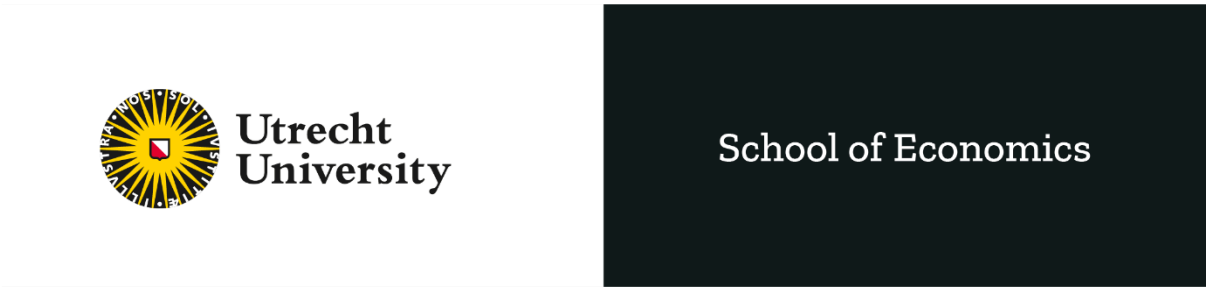
Fund Flows of Socially Responsible Mutual Funds During Crises



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Introduction

Socially Responsible Investments (SRI) have experienced a surge in popularity over the past decade, with investors increasingly incorporating environmental, social, and governance (ESG) criteria into their investment decisions. In the US alone, the assets under professional management following SRI strategies grew from $8.7 trillion to $12.0 trillion between 2016 and 2018, representing a significant portion of total assets under management. As of the beginning of 2020, sustainable investment worldwide amounted to $35.3 trillion across five key markets (Europe, United States, Canada, Australasia and Japan), marking a 15% rise over the previous two years (2018-2020) and a 55% increase over the past four years (2016-2020). This upward trajectory has been bolstered by regulatory efforts such as the United Nations Principles for Responsible Investments and sustainability assessments offered by organizations like Morningstar (GSIR, 2021).

Mutual Funds & ETFs focused on Socially Responsible Investing (SRI) utilize both positive and negative screening approaches to curate their portfolios. Positive screening involves identifying companies that excel in Environmental, Social, and Governance (ESG) criteria, while negative screening involves excluding companies engaged in contentious industries such as tobacco, weapons, and fossil fuels. The majority of funds typically employ screening for either product-related criteria or for ESG attributes combined with a few product screens. A smaller number of funds solely screen for ESG attributes, disregarding any product screens (Varma & Nofsinger, 2012).

Regarding crisis periods, active management, which mutual funds inherently involve to some degree, is valued by investors due to their superior performance in such periods. Glode (2011) suggests that the significant demand from investors for actively managed funds may stem from the active managers' capacity to achieve better performance during adverse market conditions compared to favourable ones. The term "flight-to-quality" describes a financial market trend observed during crises, wherein investors shift their capital from higher-risk assets to those considered safer, such as US Treasuries and gold. This phenomenon has been discussed by scholars like Vayanos (2004), Caballero and Krishnamurthy (2008), and Bernanke et al. (1996) across different contexts.

Whether SRI mutual funds are as resilient during crises as comparative “traditional funds” is a question I seek to look at throughout this paper. The effect of selection methods on SRI fund capital flows also requires investigation as some techniques may be seen as more “active” i.e.

positive screening than others. Finally, I will also assess the effect of "market focus" on fund flows during the crisis period.

