

THE PERFORMANCE OF SOCIALLY RESPONSIBLE MUTUAL FUNDS

by

Brandon Burrell
Bachelor of Business Administration
Simon Fraser University, 2016

and

Earendil Gutierrez
Bachelor of Commerce and International Business
La Salle University, 2013

PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE IN FINANCE

In the Master of Science in Finance Program
of the Faculty of
Business Administration

© Brandon Burrell and Earendil Gutierrez

SIMON FRASER UNIVERSITY

Fall 2017

All rights reserved. However, in accordance with the *Copyright Act of Canada*, this work may be reproduced, without authorization, under the conditions for *Fair Dealing*. Therefore, limited reproduction of this work for the purposes of private study, research, criticism, review and news reporting is likely to be in accordance with the law, particularly if cited appropriately.

Approval

Name: **Brandon Burrell and Earendil Gutierrez**

Degree: **Master of Science in Finance**

Title of Project: **The Performance of Socially Responsible Mutual Funds.**

Supervisory Committee:

Peter Klein
Senior Supervisor
Academic Director, PhD Program
Professor, Finance

Victor Song
Second Reader
Lecturer, Finance

Date Approved:

Abstract

Socially responsible investing (SRI) is a growing practice in the investment management industry which seeks to incorporate environmental, social and corporate governance factors into the investment decision-making process. Arguments have been made for and against it, and previous research has sought to answer the question of whether funds of this type outperform their conventional counterparts.

This study explores the performances of both types of funds on a before-fee basis and analyzes the impact fees have. We show that in the US from 1997-2017, SRI mutual funds after fees significantly underperform conventional funds after adjusting for market risk. Accounting for four risk factors, however, we find no significant difference in performance. Further, we find no significant difference in fees for the period. Analyzing the two 10-year subperiods of our test period, we find that SRI funds likely improve over the sample period and the performance of conventional funds likely deteriorates on a relative basis.

Keywords: socially responsible investment; mutual fund performance; management expense ratio; mutual fund load; risk adjusted alpha

Acknowledgements

We would like to thank Dr. Peter Klein, first and foremost, for his valuable guidance and reassurance as we worked to complete this project. We also appreciate the time and effort of Victor Song, who reviewed our project and gave insightful feedback. We would also like to show sincere gratitude to our professors in the Master of Science in Finance program at SFU. Much of the instruction they gave us went into this project and much more, we know, will be used for years to come in our professional careers.

Finally, we want to thank our friends and our family, for being the foundation from which we build our lives.

Table of Contents

Approval.....	ii
Abstract	iii
Acknowledgements	iv
Table of Contents	v
List of Figures	vi
List of Tables.....	vii
1: Introduction.....	1
2: Literature Review	4
3: Data	7
3.1 Mutual Funds and Fees	7
3.2 Sample Selection	8
3.3 Example of SRI Fund from Sample	11
4: Estimation of Risk-Adjusted Returns	13
5: Performance Differences Between SRI and Conventional Funds	15
5.1 Before-fee Performance	15
5.2 Comparison of Fees.....	16
5.3 After-fee Performance.....	18
5.4 Significance of Differences in Performance.....	19
5.5 Robustness Checks	22
6: Conclusion.....	24
Appendix: Means of Regression Results	26
Bibliography.....	27
Works Cited.....	27
Websites Reviewed	28

List of Figures

FIGURE 1: SRI Monthly Net Returns	20
FIGURE 2: Conv Monthly Net Returns	20
FIGURE 3: SRI 1-Factor Alphas	21
FIGURE 4: Conventional 1-Factor Alphas	21
FIGURE 5: SRI 4-Factor Alphas	21
FIGURE 6: Conv 4-Factor Alphas	21

List of Tables

TABLE I: Number and Total Net Assets of SRI and Conventional Funds.....	9
TABLE II: Descriptive Statistics.....	10
TABLE III: SRI Fund Sample.....	12
TABLE IV: Before-Fee Performance	15
TABLE V: Comparison of Fees	17
TABLE VI: Fees and After-fee Performance.....	18
TABLE VII: Differences in Performance and Their Significance	22
TABLE VIII: Annualized Net Alpha for Subperiods.....	23

1: Introduction

According to the Sustainable Investment Forum (SIF), sustainable, responsible and impact investing (SRI) or also called socially responsible investing, is the practice of investing taking into consideration environmental, social and governance (ESG) criteria, that aims at generating financial utility as well as a positive impact for society (2017). Objectives of such investment strategies have been long discussed since their inception as a popularized strategy in the 1980's. This type of investment has evolved during the last 30 years, starting as an approach that focused on negative (exclusionary) screening, which filtered out stocks according to activities or industries, or based on poor performances in aspects such as labour conditions or environmental impact.

The SRI concept has evolved since then, making it a more inclusive tool, and as such, it emphasizes the selection of stocks that rank above average in factors including environmental friendliness, management team compensation and workforce treatment. Modern SRI provides investors with a holistic approach that considers ESG factors aimed at providing long-term returns and increased positive impact on our societies. The market for SRI has also growth significantly, and accounts for \$8.2 trillion (or one out of five) dollars of professionally managed money in the United States (SIF, 2017).

The topic of performance of SRI funds has been previously discussed by many authors, often around the question of whether investors should expect less returns for their investments when they derive utility from non-financial factors such as peace of mind, consciousness or integrity by investing in SRI funds. Proponents of sustainable responsible and impact investing maintain that investing in stocks or funds with these characteristics adds financial value to the portfolio in two ways. First, by limiting the

downside potential arising from litigation costs, fines or compensations, making them more resilient to market shocks (Nofsinger and Varma, 2014). This robustness comes as result of the chosen operations, corporate structure and integration of enterprise risk management that earned companies their SRI label. Second, by generating long term value through the generation of sustainable practices and goodwill within the communities they operate in.

