Sustainable Socially Responsible Exchange Traded Funds Performance

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ABSRACT
This study examines socially responsible Exchange Traded Funds (SR ETFs) financial performance using the population of 36 sustainable SR ETFs in the U.S. These SR ETFs perform similarly to the overall market in terms of returns. SR ETFs have a low market risk. In addition, SR ETFs returns are positively associated with the market return. Momentum is found in the daily SR ETFs returns, but disappears at the monthly level. For investors who are conscious about sustainability and environmental protection, this study suggests that being socially responsible does not comprise financial performance; investors do not need to sacrifice financial returns for being socially responsible in ETF investments.

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I. Introduction

A socially responsible Exchange Traded Fund (SR ETF) is a marketable security that, unlike mutual funds, trades like a common stock on a stock exchange. The underlying securities of SR ETFs are of those corporations engaging in corporate social responsibility. SR ETF is one group of ETF investment. The first ETF was launched in 1993 and the first SR ETF was created twelve years later in 2005. This idea of ETF investment with specific emphasis on corporate social responsibility comes from investors being more conscious about social responsibility and environmental protection.

It is well accepted that the goal of corporate financial management is to maximize shareholders' wealth (Jensen 1988). However, due to the conflicting goals from the stakeholders in a corporation, the definition of corporate social responsibility (CSR) is not always clear. The Nobel laureate for Economic Science in 1976, Milton Friedman claimed that "the social responsibility of business is to increase its profit" (Friedman, 1970). McWilliams and Siegel (2001) rephrase Friedman's assertion that "engaging in CSR is symptomatic of an agency problem or a conflict between the interests of managers and shareholders". They define CSR as "actions that appear to further some social good, beyond the interest of the firm and that is required by law".

However, other researchers have challenged this agency theory perspective. Carroll (1979) argues that responsibility suggests motivation and is not measurable. Instead of using performance as an operative term, he lays out a three-dimensional conceptual model to describe the basic aspects of corporate social performance, including definition of social responsibilities, social issues involved, and philosophy of responsiveness. Another venue of research tests empirical data. Waddock and Graves (1997) conduct empirical work and demonstrate that corporate social performance is positively associated with companies' financial performance.

The evolution of the corporate social responsibility (CSR) theory continues. McWilliams and Siegel (2001) view CSR as a form of investment. They relate CSR investment to the goal of maximizing shareholders' wealth (Jensen 1988). They believe that "some level of CSR will maximize profits while satisfying the demand for CSR from multiple stakeholders" (McWilliams and Siegel 2001). This ideal level of CSR investment can be determined by the cost-benefit analysis. As firms with higher CSR might generate higher demand and more revenues, they have higher costs at the same time. McWilliams and Siegel (2001) argue that in equilibrium, there is no relationship between CSR activity and financial performance; firms maximize their shareholders' wealth with various levels of CSR investment.

The investors' awareness of corporate social responsibility (CSR) leads to more corporations engaging in socially responsible investment (SRI) in recent years (Galema et al., 2008). In other words, investors' enthusiasm in CSR motivates firm managers to engage in corporate social responsibility. Sparkes and Cowton (2004) argue that SRI not only has grown significantly, but also has matured; SRI becomes "an important phenomenon in its own right – one to which corporate executives are likely to be paying increasing attention in the years to come."

Investors' interest in SRI is also reflected in their mutual fund investments. In mutual fund management, sustainable socially responsible investments refer to the investment strategies that consider environmental, social, and governance (ESG) factors in the portfolio construction and management, according to the U.S. SIF 2016 Global Sustainable Investment Review (www.ussif.org). The Review reports that the total socially responsible investment (SRI) of 8.7 trillion dollars in 2016 account for 21.6 percent of the 40.3 trillion dollars total managed assets in the U.S. markets. Compared to the total socially responsible investment of 6.6 trillion dollars in 2014, accounting for 17.9 percent of the 36.9 trillion dollars total managed assets, SRI grew rapidly

over this time period. As SRI concept becomes more popular, there are abundant socially responsible mutual funds created to meet investors' desire for being socially responsible in their investments.

Riedl and Smeets (2017) explain this phenomenal socially responsible investment (SRI) growth by investigating why investors hold socially responsible mutual funds. They find that investors' intrinsic social preferences are a major factor determining the likelihood to hold SRI equity funds. Their study shows that most socially responsible investors "expect to earn lower returns on SRI than on conventional funds and pay higher management fees." In addition, "investors are willing to forgo financial returns in order to invest in accordance with their social preferences." This observation of the excess demand from these investors is consistent with the findings of Galema et al. (2008) that excess demand for socially responsible stocks may command a return premium. They show that socially responsible investment (SRI) "- in particular portfolios that score positive on diversity, environment and product - has a significant impact on stock returns."