Literature Review

Early investigations into SRI mutual funds primarily concentrate on comparing their performance with conventional counterparts. They generally reveal no significant disparities, likely attributed to portfolio constraints favouring non-financial criteria over mean-variance efficiency (Benson et al., 2006; Hamilton et al., 1993; Renneboog et al., 2008). Hamilton et al. (1993) observe that only newer SRI funds outshine randomly selected conventional funds during 1981–1990, but this advantage diminishes for older funds. Statman (2000) similarly notes that SRI funds marginally outperform conventional ones during 1990–1998. Benson et al. (2006), however, find SRI funds to under perform conventional ones using an eight-factor model from 1994–2003. Various studies during different time spans—Bauer et al. (2005) from 1990–2001 and Renneboog et al. (2008) from 1991–2003—detect no significant disparity in performance between SRI and conventional funds. Climent and Soriano (2011) affirm that SRI funds either under perform or perform equivalently to conventional ones from 1987–2009. Gil-Bazo et al. (2010), using a distinct matching method, found SRI funds to perform better both pre- and post-fees than conventional ones from 1997–2000, attributing this solely to SRI funds managed by specialized management companies.

Renneboog et al. (2008) suggest that the social value component in the utility function diminishes the significance of financial attributes for SRI investors. In line with this argument, Renneboog et al. (2011) and Benson and Humphrey (2008) find indications that SRI investors may exhibit greater loyalty towards SRI mutual funds compared to conventional investors. They analyse the monthly to annual lead-lag relationships between returns and fund inflows for both SRI and conventional funds. Their findings reveal that SRI fund inflows are notably less responsive to past negative returns compared to inflows into conventional funds. However, Renneboog et al. (2011) observe that not all categories of SRI funds behave similarly. Specifically, SRI funds employing negative screens or screens based on specific ethical concerns show a weaker sensitivity of inflows to negative returns, whereas social screens lead to a weaker relationship between inflows and returns when past returns have been positive. Conversely, flows of SRI funds with environmental screens are more reactive to past returns.

Nakai et al., (2016) suggested that SRI funds better resisted the bankruptcy of Lehman brothers' than conventional funds, with international SRI funds proving more resilient than domestic funds.

Theoretical Framework

SRI portfolios may carry unsystematic risk due to investors limiting their choices of available firms through various screens, incurring diversification costs (Guenster, 2012). Consequently, SRI mutual funds might become under diversified and under perform within traditional mean-variance optimization frameworks. While the discussion surrounding whether SRI yields positive, negative, or neutral returns is valuable from an asset pricing standpoint, it underscores investors' perceptions of return distribution and risk. During economic downturns, investors prioritize downside risk protection, leading to increased demand for actively managed funds despite their unconditional under performance (Glode, 2011). Moskowitz (2000) suggests that active managers may add value by delivering superior returns precisely when investors need them the most, particularly in adverse economic conditions. Kahneman and Tversky's Prospect Theory (1979) further supports this, showing that investors are more averse to losses than they are drawn to gains of equal magnitude, prioritizing downside protection even at the expense of sacrificing some returns during favourable periods.

People tend to scrutinize corporate behaviour more closely during economic downturns (Hirshleifer, 2007). Supporters of SRI argue that their investment approach significantly reduces downside risk. Companies focusing on social responsibility and good governance practices may face lower risks, potentially leading to better financial performance. SRI funds utilizing positive screens select firms with strong environmental records, robust corporate governance, and positive employee relations, which are less prone to negative outcomes in these social aspects. Conversely, negative screens avoid stocks that are likely to generate high-impact negative news related to social issues. Consequently, SRI portfolios may demonstrate greater resilience during bear markets, albeit at the expense of potentially under performing during bull markets, explaining their appeal.

Hypothesis 1: SRI fund performance will be superior, during crisis periods, then conventional funds.

When combined with the findings of Renneboog et al. (2011) and Benson and Humphrey (2008) that SRI investors may exhibit greater loyalty towards SRI mutual funds compared to

conventional investors, I theorize that fund outflows should be less severe during market crises than comparative non-SRI funds. I intend to evaluate fund flow performance during pre-crisis, crisis and post-crisis periods which I lay out below, with the expectation of fund-flows being less sensitive to negative performance during all periods but especially so during the crisis period. I will also assess the effect of SRI fund characteristics on this relationship.

Hypothesis 2: The convexity of fund-flow performance is greater for SRI funds than conventional funds.