Conversely, detractors of SRI investments could argue that the nature of the funds is a limiting factor, particularly in the context of modern portfolio theory. The reduced investment universe that SRI funds select from, it would claim, inherently results in an inability of these funds to perform above their conventional counterparts (Markowitz, 1952).

In this paper we make a comparison in the performance of SRI and conventional mutual funds in the US from 1997-2017. As the market capitalization of SRI funds grows faster than conventional funds, we seek to determine if investors today should follow the trend and invest in SRI products on strictly financial terms. We make our comparison on the basis of Jensen's alpha as well as the alpha utilizing Carhart's (1997) four-factor model, which extends the Fama and French (1993) three-factor model by adding in a momentum factor. We also compare fees directly across the two fund types and utilize the total ownership cost (TOC) measure developed by Sirri and Tufano (1998) to extend the comparison. With this, we compare both the before- and after-fee risk-adjusted performance of SRI and conventional mutual funds. This study aims to expand the time period covered by Gil-Bazo, Ruiz-Verdú, and Santos (2010) by utilizing a similar

process, to determine if the performance of SRI funds in the United States is above or below that of traditional funds in a period extending into 2017.

This paper is limited in several key ways. First, our analysis was done with limited access to SRI mutual funds meeting our criteria. Within the subset of 85 SRI funds, only 26 of these had reported information for front end loads, for example, and our comparison of total ownership cost had to be done with this small sample. Second, our estimation of betas for the one- and four-factor alpha calculations was done once for each fund. An extension of this work could calculate betas for each fund for each month so that the conclusions are based on more recent, relevant data. Lastly, our performance comparison is done between the two broad classes, SRI and conventional. The comparison could be done at a more precise level by matching SRI funds to conventional funds that are more similar across a number of variables. These variables could include size, age, and other potential factors.

In section 2: Literature Review, previous literature on the topic of performance of SRI funds and related topics are discussed, with a focus on studies done in the United States. Section 3: Data, elaborates on the process of data selection, treatment and validation. In section 4: Estimation of Risk-Adjusted Returns, we discuss the chosen methodology to conduct the study of the funds' performances and present our results in section 5: Performance Differences Between SRI and Conventional Funds, along with a comparative discussion and robustness check for our work. We conclude in section 6: Conclusion, by summarizing our findings and outlining key considerations appropriate for further research.

2: Literature Review

Early studies regarding the performance of SRI funds, both in isolation and compared with the traditional mutual funds are inconclusive at best, and generally shows that there are no statistical differences. Hamilton, Jo, and Statman (1993) find a less negative performance of 17 SRI funds against their non-SRI counterparts, but these differences are insignificant. Statman (2000) finds that the performance of the Domini Social Index, which is constructed based on exclusionary and qualitative screening, was better than that of the S&P 500 index during the 1990 to 1998 period, both in raw and risk-adjusted returns. Although this difference was not statistically significant. On the other hand, Geczy, Stambaugh, and Levin (2006) find that investors in the SRI space pay higher diversification costs than traditional investors due to imposition of SRI constraints, and find that this cost is contingent on investors beliefs of asset pricing models and efficient markets. They find an investor that seeks alpha based on the CAPM market-risk model earns 5 basis points over the market, and this increases to 30 basis points if investors were to shift their decision-making to models like Fama-French's (1993) three factor model and Carhart's (1997) four factor model.

Following the growth of the SRI investing, a solution for the performance-to-ethics investing puzzle remains non-definite, but Renneboog, Ter Horst, and Zhang (2008) provide some key considerations for the ongoing discussion of the matter. Mainly, they discuss that the debate of SRI finds its roots in the theoretical trade-off between maximization of shareholder value and alignment with general stakeholder value criterion. Also, they discuss how SRI investors behave differently from conventional investors and are less concerned with recent, past performance. They then differentiate

between performance of funds employing positive screening with funds employing negative screening, and conclude performance is superior for positive screening funds (Renneboog et al., 2008).

Several studies have been conducted using Jensen's alpha or Carhart's (1997) four-factor alpha as a measure of risk adjusted performance. Statman (2000) uses Jensen's alpha and finds that from 1990-1998 SRI funds have higher, but barely significant, risk-adjusted returns. Bauer et al. (2005), Renneboog et al. (2008) and Gil-Bazo et al. (2010) all use a four-factor model. Bauer, Koedijk, and Otten (2005) find no significant difference in performance for funds matched on both age and size from 1990-2001. Renneboog et al. (2008) find no significant difference in their adjusted performance from 1991-2003, but SRI funds significantly underperform conventional funds in the 1991-1995 subperiod.

In their 2010 paper, Gil-Bazo et al. argue that SRI funds managed by firms specialized in socially responsible investing outperform conventional funds of similar characteristics on a before-and-after-fee basis in the period 1997-2005. Additionally, they find that the outperformance is driven by SRI specialized firms, while SRI funds offered by non-specialized firms underperform their conventional fund equivalents. Further, they find that while there is no significant difference between fees for SRI funds and conventional funds, there is a significant difference between fees of SRI and conventional funds offered by the same firm.

The difference in fees between SRI and conventional mutual funds has received much less attention in the literature. When it is mentioned in papers, the average expense ratios do not differ significantly (Bauer et al., 2005; Benson et al., 2006; Gil-Bazo et al.,

2010; Renneboog et al., 2008), with the exception of Benson and Humphrey (2008) who found, with significance, that the median expense ratio is higher for conventional mutual funds.

