discovery Fund	Active	Mutual Fund	Socially Responsible	01/2011	U.S.	Russell 2000 Value
Ariel Focus Fund	Active	Mutual Fund	Socially Responsible	06/2005	U.S.	Russell 1000 Value
Ariel Fund	Active	Mutual Fund	Socially Responsible	11/1986	U.S.	S&P 500
Ave Maria Catholic Values Fund	Active	Mutual Fund	Religiously Responsible	05/2001	U.S.	S&P 500
Ave Maria Growth Fund	Active	Mutual Fund	Religiously Responsible	05/2003	U.S.	S&P 500
Ave Maria Opportunity Fund	Active	Mutual Fund	Religiously Responsible	05/2006	U.S.	Russell 2000
Ave Maria Rising Dividend Fund	Active	Mutual Fund	Religiously Responsible	05/2005	U.S.	S&P 500
Ave Maria World Equity Fund	Active	Mutual Fund	Religiously Responsible	04/2010	International	S&P Global 1200
AXA Enterprise Socially Responsible Fund	Active	Mutual Fund	Socially Responsible	09/2000	International†	MSCI World
Azzad Ethical Fund	Active	Mutual Fund	Religiously Responsible	11/2000	International	Russell/Nomura MidCap

						Growth with Dividend
Azzad Ethical Income Fund	Active	Mutual Fund	Religiously Responsible	07/2000	U.S. †	S&P 500
Boston Common International Fund	Active	Mutual Fund	ESG	12/2010	International	MSCI EAFE
Brown Advisory Sustainable Growth Fund	Active	Mutual Fund	Environmentally Responsible	06/2012	U.S.	Russell 1000 Growth
Calvert Capital Accumulation Fund	Active	Mutual Fund	ESG	03/1988	International†	Russell Midcap Growth
Calvert Emerging Markets Equity Fund	Active	Mutual Fund	ESG	10/2012	International	MSCI Emerging Markets
Calvert Equity Income Fund	Active	Mutual Fund	ESG	10/2011	U.S.	Russell 1000
Calvert Equity Portfolio	Active	Mutual Fund	ESG	08/1987	International†	S&P 500
Calvert Global Alternative Energy Fund	Active	Mutual Fund	Specialist Thematic	05/2007	International	Ardour Global Alternative Energy*
Calvert Global Water Fund	Active	Mutual Fund	Environmentally Responsible	09/2008	International	Calvert Global Water Research*
Calvert International Equity Fund	Active	Mutual Fund	ESG	07/1992	International	MSCI EAFE
Calvert International Opportunities Fund	Active	Mutual Fund	ESG	05/2007	International	MSCI EAFE IMI
Calvert Large Cap Core Portfolio	Active	Mutual Fund	ESG	04/1998	U.S.	Russell 1000
Calvert Large Cap Value Fund	Active	Mutual Fund	ESG	12/1999	U.S.	Russell 1000 Value
Calvert Mid Cap Value Fund	Active	Mutual Fund	ESG	10/2004	U.S.	Russell Midcap Value
Calvert New Vision Small Cap Fund	Active	Mutual Fund	ESG	01/1997	U.S.	Russell 2000
Calvert Small Cap Fund	Active	Mutual Fund	ESG	10/2004	U.S.	Russell 2000
Calvert US Large Cap Core Responsible Index Fund	Passive	Mutual Fund	Socially Responsible	06/2000	U.S.	Calvert US Large Cap Core Responsible*
Camco Investors Fund	Active	Mutual Fund	Socially Responsible	08/2004	U.S.	S&P 500
Citizens Core Growth Fund	Active	Mutual Fund	Socially Responsible	03/1995	U.S.	S&P 500
Citizens Global Equity Fund	Active	Mutual Fund	Socially Responsible	02/1994	International	MSCI World
Citizens Small Cap Core Growth Fund	Active	Mutual Fund	Socially Responsible	12/1999	U.S.	Russell 2000 Growth
City National Rochdale Socially Responsible Equity Fund	Active	Mutual Fund	Socially Responsible	01/2005	U.S.	MSCI KLD 400 Social
Cortina Small Cap Growth Fund	Active	Mutual Fund	ESG	09/2011	U.S.	Russell 2000 Growth
DFA CSTG&E International Social Core Equity Portfolio	Active	Mutual Fund	Socially Responsible	08/2007	International	MSCI World Ex USA USD
DFA CSTG&E US Social Core Equity 2 Portfolio	Active	Mutual Fund	Socially Responsible	08/2007	U.S.	Russell 3000
DFA Emerging Markets Social Core Equity Portfolio	Active	Mutual Fund	Socially Responsible	08/2006	International	MSCI Emerging Markets
DFA International Sustainability Core 1 Portfolio	Active	Mutual Fund	Environmentally Responsible	03/2008	International	MSCI World
DFA International Value ex Tobacco Portfolio	Active	Mutual Fund	Socially Responsible	06/2008	International	MSCI World
DFA US Social Core Equity 2 Portfolio	Active	Mutual Fund	Socially Responsible	10/2007	U.S.	Russell 3000