With the growth in socially responsible mutual funds, there are many studies examining the performance of socially responsible mutual funds in comparison to traditional mutual funds. However, researchers have not had conclusive results. Some studies report that socially responsible mutual funds underperform traditional mutual funds (Change et al. 2012; Das and Rao 2013). Change et al. (2012) investigate the performance of 131 "green" mutual funds in a 15-year span. Green investing emerges from the socially responsible investment theme, with more emphasis on environmental issues. For example, green companies could involve in minimizing resource usage in production, producing renewable energy, or producing ecologically friendly products. Green mutual funds specialize in green company investment. Change et al. (2012) suggest that high R&D costs of green companies and high expense ratios of green mutual funds cause the poor performance of green mutual funds.

On the other hand, another group of researchers indicates that socially responsible mutual funds outperform conventional funds. Ito et al. (2013) employ a dynamic mean-variance model to compare socially responsible mutual funds to conventional funds in the E.U. and U.S. markets. They find that socially responsible mutual funds have superior performance when compared to conventional funds. However, other studies show no significant difference between socially responsible and conventional mutual funds (Utz and Wimmer 2014), especially after the risk is incorporated (Rodriguez 2010). The literature about socially responsible mutual funds' performance is rich, yet inconclusive.

While many studies focus on socially responsible mutual funds, insufficient attention has been given to socially responsible Exchange Traded Funds (SR ETFs). Although ETFs share the similar investment concept with mutual funds, they are different as they are listed and traded like stocks. Given the convenience of trading, ETFs become popular in recent decades. The increasing influence of ETFs in capital markets has attracted studies investigating ETFs performance. Sharifzadeh and Hojat (2012) find that ETFs performance is of no difference when compared to similar mutual funds. Rompotis (2009) reports similar risk and return level between ETFs and index funds. However, due to the fact that ETFs are relatively new in the capital markets, the literature about ETFs performance is limited. As socially responsible ETFs (SR ETFs) become popular only in the most recent decade, the literature about SR ETFs performance is even more scarce. This research aims to close the gap by studying the performance of SR ETFs.

This study examines the financial performance of SR ETFs by using the population of 36 sustainable SR ETFs in the U.S. We compare SR ETFs returns to the market return and find that

the difference is not statistically significant. Our findings that SR ETFs perform in line with the overall market indicates that being socially responsible does not promote nor compromise stock returns. A high positive correlation is identified between SR ETFs returns and the market return. In addition, SR ETFs have a lower market risk than the overall market. We conduct regression analysis on SR ETFs returns and find that SR ETFs returns have a positive association with the market return. We also find momentum in daily SR ETFs returns, but the momentum disappears at the monthly level.

This study is innovative in its attempt to investigate the financial performance of SR ETFs. Our finding that SR ETFs perform as well as the overall market suggests that we do not have to comprise financial performance for being socially responsible in ETFs investment. As individual investors become more conscious about sustainability and environmental protection, with our finding that being socially responsible does not comprise financial performance, we hope to not only shed some light in the SR ETFs field, but also encourage investors to incorporate more social responsibility in ETFs investment.

The paper proceeds as the following. After the Introduction in Section I, Section II covers data and methodology. Section III presents the empirical results. Section IV concludes.

II. Data and Methodology

The SR ETFs list is obtained from the ETF Website (http://www.etf.com). According to the website, the SR EFTs list can be generated with the "Principles" based on the selection. The website defines SR ETFs as investment in "the equity of companies that consider financial returns as well as social good" (http://www.etf.com/channels/socially-responsible-etfs). We obtain the original list with 40 SR ETFs. Among the 40 SR ETFs, four of them are bond funds. Since we focus on the stock market in this study, we exclude the four bond funds and have 36 equity SR ETFs on our list. Among the 36 equity SR ETFs, 15 of them have some extent of international investments and are defined as global funds, while 21 of them are domestic funds. Most of these funds are quite young, with the earliest inception in January 2005. We investigate the number of holdings and the trading days for each of these SR ETFs based on the latest available fact sheet. The daily prices for these 36 ETFs from each fund's inception till September 2017 are extracted from the Datastream. The number of trading days is also computed from inception till September 2017 for each fund. Based on the daily prices, we compute the daily, monthly, and annual returns for each of these SR ETFs.

We first examine each SR ETF daily returns and compare the daily returns to the market. We use S&P 500 Index as a proxy for the U.S. stock market. The daily values of the S&P 500 Index are extracted from the Datastream and the daily returns are computed based on these values over our sampling period from January 2005 to September 2017. The daily difference of the returns between each SR ETF and the market is examined by Student's t-Test to verify if these SR ETFs outperform or underperform the market. We also compute beta for each SR ETF based on the fund prices and the market prices. According to the Capital Asset Pricing Model (CAPM, Treynor 1962), beta (β) is measure of the market risk. A higher beta suggests a higher market risk. The difference between SR ETF's beta and the market beta is also examined by Student's t-Test.