As the market for SRI has seen rapid growth, it is likely that many factors of this type of investment have changed. These include size and turnover of funds, the fees charged, and both the before- and after-fee performance realized by SRI funds. This makes it more important to have recent data, as relevance of data may be more quickly lost with time. Our paper extends the testing period of SRI funds right up until June 2017. Further, in testing robustness, we roughly compare the decade prior to the 2008 financial crises to the decade since. While the event did not directly pertain to socially responsible investing, it did cause many investors to look more closely into their investments and rethink their objectives and constraints.

3: Data

3.1 Mutual Funds and Fees

Mutual funds come in many varieties. Funds can be composed of equities, fixed income, or a combination of the two. They may also contain alternative investment securities. Mutual funds can be constructed to track a particular market or replicate an index, representing passive investments, or can be actively managed in accordance with an established set of goals and guidelines. Further, mutual funds can restrict investments to a particular sector or be more generally diverse and invest based on style or market capitalization guidelines in order to meet varying investor needs.

The fees for mutual funds are in the form of expenses and loads. Expenses are charged as a percentage of net asset value (NAV), known as the expense ratio, and this is charged on an ongoing basis. Loads are charges as a percentage of NAV at either time of purchase or sale. Front end loads are charged at time of purchase, whereas back end loads are charged at time of sale, and often at a decreasing rate the longer the fund is held. While all funds charge an expense ratio to cover management and operating expenses, funds can opt to set maximum loads to be charged or have no load at all. Often, different classes of the same fund will vary only by the loads that are charged. For example, Class A shares could have no loads, while Class B shares would offer mutual fund brokers the opportunity to charge a front-end load and a back-end load as well.

To approximate the expenses of the funds, we use the total ownership cost (TOC) measure developed by Sirri and Tufano (1998). The measure assumes a holding period of 7 years, and so the lifetime load cost divided by 7 is added to the annual expense ratio.

This is shown in the formula:

$$\text{TOC} = \text{lifetime load}/7 + \text{expense ratio}$$

Because TOC assumes a 7-year holding period, back-end loads (BEL) become irrelevant to the measure in our study. In our test period, no SRI funds have a BEL that applies for longer than 6 years, and only 7 funds from the entire sample of conventional funds, or less than 0.1%, have a BEL that applies for more than 7 years. To be precise, there are 7 funds with a BEL that applies for 8 full years, each charging a maximum of 1% in the eighth year.

3.2 Sample Selection

Funds and fund data were collected from the CRSP Survivor Bias Free US Mutual Fund Database. Our study looks at retail, equity, US domestic, diversified mutual funds in the 20-year period from June 1997 – June 2017. Monthly returns and total net asset data as well as all other required data in yearly intervals was downloaded from the database.

Funds for the period were considered to be equity, domestic, and diversified if they contained the CRSP Style Codes for equity (E), for domestic (D), and then for either cap-based (C) or style (Y). Equity, domestic funds that were sector-based (S) were not included as these funds are not diversified. CRSP Style Codes are used by the database to classify funds, and the system is a mapping and combination of Wiesenberger, Strategic Insight, and Lipper Objective codes which only exist for partial date ranges of the whole database.

Next, the CRSP ETF and ETN identifier was used to identify passive and semi-active funds. Funds that were index-based (B), pure index funds (D) or index enhanced

(E) were removed from the fund dataset. Funds that were also identified as index-based by their name were eliminated.

Funds were considered to be retail if more than 50% of NAV was classified as retail. For funds with multiple classes, a weighted average based on NAV of each class was calculated for the fund as a whole. Institutional funds were not included in this study.

To identify SRI mutual funds from the sample, general attribute information was retrieved from the Bloomberg Terminal. In addition, the sample was filtered based on fund name. Funds indicating an SRI mandate from their name were manually verified using the Bloomberg Terminal or SEC archives available online.

TABLE I: Number and Total Net Assets of SRI and Conventional Funds

Year	SRI Funds			Conventional Funds		
	Number of Funds	TNA	Mean TNA/Fund	Number of Funds	TNA	Mean TNA/Fund
1997	18	1725	94	1632	639,016	392
1998	20	2050	100	1900	839,514	442
1999	24	3233	136	2068	1,056,454	511
2000	27	5327	198	2221	1,291,276	581
2001	29	4011	138	2341	1,122,339	480
2002	28	3566	129	2403	985,851	410
2003	28	3899	142	2390	994,015	416
2004	27	4772	177	2351	1,252,491	533
2005	25	5201	208	2304	1,397,186	607
2006	25	5698	224	2280	1,572,701	690
2007	27	5985	220	2199	1,767,285	804
2008	32	6047	189	2155	1,419,894	659
2009	41	5222	127	2013	1,038,347	516
2010	50	6576	132	1918	1,170,341	610

2011	49	6948	142	1879	1,221,739	650
2012	47	6808	145	1878	1,171,884	624
2013	46	7556	166	1839	1,313,967	715
2014	44	9420	212	1858	1,479,454	796
2015	45	9078	201	1852	1,463,592	790
2016	47	7913	167	1740	1,376,557	791
2017	44	8184	185	1677	1,407,497	839

The table shows number and total net assets (TNA) of SRI and conventional funds in the sample each year. TNA reported in millions of US dollars.