DFA US Sustainability Core I Portfolio	Active	Mutual Fund	Environmentally Responsible	03/2008	U.S.	Russell 3000
Domini European Social Equity Portfolio	Active	Mutual Fund	ESG	10/2005	International	MSCI Europe
Domini International Social Equity Fund	Active	Mutual Fund	ESG	12/2006	International	MSCI EAFE
Domini PacAsia Social Equity Portfolio	Active	Mutual Fund	ESG	12/2006	International	MSCI EAFE
Domini Social Equity Fund	Active	Mutual Fund	ESG	06/1991	U.S.	S&P 500
Dreyfus Global Sustainability Fund	Active	Mutual Fund	ESG	12/2008	International	Dow Jones Sustainability World*
Dreyfus Premier Third Century Fund Inc	Active	Mutual Fund	ESG	03/1972	U.S.	S&P 500
DWS Clean Technology Fund	Active	Mutual Fund	Specialist Thematic	09/2007	International	MSCI World
Epiphany FFV Fund	Active	Mutual Fund	Religiously Responsible	01/2007	U.S.	S&P 500
Epiphany FFV Small Cap Fund	Active	Mutual Fund	Religiously Responsible	02/2008	U.S.	S&P 500
ESG Managers Aggressive Growth Portfolio	Active	Mutual Fund	ESG	01/2010	U.S. †	S&P 500
Eventide Gilead Fund	Active	Mutual Fund	ESG	07/2008	U.S. †	S&P 500
Fidelity New Millennium Fund	Active	Mutual Fund	ESG	12/1992	International	S&P 500
Fidelity Select Environment & Alternative Energy Portfolio	Active	Mutual Fund	Specialist Thematic	06/1989	U.S. †	MSCI World
First Trust Global Wind Energy ETF	Passive	ETF	Specialist Thematic	06/2008	International	S&P Global Wind Energy*
First Trust NASDAQ Clean Edge Green Energy Index Fund	Passive	Mutual Fund	Specialist Thematic	02/2007	U.S. †	NASDAQ Clean Edge Green Energy*
First Trust NASDAQ Clean Edge Smart Grid Infrastructure Index Fund	Passive	Mutual Fund	Specialist Thematic	11/2009	International	NASDAQ OMX Clean Edge Smart Grid Infrastructure*
Firsthand Alternative Energy Fund	Active	Mutual Fund	Specialist Thematic	10/2007	International	MSCI World
Gabelli SRI Fund Inc	Active	Mutual Fund	Socially Responsible	06/2007	U.S. †	MSCI World Free USD
GMO Tobacco-Free Core Fund	Active	Mutual Fund	Socially Responsible	10/1991	U.S.	S&P 500
Green Century Equity Fund	Active	Mutual Fund	Socially Responsible	06/1991	U.S.	MSCI KLD 400 Social*
Guggenheim Solar ETF	Passive	ETF	Specialist Thematic	04/2008	International	MAC Global Solar Energy*
Huntington EcoLogical Strategy ETF	Active	ETF	Environmentally Responsible	06/2012	U.S.	MSCI KLD 400 Social*
iShares Global Clean Energy ETF	Passive	ETF	Specialist Thematic	06/2008	International	S&P Global Clean Energy*
iShares MSCI KLD 400 Social ETF	Passive	ETF	ESG	11/2006	U.S.	MSCI KLD 400 Social*
iShares MSCI USA ESG Select ETF	Passive	ETF	ESG	01/2005	U.S.	MSCI USA ESG Select*
Leuthold Global Clean Technology Fund	Active	Mutual Fund	Specialist Thematic	07/2009	International	S&P 500
LKCM Aquinas Growth Fund	Active	Mutual Fund	Religiously Responsible	07/2005	U.S.	Russell 1000