We compute Sharpe ratio and Treynor measure for each SR ETF as the risk-adjusted return measurements. Sharpe ratio (Sharpe 1966) is the difference between the return and the risk-free rate, divided by the standard deviation, shown in equation (1). For the risk-free rate, we use the three-month Treasury Bills rate, which is also extracted from the Datastream on a daily basis over our sampling period. Sharpe ratio measures the investment performance by adjusting to the total

risk, while the total risk is measured by standard deviation. It measures the excess return for each unit of the total risk. Therefore, a higher Sharpe ratio indicates a higher risk-adjusted excess return. Given the same risk level, investors desire higher returns. Thus, a higher Sharpe ratio indicates a higher risk-adjusted return and better performance.

$$Sharpe_i = (\mu_i - Rf_i) / \sigma_i \quad (1)$$

where μ_i is the average daily return of the SR ETF, Rf_i is the average risk-free return, σ_i is the standard deviation of the SR ETF. Sharpe ratio is computed separately for each fund *i* from daily return data.

Treynor measure (Treynor 1965) is another risk-adjusted return measurement. It is the difference between the return and the risk-free rate, divided by the beta, shown in equation (2). Treynor measures the investment performance by adjusting to the market risk, while the market risk is measured by beta. It measures the excess return for each unit of the market risk. Therefore, a higher Treynor measure indicates a higher risk-adjusted excess return. Given the same market risk level, investors desire higher returns. Thus, a higher Treynor measure indicates a higher risk-adjusted return and better performance.

$$Treynor_i = (\mu_i - Rf_i) / \beta_i \quad (2)$$

where μ_i is the average daily return of the SR ETF, Rf_i is the average risk-free return, β_i is the beta of the SR ETF. Treynor measure is computed separately for each fund *i* from daily return data.

We compare Sharpe and Treynor of each SR ETF against the market's merits over the same time period. The difference between SR ETF and the market is also examined by Student's t-Test. We further compute each SR ETF's monthly and annual returns and compare the returns to the market. The difference of the returns between each SR ETF and the market is examined by Student's t-Test to examine if these SR ETFs outperform or underperform the market on the monthly and annual basis.

Each SR ETF has different inception date. We have different trading days for these SR ETFs. We aggregate the SR ETFs performance by taking the average daily returns of the available SR ETFs on each date. These returns are compared to the market daily returns based on the mean, median, standard deviation, Sharpe ratio, and Treynor measure. The difference of the returns is examined by Student's t-Test. The same analysis is also conducted on the monthly frequency.

We also utilize the average SR ETFs returns in the time series analysis. We use the aggregate average SR ETFs daily returns as the dependent variables in the regression. We include the market performance (Fama and French 1993) and the momentum effect (Carhart 1997) as the independent variables. Some SR ETFs are very young. In fact, more than half of the SR ETFs in our sample started in 2016. With different population size each day, we choose to take the average daily returns from all available SR ETFs to generate the aggregate average daily returns as the dependent variable in the time series analysis. In other words, we have one aggregate average SR ETFs return each day. We use the SR ETFs daily returns as the dependent variable; the independent variables include the daily market return and one-day lag SR ETFs average daily return for the momentum effect. The daily regression model is shown in equation (3).

$$r_t = \alpha + \beta_1 M_1 + \beta_2 r_{t-1} + \varepsilon_t \quad (3)$$

where r_t is the daily average return of the SR ETFs, M_1 is the daily market return, and r_{t-1} is the lagged average SR ETFs daily return, while α is the interception, β_1 and β_2 are parameters to be estimated, and ε_t is the error term.

We expand the same time series analysis into the monthly frequency. The dependent variable is the SR ETFs average monthly return and the independent variables include the monthly market return and one-month lagged SR ETFs average return. The monthly regression model is shown in equation (4).

$$r'_m = \alpha' + \beta'_1 M'_m + \beta'_2 r'_{m-1} + \varepsilon'_m \quad (4)$$

where r'_m is the monthly average return of the SR ETFs, M'_m is the monthly market return, and r'_{m-1} is the lagged SR ETFs average monthly return, while α' is the interception, β'_1 and β'_2 are parameters to be estimated, and ε'_m is the error term.

To examine the factors that might affect SR ETFs performance, we also conduct cross-sectional analysis on SR ETFs returns. We consider price-to-book ratio and fund size from Fama and French (1993), as well as expense ratio (Kostovetsky 2003 and Rompotis 2009). ETFs, as well as mutual funds, usually charge investors annual management fees. The management fees with other possible expenses are charged as a percentage of the investment amount, called expense ratio. Take the oldest SR ETF (SUSA) for example; it carries an expense ratio of 0.25 percent, which means that investors have to pay the investment company 0.25 percent fees out of the investment amount. Some studies (Kostovetsky 2003 and Rompotis 2009) find that the expense ratio plays an important role in investment returns. Therefore, we also include the expense ratio as one of the independent variables in the analysis. SR ETF specific information, including expense ratio, price-to-book, and fund size, is obtained from its latest fact sheet on each SR ETF website.

In the cross-sectional regression, we use the latest annual return for each SR ETF as the dependent variable. If the fund is younger than a year, the return is computed based on the available price information and annualized to get the annual return. The independent variables include expense ratio, price-to-book, and fund size. The annual regression model is shown in equation (5).

$$r''_i = \alpha'' + \beta''_1 E_i + \beta''_2 PB_i + \beta''_3 S_i + \varepsilon''_i \quad (5)$$

where r''_i is the annual return for each SR ETF, E_i is the expense ratio, PB_i is the price-to-book ratio, and S_i is fund size, while α'' is the interception, β''_1, β''_2, and β''_3 are parameters to be estimated, and ε''_i is the error term.