Table I above shows the number and total net assets of both types of funds by year. Table II shows key differences between SRI and conventional funds. First, the expense ratio is higher for SRI funds. Second, while SRI investments see lower front-end loads, this is because fewer SRI funds have a front-end load. When comparing SRI and conventional funds that charge a load, SRI funds have a marginally higher fee. Next, on average conventional funds are more than 50% bigger than their SRI counterparts and are roughly 3 years older. Turnover is substantially higher for conventional funds. Lastly, gross returns are higher for SRI funds and even though SRI funds have higher fees, SRI funds also see higher net returns over the sample period.

TABLE II: Descriptive Statistics

	SRI Funds			Conventional Funds		
	Mean	SD	Median	Mean	SD	Median
Expense Ratio	1.85%	1.88%	1.60%	1.52%	0.82%	1.44%
FEL (all funds)	1.95%	1.37%	2.67%	2.11%	1.33%	2.88%
FEL (load funds)	2.67%	0.75%	3.00%	2.65%	0.87%	3.00%
TNA, funds	87.1	283.0	10.3	136.9	457.1	28.7
Age	14.5	11.9	13.7	17.4	9.7	17.8

Turnover	0.66	0.49	0.49	1.1	5.1	0.7
Gross Returns	9.00%	7.32%	9.86%	7.84%	10.56%	8.54%
Net Returns	7.15%	7.32%	8.01%	6.32%	10.56%	7.02%

The table highlights several annualized statistics for the two types of funds in the sample over the 20-year period from June 1997 to June 2017. SD denotes standard deviation. Front end loads are maximum front end load reported by CRSP. Loads in report do not include back end loads (BEL) because a 7-year holding period was assumed. Within sample, no SRI fund had a BEL applying beyond 7 years, and less than 0.1% of conventional funds had a BEL. TNA, funds is reported in millions of US dollars. Age is reported in years. Turnover is the funds turnover ratio which is calculated as the lesser of aggregate purchases or aggregate sales divided by average annual TNA of fund. Gross returns are calculated as average of all monthly returns for the funds reported by CRSP, annualized, plus the average annual expense ratio of the fund type. Net returns are calculated simply as average of all monthly returns for the fund reported by CRSP. The sample contains 85 SRI funds and 4044 conventional funds.

3.3 Example of SRI Fund from Sample

The table below outlines the characteristics of a fund that met the SRI screening criteria of this paper. The randomly chosen sample fund, John Hancock ESG Large Cap Core Fund; Class A Shares, employs their screening during the bottom-up analysis of potential investments. Both inclusionary and exclusionary screening, as described in the introduction, are deployed for this particular fund. On the one hand, sector-leading qualities regarding ESG factors are sought out, while on the other, certain sectors and practices are avoided.

TABLE III: SRI Fund Sample

Fund Name	John Hancock ESG Large Cap Core Fund; Class A Shares
CRSP Fund No	87845
NASDAD Ticker	JHJAX
Management Company Name	John Hancock Group
SRI Screening deployed, according to prospectus	<ul style="list-style-type: none"> • Review of ESG issues during bottom-up financial analysis • Seeking strong or sector-leading ESG policies, performance, and reporting • Seeking strong awareness of industry-relevant ESG opportunities and risks* • Avoiding material exposure to particular sectors or practices† • Avoiding companies with major recent or ongoing ESG controversies
<p>* Opportunities include environmental (clean tech opportunities, climate change policies, sustainable agriculture, water use), social (healthier products, product safety, supply chain and human rights, worker safety), and governance (board diversity, employee relations, executive compensation)</p> <p>† Sectors and practices include companies with coal mining exposure; companies that derive any revenue from manufacturing landmines or their components; energy companies with 10% or more of proven reserves in the Tar Sands; energy companies that generate 10% or more of revenues (or have the capacity to do so) from coal; companies that derive 5% or more of revenues from: nuclear power, agricultural biotechnology or the sale of conventional, chemical or biological weapons; companies that derive 5% or more from revenues, excluding retail, from firearms, gaming, pornography or tobacco; companies that derive 1% or more of revenues from nuclear weapon sales</p>	

4: Estimation of Risk-Adjusted Returns

Like Bauer et al. (2005), Renneboog et al. (2008) and Gil-Bazo et al (2010), we use Carhart's (1997) four-factor model to estimate risk adjusted alphas for SRI funds.

The four-factor equation is as follows:

$$r_{it} - r_{ft} = \alpha_i + \beta_{MKT-rf,i}(MKT_t - r_{ft}) + \beta_{SMB}(SMB_t) + \beta_{HML}(HML_t) + \beta_{pr1y}(pr1y_t) + \varepsilon$$

where r_{it} is fund i 's pre-expense return for t month; r_{ft} is the risk-free rate of 1-month US Treasury bills; α_i is the 4-factor which represents the after-risk performance in the model; MKT_t is the monthly return of the market; SMB_t , HML_t and $pr1y_t$ are the returns for the portfolios which mimic the risk factors associated with size of fund, book-to-market ratio, and returns over the previous year, respectively. The risk-free rate and four risk factors were retrieved from Kenneth French's (2017) online data library for the whole sample period.

In order to calculate fund coefficients for the risk factors (betas), we base our method off of Carhart's (1997) two-step process. For every fund, the first 30 monthly observations are regressed against the four risk factors to obtain betas as in the above equation. If 30 or less monthly observations are available for a fund, it is not included in the regression and alpha analysis. Next, for the 31st month until the end of the fund, the vector of betas for each fund is multiplied by the vector of risk factors every month. These values are subtracted from the excess return for the fund for each month to obtain monthly alphas. Fund level, average alphas are not required. Instead, all monthly alphas for SRI and conventional funds are summed up separately and then divided by the total number of alphas. This risk-adjusted performance is then annualized.