LKCM Aquinas Small Cap Fund	Active	Mutual Fund	Religiously Responsible	07/2005	U.S.	Russell 2000
LKCM Aquinas Value Fund	Active	Mutual Fund	Religiously Responsible	07/2005	U.S.	Russell 1000
Market Vectors Global Alternative Energy ETF	Passive	ETF	Specialist Thematic	05/2007	International	Ardour Global Extra Liquid*
Market Vectors Solar Energy ETF	Passive	ETF	Specialist Thematic	04/2008	International	Market Vector Global Solar Energy*
MMA Praxis International Fund	Active	Mutual Fund	ESG	04/1997	International	MSCI All Country World Ex USA Local
Neuberger Berman Climate Change Fund	Active	Mutual Fund	Specialist Thematic	05/2008	International	MSCI World
Neuberger Berman Socially Responsive Fund	Active	Mutual Fund	Socially Responsible	03/1994	U.S.	S&P 500
New Alternatives Fund Inc/fund	Active	Mutual Fund	Specialist Thematic	09/1982	U.S. †	Russell 2000
New Covenant Growth Fund	Active	Mutual Fund	Religiously Responsible	09/1989	U.S.	S&P 500
Parnassus Asia Fund	Active	Mutual Fund	ESG	04/2013	International	MSCI EAFE
Parnassus Core Equity Fund	Active	Mutual Fund	ESG	08/1992	U.S.	S&P 500
Parnassus Endeavor Fund	Active	Mutual Fund	ESG	04/2005	U.S.	S&P 500
Parnassus Fund	Active	Mutual Fund	ESG	12/1984	U.S.	S&P 500
Parnassus Mid Cap Fund	Active	Mutual Fund	ESG	04/2005	U.S.	Russell Midcap
Parnassus Small Cap Fund	Active	Mutual Fund	ESG	04/2005	U.S.	Russell 2000
Pax Ellevate Global Women's Index Fund	Passive	Mutual Fund	Socially Responsible	10/1993	International	MSCI Daily TR Net World USD
Pax MSCI International ESG Index Fund	Passive	Mutual Fund	ESG	03/2008	International	MSCI Daily TR Net EAFE USD
Pax World Global Environmental Markets Fund	Active	Mutual Fund	Environmentally Responsible	03/2008	International	MSCI World
Pax World Growth Fund	Active	Mutual Fund	ESG	04/2007	International†	Russell 3000 Growth
Pax World Small Cap Fund	Active	Mutual Fund	ESG	03/2008	U.S.	Russell 2000
PowerShares Cleantech Portfolio	Passive	ETF	Specialist Thematic	10/2006	International	Cleantech*
Powershares Global Clean Energy Portfolio	Passive	ETF	Specialist Thematic	06/2007	International	WilderHill New Energy Global Innovations TR*
Powershares WilderHill Clean Energy Portfolio	Passive	ETF	Specialist Thematic	03/2005	U.S. †	ECO*
Praxis Core Stock Fund	Active	Mutual Fund	ESG	01/1994	U.S.	S&P 500
Praxis Growth Index Fund	Passive	Mutual Fund	ESG	05/2007	U.S.	S&P 500 Growth
Praxis International Index Fund	Passive	Mutual Fund	ESG	12/2010	International	MSCI All Country World Ex USA
Praxis Small Cap Fund	Active	Mutual Fund	ESG	05/2007	U.S.	Russell 2000
Praxis Value Index Fund	Passive	Mutual Fund	ESG	05/2001	U.S.	S&P 500 Value
Professionally Managed Portfolios - Portfolio 21	Active	Mutual Fund	Environmentally	09/1999	International	S&P 500