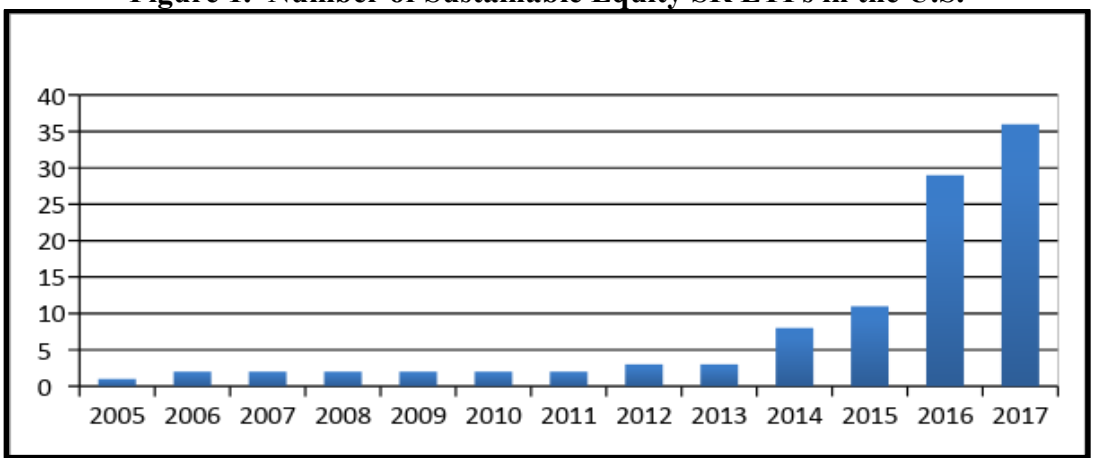
III. Empirical Results

A. Growing Numbers of Sustainable SR ETFs

SR ETFs have become popular in recent years. Based on the inception dates of the sustainable SR ETFs in our data, Figure 1 shows the total number of the sustainable equity SR ETFs in the U.S. The very first SR ETF traded in the U.S. is iShares MSCI U.S.A. ESG Select ETF, with the trading ticker of SUSA. It was issued by BlackRock Inc., a global investment corporation, on January 24, 2005. SUSA is traded on New York Stock Exchange and the closing price is $113.63 per share as of May 31, 2019. It has 8.5 million shares outstanding with the

average daily trading volume of 45,954 shares over the last 20 trading days as of May 31, 2019. The asset value under management is slightly under one billion dollars ($965,425,121 as of May 31, 2019). SUSA invests in U.S. companies with the highest Environmental, Social, and Governance (ESG) ratings, with the top 10 holdings as the following: Microsoft Corp., Ecolab Inc., Apple Inc., Accenture Plc, Alphabet Inc., 3M Co., BlackRock Inc., Salesforce.com Inc., Marsh & McLennan Co., and PepsiCo Inc.

Figure 1. Number of Sustainable Equity SR ETFs in the U.S.



The number of SR ETFs shown in Figure 1 increases sharply in 2014 and continues the rapid growth thereafter. A tremendous increase in number of SR ETFs is observed in 2016 and 2017. This finding aligns with the conclusion of the survey done by Morgan Stanley Institute for Sustainable Investing in 2015, which reports that "total volume of sustainable investments nearly doubled from 2012 to 2014", where sustainable investments refer to investment strategies that consider environmental, social, and governance (ESG) factors, also named as socially responsible investments. According to this survey, sustainable investments have received increasing attention from media and investors, with "the number of media mentions doubling since 2010." In addition, "millennials are on board with sustainability"; 84 percent of them express interested in sustainable investing. The survey further shows that "two in three individual investors believe that sustainable investing will become more prevalent in the next five years", which supports the trend shown in the Figure 1. The survey argues that "sustainable investing is an investment approach that is expected to become much more widespread, transcending market conditions and economic outlook."

B. SR ETFs Descriptive Statistics

There are 36 equity SR ETFs in our analysis. Among these 36 SR ETFs, 15 of them have some extent of global investments and are defined as global equity funds, while the rest 21 are U.S. domestic equity funds. We first examine the number of holdings from each SR ETF. The information is generated from the latest available fact sheet from each SR ETF as of June 11, 2019. The descriptive statistics is presented by groups; Group I includes the 21 domestic equity SR ETFs and Group II includes the 15 global equity SR ETFs. We also combine them in the All Group, shown in Table 1 Panel A. The average number of holdings or positions for domestic SR ETFs is 312 and the number is 430 for global SR ETFs. The global SR ETFs seem to have more holdings when compared to the domestic ones. As most SR ETFs are still young, we examine the number

of trading days for each SR ETF from inception to our data point of September 2019, shown in Table 1 Panel B. We have the longest trading days of 3,306 days and the shortest trading days of 16 days, while the average trading days are around 500 days.