We also calculate and compare Jensen's alpha, estimated using the excess market return detailed above as the single risk factor. An overall Jensen's alpha for SRI and conventional funds is calculated and annualized in the same way that four-factor alpha is calculated.

5: Performance Differences Between SRI and Conventional Funds

Mean risk-adjusted performance is compared between SRI and conventional funds in this report. It would be more ideal to compare SRI funds against a control group of the same funds where investment is not restricted based on SRI criteria. Such a control group is, however, not readily available. Other studies have sought to match SRI funds to conventional funds on several variables in place of such a control group (Bauer et al., 2005; Kreander et al., 2005; Statman, 2000). To extend this report, a similar approach could be taken and differences in performance would then be calculated first as differences between matched pairs or groups.

5.1 Before-fee Performance

As per the method outlined in the previous section, before-fee performance was calculated using the one- and four-factor models. Results are displayed in the table below.

TABLE IV: Before-Fee Performance

	Mean SRI	Mean conventional	Difference
Gross return	7.62%	7.89%	-0.27%
Gross alpha, 1 factor	-0.65%	-0.05%	-0.60%
Gross alpha, 4 factor	-0.61%	-0.69%	0.09%

Gross returns are calculated as average of all monthly returns for the funds reported by CRSP, annualized, plus the average annual expense ratio of the fund type. Gross alpha, 1 factor and Gross alpha, 4-factor are calculated as average of all alphas calculated, plus the

average annual expense ratio of the fund type. The regressions and alpha calculations were based on 70 SRI funds and 3762 conventional funds that had more than 30 months of data.

During the period of 1997 to 2017, gross returns were higher for conventional funds. However, after factoring in risk, SRI underperformed in both models. While SRI funds underperformed in gross returns by 27 basis points and in one-factor gross returns by 60 basis points, SRI funds outperformed their conventional counterparts by 9 basis points in four-factor alpha. However, none of these results are statistically significant.

5.2 Comparison of Fees

Mean differences on fees were calculated for the funds. For the conventional type, only the funds which met the screening described previously and for which expense ratios (ER) and maximum front-end load (FEL) were available were considered. This reduced the observations to 4044 from 7963 funds that met initial screening. Due to the limited number of SRI funds and of data for SRI fees, this constraint was relaxed. Where ER and FEL data were available for the SRI funds sample, it was used, regardless of whether both fees were available for the same fund. This resulted in our tests using 58 SRI funds with ER data and 26 SRI funds had FEL data.

To test if the mean fees were significantly different between the two types of funds, we used a two-tailed test for our two independent samples. We assumed unequal variances and normal distribution, and we used a 95% confidence level. Our hypotheses are of the form:

$$H_0: \mu_{SRI} = \mu_{Conv}$$

$$H_1: \mu_{SRI} \neq \mu_{Conv}$$

The table below shows the comparative fee data obtained for both types of funds. For expense ratios, SRI funds were 33 basis points more, although this is not statistically significant. As discussed previously, comparisons solely based on expense ratios fail to depict a complete picture of the costs for investors. The difference for front-end loads is -15 basis points, meaning that conventional funds carry a higher load burden, although this difference again is not significant at the 95% confidence level. These two components combine in the calculation of total ownership cost (TOC), which is higher for SRI than conventional funds by 31 basis points, but is also not statistically significant. The finding that fees do not differ significantly between the two is in line with the literature (Bauer et al., 2005; Benson et al., 2006; Gil-Bazo et al., 2010; Renneboog et al., 2008).

TABLE V: Comparison of Fees

	SRI Funds	Conventional Funds	Difference of means	SE	p-value
<i>Expense ratio</i>					
Mean	1.85%	1.52%	0.33%	0.2467%	0.1829
Observations	58	4044			
SD	1.88%	0.82%			
<i>Front-end Load</i>					
Mean	1.95%	2.11%	-0.15%	0.2691%	0.5745
Observations	26	4044			
SD	1.37%	1.33%			
<i>TOC</i>					
Mean	2.13%	1.82%	0.31%	0.2484%	0.2160
Observations	58†	4044			
SD	1.89%	0.79%			

P-value is calculated from the two-tailed t-test of difference in means, where normality and unequal variances are assumed. TOC is total ownership cost and was calculated using 58 data points of expense ratios and 58† data points of front loads, of which 26 were available data points and the remaining 32 data points were proxied using the average of the available data.

5.3 After-fee Performance

After-fee performance was calculated using the 1- and 4-factor models also used for before-fee performance. Results are displayed in the table below. Net returns were substantially higher for SRI funds. However, after factoring in risk, SRI underperformed in both models. While SRI funds outperform in net returns by 83 basis points, this is not significant. Conventional funds outperform their SRI counterparts by 1.64% during the test period, which is significant at the 5% level. Conventional funds also outperform by 90 basis points in four-factor alpha, but this was not found to be significant. As stated in the previous section, the differences in fees is not statistically significant. This results in what appears to be inconsistent results between before-fee (gross) and after-fee (net) performance. In actuality, we can only significantly state that, after accounting for market risk alone, conventional funds outperform SRI funds by 1.64%.