			Responsible			
Professionally Managed Portfolios - Women's Equity Fund	Active	Mutual Fund	Socially Responsible	10/1993	U.S.	S&P 500
RBB SAM Sustainable Climate Fund	Active	Mutual Fund	Environmentally Responsible	10/2007	International	MSCI World
SEI Institutional Investment Trust - Screened World Equity Ex-US Fund	Active	Mutual Fund	ESG	06/2008	International	MSCI All Country World Ex USA
Sentinel Sustainable Core Opportunities Fund	Active	Mutual Fund	ESG	06/1996	U.S.	S&P 500
Sentinel Sustainable Mid Cap Opportunities Fund	Active	Mutual Fund	ESG	02/1994	U.S. †	Russell Midcap Growth
Shelton Green Alpha Fund	Active	Mutual Fund	Environmentally Responsible	03/2013	International†	S&P 500
Sierra Club Funds - Sierra Club Equity Income Fund	Active	Mutual Fund	ESG	01/2003	U.S.	S&P 500
Sierra Club Funds - Sierra Club Stock Fund	Active	Mutual Fund	ESG	10/1998	U.S.	S&P 500
Steward Global Equity Income Fund	Active	Mutual Fund	Religiously Responsible	04/2008	International	S&P 500
Steward International Enhanced Index Fund	Passive	Mutual Fund	Religiously Responsible	02/2006	International	S&P ADR TR
Steward Large Cap Enhanced Index Fund	Passive	Mutual Fund	Religiously Responsible	10/2004	U.S.	S&P 500
Steward Small-Mid Cap Enhanced Fund	Active	Mutual Fund	Religiously Responsible	03/2006	U.S.	S&P 1000
TDAM Global Sustainability Fund	Active	Mutual Fund	Environmentally Responsible	03/2009	International	Dow Jones Sustainability World*
TIAA-CREF Social Choice Equity Fund	Active	Mutual Fund	ESG	07/1999	U.S.	Russell 3000
Timothy Plan Aggressive Growth Fund	Active	Mutual Fund	Religiously Responsible	10/2000	U.S.	Russell Midcap Growth
Timothy Plan International Fund	Active	Mutual Fund	Religiously Responsible	05/2007	International	MSCI EAFE
Timothy Plan Large/Mid Cap Growth Fund	Active	Mutual Fund	Religiously Responsible	03/1994	U.S.	Russell 1000 Growth
Timothy Plan Large/Mid-Cap Value Fund	Active	Mutual Fund	Religiously Responsible	07/1999	U.S. †	S&P 500
Timothy Plan Small-Cap Value Fund	Active	Mutual Fund	Religiously Responsible	03/1994	U.S.	Russell 2000
Tributary Growth Opportunities Fund	Active	Mutual Fund	ESG	11/1992	U.S.	Russell Midcap Growth
UBS International Sustainable Equity Fund	Active	Mutual Fund	ESG	06/1997	International	MSCI World
Vanguard FTSE Social Index Fund	Passive	Mutual Fund	ESG	05/2000	U.S.	FTSE4Good USA*
Walden Equity Fund	Active	Mutual Fund	ESG	06/1999	U.S.	S&P 500
Walden Midcap Fund	Active	Mutual Fund	ESG	08/2011	U.S.	Russell Midcap
Walden Small Cap Innovations Fund	Active	Mutual Fund	ESG	10/2008	U.S.	Russell 2000
Walden SMID Cap Innovations Fund	Active	Mutual Fund	ESG	06/2012	U.S.	Russell 2500
Wells Fargo Advantage Small/Mid Cap Core Fund	Active	Mutual Fund	ESG	12/2007	U.S. †	Russell 2500
Wells Fargo Advantage Social Sustainability Fund	Active	Mutual Fund	ESG	09/2008	U.S.	S&P 500
Wells Fargo Large Cap Core Fund	Active	Mutual Fund	ESG	12/2007	U.S.	S&P 500
Winslow Green Growth Fund	Active	Mutual Fund	Environmentally Responsible	05/1994	U.S. †	Russell 2000 Growth