We then examine each SR ETF's returns. The returns for each SR ETF and the market are generated on a daily basis, while we use S&P 500 Index as the proxy for the market. We also compare each SR ETF's return to the market return on the same day to generate the difference. We generate the average daily returns for each SR ETF, following equation (6) shown in Table 1 Panel C-1, and present the results in quantiles by groups. The average daily return is around 0.05 percent across three groups. When compared to the market, all three groups have positive difference and the global SR ETFs seem to have statistically significant difference. However, when we combine all 36 SR ETFs, the difference is not statistically significant with Student's t-Test. We conclude the daily returns for the 36 SR ETFs are not significantly different from the market. These SR ETFs perform as well as the overall market; being socially responsible does not comprise SR ETFs returns.

We also generate beta as the market risk measurement for each SR ETF, following Capital Asset Pricing Model (CAPM, Treynor 1962) with equation (7) shown in Table 1 Panel C-2. The beta is around 0.5 for all three groups, while the market beta is one. We examine the beta difference between the SR ETFs and the market. We find that the difference is statistically significant. The evidence suggests that these SR ETFs tend to have lower market risk when compared to the market.

We compute the risk-adjusted returns for each SR ETF, including Sharpe ratio and Treynor measure. As defined in equation (1) under Section II, Sharpe ratio (Sharpe 1966) is the difference between the return and the risk-free rate, divided by the standard deviation. It measures the excess return for each unit of the total risk. A higher Sharpe ratio indicates a higher risk-adjusted excess return. We use the 3-month Treasury Bills rate as the proxy for the risk-free rate. Given the return series for each SR ETF and the risk-free rate over the same time period, we generate Sharpe ratio for each SR ETF and present the results in quantiles by groups in Table 1 Panel C-3. We also compare each SR ETF's Sharpe ratio to the market's Sharpe ratio over the same time period to generate the difference. The difference in Sharpe between each SR ETF and the market is very close to zero for all three groups and is not statistically significant. The SR ETFs have similar risk adjusted returns, measured in Sharpe ratio, when compared to the market.

We also generate Treynor as another risk-adjusted return measurement. As defined in equation (2) in Section II, Treynor measure (Treynor 1965) is the difference between the return and the risk-free rate, divided by the beta. Treynor measures the investment performance by adjusting to the market risk. It measures the excess return for each unit of the market risk. A higher Treynor measure indicates a higher risk-adjusted excess return. We generate Treynor measure for each SR ETF and present the results in quantiles by groups in Table 1 Panel C-4. We also compare each SR ETF's Treynor to the market over the same time period to generate the difference. The difference in the 15 global SR ETFs group is positive and statistically significant. These 15 global SR ETFs have higher risk-adjusted returns, measured by Treynor, when compared to the market. However, when we combine all 36 SR ETFs, the difference is not statistically significant. We conclude that the 36 SR ETFs have similar risk-adjusted returns, measured by Treynor, when compared the market.

In addition to the daily returns, we also generate the average monthly returns with equation (8) for each SR ETFs and present the result in quantiles by groups in Table 1 Panel C-5. The average monthly return is around 1.2 percent for these SR ETFs. The monthly returns are

compared to the market to generate the difference. The global SR ETFs seem to have higher monthly returns when compared to the market. However, such significance disappears when we combine all 36 SR ETFs to examine the monthly return difference. We conclude that these SR ETFs perform as well as the overall market in terms of the monthly returns.

We further expand the return to the average annual return with equation (9) for each SR ETF and present the result in quantiles by groups in Table 1 Panel C-6. If the fund is younger than a year, the return is computed based on the available price information and annualized to get the annual return. The average annual return is around 14 percent for these SR ETFs. The annual returns are compared to the market to generate the difference. The global SR ETFs seem to have higher annual returns when compared to the market. However, such significance disappears when we combine all 36 SR ETFs to examine the annual return difference. We conclude that these SR ETFs perform as well as the overall market in terms of the annual returns.

Table 1. Descriptive Statistics

Panel A. Basic Information for SR ETFs: Number of Holdings[1]

Group[2]	Mean	Std Dev	Min	Q25	Median	Q75	Max
I (21 SR ETFs)[3]	312	353	82	128	164	382	1,573
II (15 SR ETFs)	430	428	48	129	293	495	1,464
All (36 SR ETFs)[3]	366	387	48	128	239	459	1,573

Panel B. Basic Information for SR ETFs: Number of Trading Days in the Market[4]

Group[2]	Mean	Std Dev	Min	Q25	Median	Q75	Max
I (21 SR ETFs)	538	858	16	208	239	409	3,306
II (15 SR ETFs)	545	414	83	315	340	739	1,378
All (36 SR ETFs)	541	699	16	208	323	554	3,306

Panel C. Market Performance of SR ETFs

Panel C-1. Average Daily Return (μ_i) (%)

$$r_{it} = \mu_i + \varepsilon_{it} \quad (6)$$

where r_{it} is the daily return of the SR ETFs, μ_i is each SR ETF's average daily return, and ε_{it} is the error term. This regression is run separately for each fund i to calculate μ_i, average daily return for each fund.