Empirical Strategy

My current dataset consists of 78 SRI mutual funds and 78 conventional funds. The dataset is a combination of all sustainable investment mutual funds provided by US SIF's institutional member firms and mutual funds from CRSP Survivor-Bias-Free US Mutual Fund Database. For US SIF's database financial performance data is provided by Bloomberg LP and is updated until 31/12/2023. Fund flow data is provided by FactSet or Refinitiv and is available for a range of time periods including monthly data. The CRSP dataset includes both active and inactive mutual funds, providing information on funds regardless of whether they are still active. This addresses the survivorship bias which may arise from solely using US SIF's data, which only list funds still trading.

To identify SRI funds from the CRSP data I searched the fund names for the following keywords: "responsible", "sustainable", "ecological", "environment", "green" ad "social". I also applied this method to a Refinitiv data screen. All funds have an inception date prior to the beginning of the period of study (01/06/2006). All SRI screening data was obtained manually from SEC EDGAR's mutual fund database with Impact Investing, Negative Screening, Positive Screening, and a self-made variable SRI Language which measured the contents of each funds prospectus, found on SEC, and ranked it:

Weak = No clear SRI selection method or enforcement

Medium = Clear selection method.

Strong = Clear Selection Method and Enforcement.

Methodology

Fund Comparison

To compare the performance of SRI funds with a matched sample of conventional funds. This matching approach, widely used in similar studies, ensures fair comparisons. For each SRI fund, I plan to select three conventional funds with similar Lipper fund objectives, inception dates within a year of the SRI fund, and comparable total net assets. To prevent dominance by a few large fund families, I will ensure that the matched conventional funds come from different fund families for each SRI fund (Varma, 2012).

Selection of Study Period

The US crisis period, associated with the global financial crisis, saw the S&P 500 drop from 1576.09 on October 11, 2007, to 666.79 on March 6, 2009. According to the National Bureau of Economic Research (2024), December 2007 to June 2009 (18 months) was consistent with a recession. I use the recessionary period outlined by NBER as the crisis period in this study. The pre-crisis period will span 18 months from 01/06/2006 – 30/11/2007. The post crisis period will therefore also span 18 months, 01/07/2009 until 31/12/2011. The post crisis period set out allows for significant economic recovery. Therefore, the period for all three stages, crisis, pre-crisis and post-crisis, dates from 01/06/2006 – 31/12/2011.

Fund-Flows

To gauge the influx of new capital into the mutual fund, I adhere to a common practice in the literature by utilizing two widely used measures. First, I calculate the dollar net flow of new capital for fund i in month t + 1 using equation 1. Here, $TNAi,t+1$ and $TNAi,t$ represent the Total Net Asset (TNA) of fund i at the end of month t + 1 and t, respectively, while $Ri,t+1$ denotes the fund's net return over month $t+1$. This dollar flow accounts for the new capital (cash) entering the fund, net of any potential cash outflows. Additionally, Eq. (1) assumes that new capital inflows occur at the end of month t + 1, and all dividends from the fund are reinvested.

$$dollar\ flow_{i,t\rightarrow t+1} = TNA_{i,t+1} - TNA_{i,t}(1 + R_{i,t+1}) \quad \textbf{(1)}$$

As noted by Zheng (1999), the dollar amount of new capital is more suitable for the mutual fund industry as it emphasizes economically significant inflows from an aggregate perspective. Additionally, I calculate the percentage net flow of new capital for fund i in

month t + 1, which is derived from the dollar flow equation (Eq. 1) normalized by the fund's Total Net Asset (TNA) from the previous month.

$$percentage\ flow_{i,t\to t+1} = \frac{TNA_{i,t+1} - TNA_{i,t}(1 + R_{i,t+1})}{TNA_{i,t}} \quad \textbf{(2)}$$

The percentage flow provides insight into the dollar value of new capital relative to the fund's assets. As described by Sirri and Tufano (1998), it reflects the percentage growth of a fund in excess of the growth that would have occurred had no new funds flowed in and had all dividends been reinvested.