			Environmentally	11/2007		
Winslow Green Solutions Fund	Active	Mutual Fund	Responsible		U.S. †	Russell Midcap Growth

Notes: Inception date is the month/year when the earliest share class of the fund was launched; In the 'Geographic Focus' column, funds marked with † are those whose geographic focus have been reclassified according to the magnitude of the foreign factor (β_{glo}) in the Cremers model; In the last column, SRI benchmark indices are marked with an asterisk.

Appendix B. Regression Outputs for Eq.(2) and Active Management Measures for Sample SRI Funds

Fund Name	α	β	TE	R^2
1492 Small Cap Growth Fund	-0.341	0.920	2.078	0.778
Alger Green Fund	-0.229*	1.021	1.182	0.945
Alger Green Institutional Fund	0.595***	1.055	1.454	0.766
Allianz RCM Global EcoTrends Fund	0.098	0.904	1.675	0.966
AllianzGI Global Water Fund	0.100	0.854	1.713	0.879
Allied Asset Advisors Inc - Iman Fund	-0.105	1.125	1.180	0.940
Amana Developing World Fund	-0.172	0.473	1.427	0.752
Amana Growth Fund	0.340**	0.622	1.728	0.806
Amana Income Fund	0.238**	0.773	1.322	0.861
American Beacon Small Cap Value II Fund	-0.006	0.937	1.309	0.871
American Century NT Core Equity Plus Fund	-0.048	0.991	0.680	0.950
American Israeli Shared Values Capital Appreciation Fund	-0.547*	1.023	2.497	0.843
Appleseed Fund	0.020	0.750	2.349	0.685
AQR Tax-Managed Small Cap Momentum Style Fund	0.122	1.020	0.935	0.948
Ariel Appreciation Fund	-0.152	1.132	1.675	0.922
Ariel Discovery Fund	-0.719**	0.992	2.198	0.801
Ariel Focus Fund	-0.210	1.038	1.602	0.898
Ariel Fund	-0.297	1.468	2.676	0.845
Ave Maria Catholic Values Fund	-0.340**	1.113	1.902	0.861
Ave Maria Growth Fund	0.060	0.957	1.629	0.862
Ave Maria Opportunity Fund	-0.360	0.773	2.342	0.788
Ave Maria Rising Dividend Fund	0.113	0.895	1.230	0.908
Ave Maria World Equity Fund	-0.333***	1.001	1.020	0.937
AXA Enterprise Socially Responsible Fund	-0.262	0.840	1.077	0.847
Azzad Ethical Fund	0.293	0.621	3.982	0.414
Azzad Ethical Income Fund	-0.147	1.095	2.166	0.852
Boston Common International Fund	-0.181**	0.949	0.931	0.951
Brown Advisory Sustainable Growth Fund	0.083	0.951	1.172	0.851
Calvert Capital Accumulation Fund	-0.135	0.935	1.593	0.902
Calvert Emerging Markets Equity Fund	0.502**	0.888	1.410	0.871
Calvert Equity Income Fund	-0.244*	0.904	0.866	0.905
Calvert Equity Portfolio	0.030	0.957	1.055	0.937
Calvert Global Alternative Energy Fund	-0.233	0.864	2.240	0.933
Calvert Global Water Fund	-0.184	1.009	1.434	0.930
Calvert International Equity Fund	-0.378**	1.032	1.930	0.887