TABLE VI: Fees and After-fee Performance

	Mean SRI	Mean conventional	Difference
<i>Fees</i>			
Expense ratio	1.85%	1.52%	0.33%
Total loads	1.95%	2.11%	-0.15%
Total ownership cost	2.13%	1.82%	0.31%

After-fee performance

Net return	7.15%	6.32%	0.83%
Net alpha, 1 factor	-3.22%	-1.58%	-1.64%**
Net alpha, 4 factors	-3.12%	-2.22%	-0.90%

Net returns are calculated as average of all monthly returns for the funds reported by CRSP, annualized, with average annual expense ratio of the fund type already incorporated. Gross alpha, 1 factor and Gross alpha, 4 factor are calculated as average of all alphas calculated. The regressions and alpha calculations were based on 70 SRI funds and 3762 conventional funds that had more than 30 months of data. ** denotes significance at the 5% level.

5.4 Significance of Differences in Performance

In order to measure the significance of our findings, the Welch-Satterthwaite t-test for equal means was used. This test assumes unequal variances and normal distribution of the two random variables. The following histograms of after-fee performance stand to verify the assumption of normality. In all cases, underflow bins of -0.05 and overflow bins of 0.05 were used for the sake of clarity.

FIGURE 1: SRI Monthly Net Returns

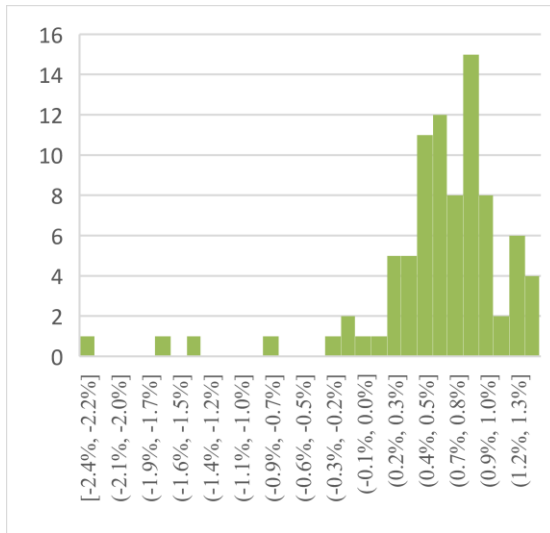
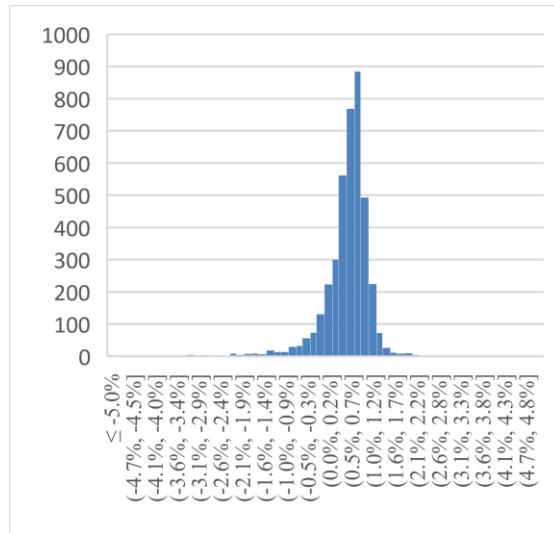


FIGURE 2: Conv Monthly Net Returns



From the two histograms above can see approximate normality of monthly net returns, with only slightly fatter tails. For SRI monthly returns, only 85 values are given based on our sample size. We assume that approximate normality would continue to persist, and be more evident, with a larger sample size.

For the four histograms below, showing one- and four-factor alphas for both SRI and conventional funds, we again see the pattern of normality, especially with the larger sample size of the conventional mutual funds. Therefore, the assumption of normality in the Welch-Satterthwaite t-test is maintained.