I intend to compare the dollar flow and percentage flow between SRI-Funds and Non-SRI funds in pre-crisis, crisis, and post-crisis periods. I will also analyse the SRI-Fund flows based on different screening criteria and foci, as well as International vs Domestic SRI funds.

Performance

I will employ three distinct factor models to compute the risk-adjusted abnormal return performance of the average SRI fund compared to matched conventional funds: the Capital Asset Pricing Model (CAPM), the Fama-French (1993) three-factor model, and the Carhart (1997) 4-factor model similar to the study of Varma (2012) and Klinkowska & Zhao (2023).

$$R_t - R_{r,t} = \alpha_{PEC} D_{C,t} + \alpha_C D_{C,t} + \alpha_{PTC} D_{C,t} + \beta_1 \left(R_{m,t} - R_{r,t}\right) + \varepsilon_t \quad \textbf{(3)}$$

In the provided equation, R_t represents the equally weighted average monthly fund returns for a specific fund category (SRI, or Conventional) at time *t*. α_{PEC} denotes the monthly alpha during pre-crisis period, while α_C represents the monthly alpha during crisis periods and α_{PTC} denotes the monthly alpha during the post-crisis period. $D_{PEC,t}$ is a dummy variable equal to 1 during the pre-crisis period, 2 during the crisis, and 3 during the post-crisis period. $R_{m,t}$ indicates the market return, $R_{r,t}$ stands for the risk-free rate (30-day T-bill rate), β_1 measures systematic risk, and ε_t refers to the idiosyncratic return component.

$$R_t - R_{r,t} = \alpha_{PEC} D_{PEC,t} + \alpha_C D_{C,t} + \alpha_{PTC} D_{PTC,t} + \beta_1 \left(R_{m,t} - R_{r,t}\right) + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_t \quad \textbf{(4)}$$

Extending the CAPM, the Fama-French 3-factor model with crisis and non-crisis alphas incorporates the following specifications, where β_2 and β_3 represent the loadings on the size (SMB) and value (HML) factors, respectively.

$$R_t - R_{r,t} = \alpha_{PEC} D_{PEC,t} + \alpha_C D_{C,t} + \alpha_{PTC} D_{PTC,t} + \beta_1 \left(R_{m,t} - R_{r,t}\right) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 WML_t + \varepsilon_t \quad \textbf{(5)}$$

Lastly, I consider the Carhart 4-factor model to measure crisis and non-crisis alphas. In the provided equation, β_4 represents the loading on the momentum (WML) factor, while the other terms have been previously defined. The monthly alphas are annualized for presentation in my tables. To address any potential time-series correlation in the regression residuals, I calculate standard errors for the regression coefficients using the Newey-West procedure (Newey and West, 1987).

I intend to compare the alpha between SRI funds and non-SRI funds in pre-crisis, crisis and post-crisis periods. I will also analyse the SRI funds based on different screening criteria and foci, as well as international vs domestic SRI funds.

Fund-Flow Performance

$$Flow_{i,t} = \gamma_0 + \left(\beta_1 R^+ + \beta_2 R^-\right) Return_{i,(t-1)} + \gamma_1 II_i + \gamma_2 NS_i + \gamma_3 PS_i + \gamma_4 Period_i + \gamma_5 Fund\_Type_i + \gamma_6 Regional\_Focus_i + u_{i,t} \quad \textbf{(6)}$$

In the provided equation, various variables are defined to elucidate the relationship between money flows and fund returns. Here, $Flow_{i,t}$ symbolizes the money flow of fund in a percentage, as denoted in Equation (2), i during month t in the USD, while $Return_{i,(t-1)}$ denotes the expected $R_t - R_{r,t-1}$ of the same fund from the previous month, also measured in USD. Two indicator variables, $R^+$and R^-, are introduced to signify whether the fund's return for the period is non-negative or negative, respectively. The inclusion of the indicator $R^+$and R^- allows for distinct sensitivities of money flows to returns following positive or negative returns. In Equation (6), the coefficients are defined as follows: β_1 represents the sensitivity of flows to positive average returns over the previous month for conventional funds, while β_2 expresses the sensitivity of flows to negative average returns over the previous for conventional funds. The SRI Attributes comprise information on the screening process for the