Calvert International Opportunities Fund	0.127	0.962	1.531	0.930
Calvert Large Cap Core Portfolio	-0.179***	0.988	0.687	0.975
Calvert Large Cap Value Fund	-0.112	0.991	0.789	0.970
Calvert Mid Cap Value Fund	-0.200	0.863	1.628	0.911
Calvert New Vision Small Cap Fund	-0.591***	0.852	1.753	0.907
Calvert Small Cap Fund	-0.188	0.868	1.798	0.882
Calvert US Large Cap Core Responsible Index Fund	0.023	1.013	0.977	0.954
Camco Investors Fund	-0.448**	0.972	1.880	0.846
Citizens Core Growth Fund	-0.198	1.041	1.405	0.779
Citizens Global Equity Fund	-0.088	0.963	0.888	0.898
Citizens Small Cap Core Growth Fund	-0.098	0.933	1.492	0.881
City National Rochdale Socially Responsible Equity Fund	-0.074	0.985	1.488	0.887
Cortina Small Cap Growth Fund	-0.425	0.937	2.087	0.806
DFA CSTG&E International Social Core Equity Portfolio	0.279***	1.046	1.034	0.972
DFA CSTG&E US Social Core Equity 2 Portfolio	-0.145*	1.124	0.852	0.977
DFA Emerging Markets Social Core Equity Portfolio	0.024	1.016	1.192	0.973
DFA International Sustainability Core 1 Portfolio	0.008	1.042	0.727	0.986
DFA International Value ex Tobacco Portfolio	-0.152	1.144	1.249	0.967
DFA US Social Core Equity 2 Portfolio	-0.127	1.134	0.905	0.975
DFA US Sustainability Core I Portfolio	-0.043	1.074	0.512	0.991
Domini European Social Equity Portfolio	0.019	1.161	3.644	0.736
Domini International Social Equity Fund	-0.095	1.036	0.951	0.974
Domini PacAsia Social Equity Portfolio	0.084	1.030	2.069	0.923
Domini Social Equity Fund	-0.169*	1.045	0.914	0.959
Dreyfus Global Sustainability Fund	-0.174	1.006	0.839	0.983
Dreyfus Premier Third Century Fund Inc	-0.028	0.998	0.930	0.954
DWS Clean Technology Fund	-0.884**	1.286	2.624	0.902
Epiphany FFV Fund	-0.246**	1.013	0.904	0.946
Epiphany FFV Small Cap Fund	-0.224	1.162	1.913	0.897
ESG Managers Aggressive Growth Portfolio	-0.418***	1.002	0.755	0.961
Eventide Gilead Fund	0.623	1.051	3.580	0.665
Fidelity New Millennium Fund	0.055	1.103	1.715	0.882
Fidelity Select Environment & Alternative Energy Portfolio	-0.100	0.955	2.296	0.788
First Trust Global Wind Energy ETF	-0.080	1.001	0.978	0.989
First Trust NASDAQ Clean Edge Green Energy Index Fund	0.014	1.039	1.012	0.990
First Trust NASDAQ Clean Edge Smart Grid Infrastructure Index Fund	0.032	0.985	0.908	0.970
Firsthand Alternative Energy Fund	-0.831	1.307	5.024	0.648