FIGURE 3: SRI One-Factor Alphas

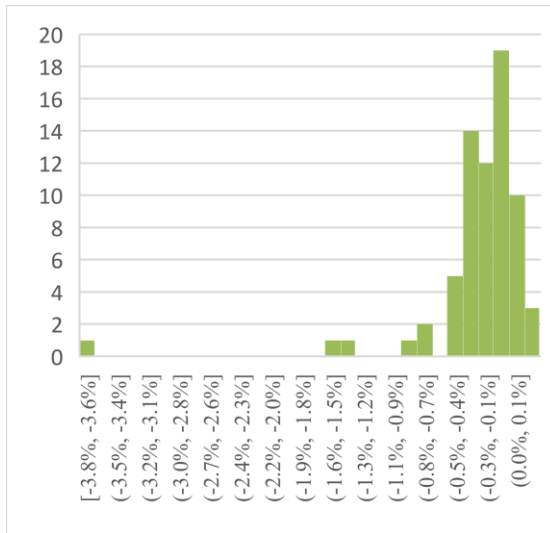


FIGURE 4: Conventional One-Factor Alphas

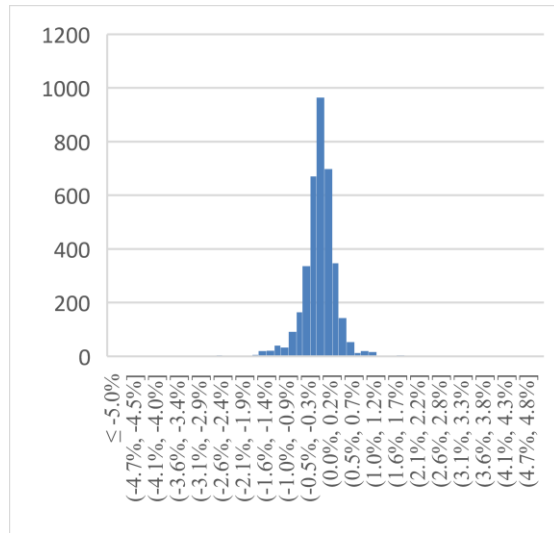


FIGURE 5: SRI Four-Factor Alphas

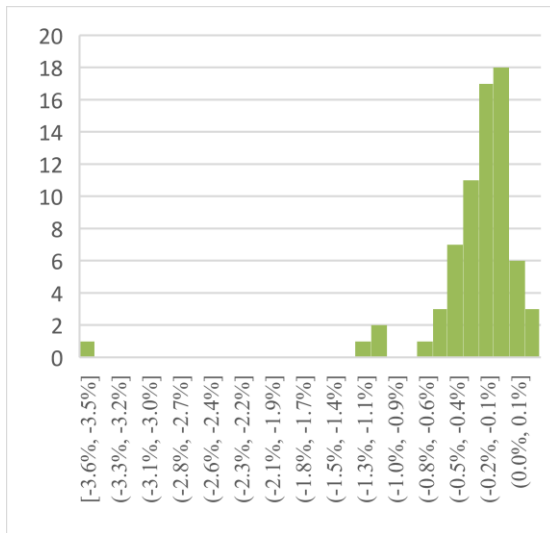
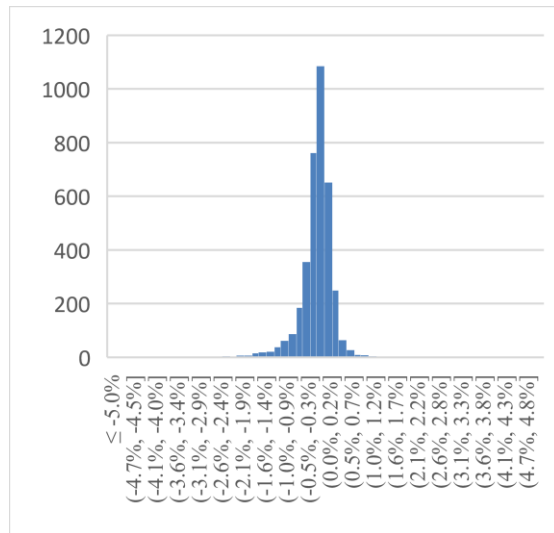


FIGURE 6: Conv Four-Factor Alphas



From the table below, we see that based on the Welch-Satterthwaite t-test, only the difference in one-factor net alphas is statistically significant. With a p-value of 0.0333 it is significant at the 5% level. The remaining differences are not even significant at the 10% level. Thus, we can conclusively say that, net of fees, conventional funds outperform SRI funds from 1997 to 2017 on a market risk-adjusted basis.

TABLE VII: Differences in Performance and Their Significance

	Difference	SE	p-value (Welch-Satterthwaite)
<i>Before-fee performance</i>			
Gross return	-0.26928%	0.80952%	0.7405
Gross alpha, 1 factor	-0.60444%	0.44928%	0.1835
Gross alpha, 4 factor	0.08640%	0.41460%	0.8356
<i>After-fee performance</i>			
Net return	0.84900%	0.80724%	0.2958
Net alpha, 1 factor	-1.63884%**	0.75504%	0.0333
Net alpha, 4 factor	-0.89772%	0.71364%	0.2124

** denotes significance at the 5% level.

5.5 Robustness Checks

Past research has been done over multiple periods and when subperiods are analyzed results show inconsistencies in performance conclusions (Bauer et al., 2005; Renneboog et al., 2008). When Gil-Bazo et al. (2010) apply the same methodology used for the whole 1997-2005 period to the two subperiods 1997-2001 and 2002-2005, they found varying levels of significance. From their study they found that, while conclusions are the same, they lost statistical significance in their subperiods and could not claim that SRI funds outperform conventional funds. This was due to a decrease in the total sample size, per period, according to the paper (2010).

As seen in the table below, when the 20-year period is split into two equal halves, our conclusions remain the same. However, statistical significance is lost as the sample size of each subperiod is decreased. We also see that the outperformance of conventional funds is mostly driven by the first subperiod, from 1997 to 2007. While conventional funds outperform in the second half of the test period, this is to a much lesser extent. This

may be due to the fact that demand for SRI has seen a large increase and outgrown conventional investments in the US over the past 15 years. More resources and skill, one could argue, have therefore been applied to SRI.

TABLE VIII: Annualized Net Alpha for Subperiods

	1997-2007	2007-2017	1997-2017
SRI 1 Factor	-4.99%	-2.28%	-3.24%
Conv 1 Factor	0.22%	-1.43%	-0.61%
Difference	-5.21%	-0.85%	-2.63%
SRI 4 Factor	-5.01%	-2.30%	-3.27%
Conv 4 Factor	-1.14%	-1.57%	-1.35%
Difference	-3.87%	-0.73%	-1.92%

One- and four-factor alphas are calculated as the average of all alphas calculated for the two fund types in their respective date range. 1997-2007 covers the period of June 1997 to May 2007. 2007-2017 covers the period of June 2007 to June 2017.

6: Conclusion

Research into the performance of socially responsible investing is of increasing importance as today one in five dollars of professionally managed in the US is now in SRI. Overall, research points to the conclusion that the difference in performance between SRI funds and conventional funds is largely insignificant. Similar conclusions have been made for the difference in fees between the two types of funds.

This study seeks to add value to the research efforts by determining whether SRI funds perform better than conventional funds in the United States. Using the same CRSP Survivor-Bias Free US Mutual Fund Database as Gil-Bazo et. al. (2010), we sought to replicate and expand the period of study from 2005 to 2017.