Group[2]	Mean	Std Dev	Q25	Median	Q75	Difference[5]	t-Value[6]
I (21 SR ETFs)	0.0568	0.0535	0.0367	0.0520	0.0571	0.0014	0.1792
II (15 SR ETFs)	0.0525	0.0200	0.0407	0.0520	0.0638	0.0075	1.8906*
All (36 SR ETFs)	0.0550	0.0424	0.0380	0.0520	0.0610	0.0039	0.8030

Panel C-2. Beta (β_i) from Average Daily Return

$$r_{it} = \alpha_i + \beta_i M_t + \varepsilon_{it} \quad (7)$$

where r_{it} is the daily return of the SR ETFs, α_i is the interception, M_t is the daily market return, β_i is the parameter to be estimated, and ε_{it} is the error term. This regression is run separately for each fund i to estimate beta, β_i, for each fund from daily return data.

Group[2]	Mean	Std Dev	Q25	Median	Q75	Difference[5]	t-Value[6]
I (21 SR ETFs)	0.5892	0.3093	0.3216	0.5679	0.8539	-0.4108	-6.0872***
II (15 SR ETFs)	0.5085	0.2246	0.3813	0.5208	0.6931	-0.4915	-8.4738***
All (36 SR ETFs)	0.5556	0.2765	0.3326	0.5301	0.7766	-0.4444	-9.6431***

Panel C-3. Sharpe from Average Daily Return

Sharpe ratio, defined as $Sharpe_i = (\mu_i - Rf_i) / \sigma_i$ in equation (1), is generated for each fund *i* based on the daily ETF return and the 3-month Treasury Bills rate as the proxy for the risk-free return.

Group[2]	Mean	Std Dev	Q25	Median	Q75	Difference[5]	t-Value[6]
I (21 SR ETFs)	0.1121	0.1983	0.0508	0.0681	0.0952	0.0004	0.0139
II (15 SR ETFs)	0.0755	0.0403	0.0333	0.0908	0.1114	-0.0011	-0.2167
All (36 SR ETFs)	0.0968	0.1532	0.0432	0.0723	0.1029	-0.0002	-0.0144

Panel C-4. Treynor (%) from Average Daily Return

Treynor measure, defined as $Treynor_i = (\mu_i - Rf_i) / \beta_i$ in equation (2), is generated for each fund *i* based on the daily ETF return, beta, and the 3-month Treasury Bills rate as the proxy for the risk-free return.

Group[2]	Mean	Std Dev	Q25	Median	Q75	Difference[5]	t-Value[6]
I (21 SR ETFs)	0.0084	0.5331	0.0461	0.0662	0.1360	-0.0449	-0.3922
II (15 SR ETFs)	0.1495	0.1559	0.0614	0.1041	0.1759	0.1060	2.7315***
All (36 SR ETFs)	0.0672	0.4208	0.0535	0.0717	0.1676	0.0180	0.2605

Panel C-5. Average Monthly Return (μ'_i) (%)

$$r'_{it} = \mu'_i + \varepsilon'_{it} \quad (8)$$

where r'_{it} is the monthly return of the SR ETFs, μ'_i is each SR ETF's average monthly return, and ε'_{it} is the error term. This regression is run separately for each Fund *i* to calculate μ'_i, average monthly return for each fund.

Group[2]	Mean	Std Dev	Q25	Median	Q75	Difference[5]	t-Value[6]
I (21 SR ETFs)	1.2484	1.1293	0.8032	1.1721	1.2887	0.0823	0.3908
II (15 SR ETFs)	1.1881	0.5353	0.8725	1.1965	1.4415	0.1930	2.0440*
All (36 SR ETFs)	1.2233	0.9188	0.7981	1.1843	1.1309	0.1285	1.0041

Panel C-6. Average Annual Return (μ''_i) (%)[7]

$$r''_{it} = \mu''_i + \varepsilon''_{it} \quad (9)$$

where r''_{it} is the annual return of the SR ETFs, μ''_i is each SR ETF's average annual return, and ε''_{it} is the error term. This regression is run separately for each Fund *i* to calculate μ''_i, average annual return for each fund.

Group[2]	Mean	Std Dev	Q25	Median	Q75	Difference[5]	t-Value[6]
I (21 SR ETFs)	14.6450	15.6211	9.5567	13.8105	16.3340	1.3468	0.4251
II (15 SR ETFs)	13.9940	6.7824	11.8651	13.8576	16.9933	2.3013	1.9923*
All (36 SR ETFs)	14.3737	12.5676	9.7101	13.8341	16.7234	1.7445	0.9227

Note:

[1] Number of holdings is number of firms or positions each ETF holds. The information is based on the latest available fact sheets on June 11, 2019

[2] Group I includes the 21 U.S. domestic ETFs, Group II includes the 15 global ETFs, and All Group includes both Group I and II.

[3] Three ETFs (ICAN, RODI, and WIL) do not have the information available for the number of holdings and are excluded in the report.

[4] Trading days are calculated from the fund's inception to the data end date of September 29, 2017.