Gabelli SRI Fund Inc	0.403	0.965	2.476	0.801
GMO Tobacco-Free Core Fund	-0.012	0.859	1.001	0.944
Green Century Equity Fund	0.041**	0.992	0.143	0.999
Guggenheim Solar ETF	0.163*	1.004	1.312	0.993
Huntington EcoLogical Strategy ETF	-0.164	1.001	1.200	0.855
iShares Global Clean Energy ETF	0.140*	1.014	1.104	0.990
iShares MSCI KLD 400 Social ETF	-0.052	1.014	0.800	0.971
iShares MSCI USA ESG Select ETF	-0.024	0.982	0.297	0.992
Leuthold Global Clean Technology Fund	-1.918***	1.444	3.754	0.727
LKCM Aquinas Growth Fund	-0.110	0.971	1.399	0.900
LKCM Aquinas Small Cap Fund	-0.088	0.937	1.370	0.937
LKCM Aquinas Value Fund	-0.123	1.063	1.147	0.942
Market Vectors Global Alternative Energy ETF	0.030	1.003	0.702	0.995
Market Vectors Solar Energy ETF	-0.670**	1.051	2.877	0.962
MMA Praxis International Fund	0.042	1.059	2.450	0.806
Neuberger Berman Climate Change Fund	-0.644	1.035	3.102	0.862
Neuberger Berman Socially Responsive Fund	-0.002	0.990	1.271	0.917
New Alternatives Fund Inc/fund	-0.037	0.852	4.183	0.570
New Covenant Growth Fund	-0.138*	1.020	0.773	0.969
Parnassus Asia Fund	-0.164	0.730	2.308	0.569
Parnassus Core Equity Fund	0.226**	0.849	1.045	0.923
Parnassus Endeavor Fund	0.231	1.063	1.638	0.886
Parnassus Fund	0.067	1.172	2.087	0.851
Parnassus Mid Cap Fund	0.077	0.819	1.441	0.894
Parnassus Small Cap Fund	0.012	0.963	2.285	0.855
Pax Ellevate Global Women's Index Fund	-0.064	0.953	1.087	0.954
Pax MSCI International ESG Index Fund	-0.147	0.964	1.273	0.953
Pax World Global Environmental Markets Fund	-0.108	1.070	2.097	0.878
Pax World Growth Fund	-0.184*	1.054	1.265	0.932
Pax World Small Cap Fund	0.167	0.849	1.932	0.883
PowerShares Cleantech Portfolio	0.043	0.999	0.608	0.993
Powershares Global Clean Energy Portfolio	-0.066	1.033	1.090	0.987
Powershares WilderHill Clean Energy Portfolio	0.068**	1.001	0.607	0.996
Praxis Core Stock Fund	-0.295***	1.009	1.014	0.955
Praxis Growth Index Fund	0.021	0.944	0.453	0.990
Praxis International Index Fund	-0.117*	0.998	0.692	0.975
Praxis Small Cap Fund	-0.115	0.890	1.475	0.932