We find no statistically significant evidence that before-fee performance for SRI and conventional mutual funds is different over the period of 1997 to 2017. We find that before-fee returns and adjusted for market risk alone was lower for SRI funds, but higher for SRI funds when Carhart's (1997) four-factor model was used. However, none of these differences was found to be significant. Second, we arrive at the conclusion that, in line with the literature, the fees charged by the two categories of funds is not significantly different. Third, we conclude that there is no evidence of a statistically significant difference in after-fee performances between the two types of funds, except when market risk is taken into account. Here, with 5% significance, SRI funds underperform their conventional counterparts by 1.64%.

Our research ultimately finds, in line with the literature, that there is not a statistically significant difference in the performance of both types of funds. However, as more historical data becomes available and more widely spread about SRI funds,

comparison tests may become more significant. Further, more robust models for calculating risk-adjusted returns specific to SRI funds may be developed and used to test hypotheses of performance differences.

Aside from lack of observations and questions about the fit of models, we can state that, at a minimum, socially responsible investing performs similarly to conventional funds. While achieving similar results, SRI also provides further utility for investors and a greater set of stakeholders. A natural follow up for this conclusion would be then to attempt to approximate the differences in utility and the utility function itself between SRI and non-SRI investors, and how this could affect demand of these types of funds.

In addition, dividing the test period into two subperiods revealed a decrease in the underperformance of SRI funds. While insignificant, our results showed that from 2007 to 2017, SRI funds lagged conventional funds to a smaller degree than they had in the previous 10 years. This possibly comes as a result of more manpower and resources applied, as well as institutional investor pressure on SRI investments. Future research could concentrate on finding whether this reduction of underperformance is significant, and look more closely into the factors behind it.

Appendix: Means of Regression Results

	SRI 1-factor	Conv 1-factor	SRI 4-factor	Conv 4-factor
Alpha	-0.00175	-0.0012	-0.00223	-0.00066
Mkt-RF	0.009535	0.009512	0.009139	0.009268
SMB			0.001165	0.002056
HML			-0.00089	0.000144
Mom			0.000302	0.000139
Alpha (S.E)	0.003535	0.004356	0.00331	0.00363
Alpha (t-stat)	-0.51554	-0.30408	-0.75748	-0.30621
Mkt-RF (S.E)	0.000783	0.001018	0.000858	0.000983
Mkt-RF (t-stat)	18.29187	12.22889	16.06229	12.16315
SMB (S.E)			0.001169	0.001162
SMB (t-stat)			0.325279	1.38163
HML (S.E)			0.001319	0.001544
HML (t-stat)			-0.60809	0.361959
Mom (S.E.)			0.000846	0.001021
Mom (t-stat)			-0.09163	0.051619

Bibliography

Works Cited

- Bauer, R., Koedijk, K., and Otten, R., “International evidence on ethical mutual fund performance investment style”, *Journal of Banking and Finance*, Vol. 29, 2005, pp. 1751-1767
- Carhart, M., “On persistence in mutual fund performance”, *Journal of Finance*, Vol. 52, pp.57-82
- Benson, K., Brailsford, T. and Humphrey, J., “Do Socially Responsible Fund Managers Really Invest Differently?”, *Journal of Business Ethics*, 65(4), 2006, pp. 337–357.
- Fama, E., and French, K., “Common risk factors in the returns on stocks and bonds”, *Journal of Financial Economics*, Vol. 33, 1993, pp. 3-53
- Geczy, C., Stambaugh, R., and Levin, D., “Investing in socially responsible mutual funds”, Working Paper (The Wharton School, University of Pennsylvania, 2006)
- Gil-Bazo, J., Ruiz-Verdú, P., and Santos, A. “The Performance of Socially Responsible Mutual Funds: The role of Fees and Management Companies”, *Journal of Business Ethics*, Vol. 94, 2010, pp. 243-263
- Hamilton, S., Jo, H., and Statman, M., “Doing well while doing good? The investment performance of socially responsible mutual funds”, *Financial Analysts Journal*, Vol. 56, 2000, pp. 30-39
- Kreander, N., Gray, R., and Power, D., “Evaluating the Performance of Ethical and Non-Ethical Funds: A Matched Pair Analysis”, *Journal of Business Finance and Accounting*, Vol. 32, 2005, pp. 1465-1493
- Nofsinger, J. and Varma, A. “Socially Responsible Funds and Market Crises”, *Journal of Banking and Finance*, Vol. 48, 2014, pp.180-193
- Renneboog, L., Ter Horst, J., and Zhang, C., “Socially responsible investments: Institutional aspects, performance, and investor behavior”, *Journal of Banking and Finance*, Vol. 32, 2008, pp. 1723-1742
- Statman, M., “Socially Responsible Mutual Funds”, *Financial Analysts Journal*, Vol. 56, 2000, pp. 30-39

Renneboog, L., Ter Horst, J., and Zhang, C., “Is ethical money financially smart? Nonfinancial attributes and money flows of socially responsible investment funds, *Journal of Financial Intermediation*, Vol. 20, 2011, pp. 562-588

Websites Reviewed

John Hancock Investments. 2017. Mutual Funds. Accessed December 2017.
<http://jhinvestments.com/Fund/FundResources.aspx?ProductType=MutualFund&ClassCode=A&CategoryID=ShowAll&TabOrder=1>.

The Forum for Sustainable and Responsible Investment (SIF). 2017. Fast Facts. Accessed November 2017. <https://www.ussif.org/>.

US Securities and Exchange Commission. 2017. Filings and Forms. 9 January. Accessed November 2017. <https://www.sec.gov/edgar.shtml>.