[5] Difference is the mean difference between each ETF and the market, with S&P 500 Index as proxy for market.

[6] The t-Value is generated based on the difference between each ETF and the market. *, **, *** indicate statistical significance at 10 percent, 5 percent, and 1 percent, respectively, using Student's t-Test.

[7] If the fund has less than a year in the return history, the available recent return information is annualized to generate the annual return.

C. Average SR ETFs Daily and Monthly Returns

To aggregate the return information from the SR ETFs, we compute the average daily returns based on the SR ETFs available on each date. These returns are compared to the market daily returns based on the mean, median, standard deviation, Sharpe ratio, and Treynor measure, shown in Table 2. The SR ETF average daily return is 0.0254 percent, while the market's average daily return is 0.0302 percent. The SR ETF average daily returns are lower than the market's, but the difference is not statistically significant based on Student's t-Test. SR ETFs also have a lower Sharpe ratio of 0.0211 when compared to the market's Sharpe ratio of 0.0228, but SR ETFs have a slightly higher Treynor of 0.0270 percent when compared to the market's Treynor of 0.0269 percent. We conclude that SR ETFs performance is not significantly different from the market, in terms of its daily returns and risk-adjusted daily returns.

The correlation between the SR ETFs daily returns and the market's daily returns is 0.9213. This high correlation between the SR ETFs and the market performance is not surprising as many of the socially responsible investment targets might be included in the S&P 500 Index. The beta of the average daily SR ETFs returns is 0.8220, indicating SR ETFs have lower market risk.

Table 2. Average SR ETFs Daily Returns

	SR ETFs	Market	Diff	Risk Free
Avg	0.0254%	0.0302%	-0.0047%	0.0032%
SD	1.0518%	1.1808%	0.4557%	
Median	0.0336%	0.0348%	0.0000%	
Sharpe	0.0211	0.0228		
Treynor	0.0270%	0.0269%		
t Value			-0.6090	
Pr > |t|			0.5426	
Corr	0.9231			
Beta	0.8220	1.0000		

The comparison between the SR ETFs monthly returns and the market's shows similar results to those of daily returns, shown in Table 3. The SR ETFs have an average monthly return of 0.5491 percent, which is lower than the market's average monthly returns of 0.6509 percent. However, the difference is not statistically significant. SR ETFs have a lower Sharpe ratio of 0.1184 when compared to the market's Sharpe ratio of 0.1485. SR ETFs also have a lower Treynor of 0.4835 percent when compared to the market's Treynor of 0.5808 percent. As the monthly return difference is not statistically significant, we conclude that SR ETFs performance is not significantly different from the market, in terms of the monthly returns. However, their risk-adjusted returns seem lower than the markets. The correlation between the SR ETFs monthly returns and the market's monthly returns is 0.9642. The beta of the average monthly returns is 0.9906, very close to the market beta of one.

Table 3. Average SR ETFs Monthly Returns

	SR ETFs	Market	Diff	Risk Free

Avg	0.5491%	0.6509%	-0.1018%	0.0701%
SD	4.0456%	3.9117%	1.0734%	
Median	1.1351%	1.1358%	-0.0112%	
Sharpe	0.1184	0.1485		
Treynor	0.4835%	0.5808%		
t Value			-1.1698	
Pr > |t|			0.2439	
Corr	0.9642			
Beta	0.9906	1.0000		

D. Time Series Analysis on Daily and Monthly Returns

The oldest SR ETF has the inception of January 2005 in our data set. We conduct the time series analysis on the SR ETFs returns. More specifically, we use the SR ETFs average daily returns as the dependent variable. One independent variable is the market return. To examine the momentum of SR ETFs performance, we also include the one-day lagged SR ETFs average daily return as another independent variable. The regression results are shown in Table 4. Both the market and the previous day return are found to be statistically significant and positive. In other words, SR ETFs returns have a significant positive association with the market return; there is the daily momentum found in the average SR ETFs daily returns.

Table 4. Daily Return Regression Results

Overall	**R-square**	**F value**	**Pr > F**	
	0.8571	9900.31	<.0001	
Variables	**Estimate**	**Std Error**	**t Value**	**Pr > |t|**
Intercept	-0.0000	0.0000	-0.21	0.8360
Market D	0.8275	0.0058	140.71	<.0001
Lag D	0.0709	0.0066	10.74	<.0001

The same time series analysis is conducted on a monthly basis. We use the SR ETFs average monthly return as the dependent variable. The independent variables include the monthly market return and the one-month lag SR ETFs average monthly return. The regression results are shown in Table 5. The market remains to be significant on the SR ETFs returns; SR ETFs monthly returns have a positive association with the market return. However, the lagged SR ETFs monthly return is not significant. The momentum disappears in the SR ETF average monthly returns.