Praxis Value Index Fund	0.047	1.059	0.715	0.977
Professionally Managed Portfolios - Portfolio 21	-0.111	0.982	1.579	0.875
Professionally Managed Portfolios - Women's Equity Fund	-0.221	0.843	0.806	0.829
RBB SAM Sustainable Climate Fund	-0.237	1.219	3.799	0.838
SEI Institutional Investment Trust - Screened World Equity Ex-US Fund	0.191***	0.992	0.712	0.986
Sentinel Sustainable Core Opportunities Fund	-0.117	1.002	0.899	0.957
Sentinel Sustainable Mid Cap Opportunities Fund	-0.228**	0.922	1.217	0.939
Shelton Green Alpha Fund	-0.060	1.263	3.359	0.570
Sierra Club Funds - Sierra Club Equity Income Fund	-0.410**	0.744	1.016	0.709
Sierra Club Funds - Sierra Club Stock Fund	-0.686**	1.237	2.096	0.855
Steward Global Equity Income Fund	-0.133	0.940	1.291	0.925
Steward International Enhanced Index Fund	-0.160	1.024	1.638	0.928
Steward Large Cap Enhanced Index Fund	-0.005	1.086	0.657	0.980
Steward Small-Mid Cap Enhanced Fund	-0.060	1.056	0.945	0.971
TDAM Global Sustainability Fund	-0.620***	0.949	1.496	0.937
TIAA-CREF Social Choice Equity Fund	-0.047	0.994	0.406	0.991
Timothy Plan Aggressive Growth Fund	-0.224**	0.974	1.339	0.934
Timothy Plan International Fund	-0.090	0.957	1.619	0.920
Timothy Plan Large/Mid Cap Growth Fund	-0.159	0.945	1.241	0.917
Timothy Plan Large/Mid-Cap Value Fund	0.078	0.992	1.429	0.897
Timothy Plan Small-Cap Value Fund	0.041	0.869	1.242	0.940
Tributary Growth Opportunities Fund	-0.015	0.907	1.453	0.912
UBS International Sustainable Equity Fund	-0.084	0.965	1.353	0.938
Vanguard FTSE Social Index Fund	0.036	1.049	0.955	0.961
Walden Equity Fund	-0.025	0.917	0.782	0.961
Walden Midcap Fund	-0.053	0.892	0.813	0.944
Walden Small Cap Innovations Fund	0.071	0.856	1.163	0.947
Walden SMID Cap Innovations Fund	-0.195	0.982	0.751	0.952
Wells Fargo Advantage Small/Mid Cap Core Fund	-0.353	0.952	1.885	0.923
Wells Fargo Advantage Social Sustainability Fund	-0.152	0.940	0.970	0.972
Wells Fargo Large Cap Core Fund	-0.105	0.977	1.207	0.938
Winslow Green Growth Fund	-0.502	1.175	3.352	0.832
Winslow Green Solutions Fund	-1.224**	1.224	3.473	0.896

Notes: this table presents the regression outputs for Eq.(2) and the two measures of the degree of active management described in Section 4.3 for all sample SRI funds. α that is statistically significant at 1%, 5% and 10% level is marked with ***, **, and *. All β estimates are statistically significant at 1% level.

Appendix C. List of potential 'Closet Funds' and Selected Cost and Performance Measures

Fund Name	TE	R^2	Expense Ratio (Retail)	Expense Ratio (Institutional)	α
Calvert Large Cap Core Portfolio	0.687	0.975	1.16	1.07	-0.155**
Calvert Large Cap Value Fund	0.789	0.970	1.23	0.98	-0.126*
DFA CSTG&E US Social Core Equity 2 Portfolio	0.852	0.977	–	0.32	-0.034
DFA International Sustainability Core 1 Portfolio	0.727	0.986	–	0.49	0.041
DFA US Social Core Equity 2 Portfolio	0.905	0.975	–	0.28	-0.037
DFA US Sustainability Core I Portfolio	0.512	0.991	–	0.32	0.006
Dreyfus Global Sustainability Fund	0.839	0.983	1.1	0.85	-0.352**
ESG Managers Aggressive Growth Portfolio	0.755	0.961	1.08	0.83	-0.173***
Green Century Equity Fund	0.143	0.999	1.25	–	-0.108
New Covenant Growth Fund	0.773	0.969	1.02	–	-0.125***
SEI Institutional Investment Trust - Screened World Equity Ex-US Fund	0.712	0.986	–	0.36	-0.115*
Steward Small-Mid Cap Enhanced Fund	0.945	0.971	0.9	0.62	0.069
TIAA-CREF Social Choice Equity Fund	0.406	0.991	0.46	0.18	-0.031
Walden Equity Fund	0.782	0.961	–	1.00	-0.046

Notes: '–' indicates that the respective fund class does not exist. α reported in the last column is based on the Cremers model.

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