Table 5. Monthly Return Regression Results

Overall	**R-square**	**F value**	**Pr > F**	
	0.9308	995.62	<.0001	
Variables	**Estimate**	**Std Error**	**t Value**	**Pr > |t|**
Intercept	-0.0011	0.0008	-1.25	0.2140
Market M	0.9941	0.0225	44.17	<.0001
Lag M	0.0330	0.0217	1.52	0.1313

E. Cross-Sectional Analysis on Annual Returns

We expand the analysis into the cross-sectional analysis to examine fund-specific factors. The factors we consider include the fund's expense ratio (Expense), price-to-book ratio (PB), and fund size (Size). We use each of the 36 SR ETF annual returns in the latest year as the dependent variable and use expense ratio, price-to-book, and fund size as independent variables to run the regression. If the fund has less than a year in the return history, the available recent return information is annualized to generate the annual return. The regression results are shown in Table 6. No significant effect is found among these factors; the R-square for this regression is only 0.0874. Our empirical results about fund expense ratio do not support Rompotis' (2009) argument that higher fees lead to higher ETF returns.

Table 6. Cross-Sectional Regression Results

Overall	**R-square**	**F value**	**Pr > F**	
	0.0874	0.89	0.4566	
Variables	**Estimate**	**Std Error**	**t Value**	**Pr > |t|**
Intercept	0.1383	0.1224	1.13	0.2681
Expense	28.1205	19.1792	1.47	0.1537
PB	0.0035	0.0339	0.10	0.9176
Size	-0.0000	0.0001	-0.59	0.5592

F. Robustness Check

Our data has 36 equity SR ETFs. 15 of these 36 SR ETFs involve some extent of global investment. Since we compare the SR ETFs to the U.S. equity market, we exclude those 15 global ones and conduct the same analysis on the rest 21 domestic ETFs in the robustness check. The results, readily available from the authors, are similar to the results of our full population. The performance of these 21 domestic equity SR ETFs is not significantly different from the market.

We also consider macroeconomic factors in the regression. Based on Fama and French (1993), market factor should be able to capture all market risks that stem from macroeconomic fluctuations. Nevertheless, we add three more macroeconomic variables as independent variables in addition to the market and the momentum in the robustness check, including Gross Domestic Product (GDP), Consumer Price Index (CPI), and interest rate. As GDP is released quarterly, quarterly data is utilized in this regression. The dependent variable is the quarterly SR ETFs average return; the independent variables are the market, lagged SR ETF return, change in GDP, change in CPI, and the three-month Treasury bill interest rate. The quarterly regression results are readily available from the authors. Lagged SR ETF return, GDP, CPI, and the interest rate do not have significant associations with the SR ETFs returns, while the market still has a positive association with the SR ETFs returns. The result seems to indicate that the market already incorporates the macroeconomic factors, while momentum (found in daily returns) disappears in the quarterly returns.

In the cross-sectional regression, we notice the R-square is only 0.0874 in our original regression. None of the independent variables is found significant. We further consider sectors in the cross-sectional regression. For each SR ETF, there are top 10 sectors identified from its fact sheet. We still use each of the SR ETF annual returns in the latest year as the dependent variable and add sectors as another independent variables, in addition to the expense ratio, price-to-book,

and fund size. The complete regression results are readily available from the authors. The R-square increases to 0.5487. The sector selection seems to help explain the SR ETF returns. However, there is still no significant effect found among these factors. We also check the multicollinearity among the independent variables, but we do not find the multicollinearity issue significant in our regression.

IV. Conclusion

Socially responsible investments used to be an investment fad that investment managers exploited (Change et al. 2012) and were believed to generate lower returns due to limited pool of securities for selection and thus lack of diversification (Kurtz and DiBartolomeo, 1996). However, with socially responsible investments getting more popular in recent years, investors are no longer shy away from this investment philosophy and have pushed the socially responsible investments to $22.89 trillion globally by end of 2016 (Global Sustainable Investment Review 2016). Many SR ETFs have emerged especially in recent years to echo this new investment trend. With only a dozen years of history for SR ETFs, the literature about SR ETFs performance is very scarce. The rapid growth in SR ETFs demands more research in the performance of SR ETFs.

This study examines the population of 36 U.S. equity SR ETFs over the 12-year time period, starting from the first inception of the SR ETF in January 2005 to September 2017. We compare the SR ETFs to the market on their daily and monthly returns. We find that the difference between SR ETFs returns and the market's return is not statistically significant. In other words, SR ETF's performance is not significantly different from the market performance. For investors who are interested in socially responsible investments, our findings suggest that investing in SR ETFs do not improve portfolio returns. As a result, investors do not need to sacrifice financial returns in order to "invest in accordance with their social preferences" (Riedl and Smeets, 2017).

Beta measures market risk. SR ETFs tend to have lower market risk. This result seems to be against the argument that socially responsible investments may encounter security selection bias and thus lack of diversification. We also find that SR ETFs are highly correlated with the market, indicating that socially responsible investment concept is now well accepted by the mainstream of the market and is no longer a merely new fad in investments. We further conduct time series and cross-sectional regressions on SR ETFs returns. We find that the SR ETFs returns have a positive association with the market return. We also find momentum in SR ETFs returns on the daily level, but it disappears at the monthly level. This study is innovative in attempting to compare the SR ETFs performance to the market. We hope to shed some light in the field and contribute to the literature about SR ETFs performance.

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