SRI funds as well as the domestic or international nature of the fund. A detailed breakdown of the each component for the equation is below in Appendix 1:

II refers to a categorical variable denoting whether an SRI fund is engaged in Impact investing. NS refers to a categorical variable denoting whether an SRI fund is engaged in Negative Screening. PS refers to a categorical variable denoting whether an SRI fund is engaged in Positive Screening. SRI Language refers to a categorical variable denoting whether an SRI fund prospectus lays out clear guidelines for choosing and maintaining the SRI policies of the fund.

$$Flow_{i,t} = \gamma_0 + \left(\beta_1 R^+ + \beta_2 R^-\right) Return_{i,(t-1)} + \gamma_4 Period + \gamma_5 Fund\_Type_i + \gamma_6 Regional\_Focus_i + u_{i,t} \quad \textbf{(7)}$$

Eq. (7) mirrors the Eq. (6) but without the SRI factors for conventional mutual funds.

Data Analysis

Fund Performance

Excess Return	(1) SRI	(2) CONV	(3) SRI	(4) CONV	(5) SRI	(6) CONV
D_PEC	-0.229***	-0.225***	-0.243***	-0.240***	-0.233***	-0.244***
	(0.000875)	(0.00182)	(0.000813)	(0.00164)	(0.000952)	(0.00188)
D_C	0.0745***	0.0797***	0.0639***	0.0669***	0.0606***	0.0679***
	(0.00111)	(0.00187)	(0.000917)	(0.00172)	(0.000874)	(0.00166)
D_PTC	0.163***	0.169***	0.150***	0.154***	0.153***	0.151***
	(0.000865)	(0.00159)	(0.000824)	(0.00152)	(0.000857)	(0.00164)
MktRF	0.00935***	0.00980***	0.0105***	0.0110***	0.0107***	0.0109***
	(0.000444)	(0.000497)	(0.000428)	(0.000481)	(0.000429)	(0.000478)
SMB			0.00106***	0.00174***	0.00102***	0.00161***
			(0.000245)	(0.000378)	(0.000245)	(0.000374)
HML			-0.00552***	-0.00611***	-0.00533***	-0.00605***
			(0.000174)	(0.000264)	(0.000176)	(0.000262)
WMLFactor					0.246***	-0.0732***
					(0.00768)	(0.0122)
_cons	-0.173***	-0.178***	-0.163***	-0.167***	-0.185***	-0.158***
	(0.000881)	(0.00167)	(0.000778)	(0.00155)	(0.00118)	(0.00231)
N	5226	5226	5226	5226	5226	5226
R-sq	0.874	0.858	0.882	0.867	0.884	0.868
adj. R-sq	0.874	0.858	0.882	0.867	0.883	0.867

Table 1: Please note for this section all SRI coefficients will precede the Conventional coefficients when bracketed together. Also all coefficients are significant at the 1% level.

CAPM Model:

The Pre-crisis Alpha (D_PEC) is significantly negative (-0.229, -0.225), indicating under performance relative to the risk-free rate before the crisis. During the crisis, the Alpha (D_C) turns significantly positive (0.0745, 0.0797) suggesting an outperformance relative to the risk-free rate during the crisis period. Post crisis suggests a more pronounced outperformance

(0.163, 0.169). Across these three periods SRI funds both under perform by more and over perform by less when compared to Conventional funds. Both SRI (0.00935) and Conventional (0.00980) funds have positive and statistically significant coefficients for the market risk premium (MktRF), indicating that both types of funds move in the same direction as the market. The very slightly higher coefficient for Conventional funds suggests they might be slightly more sensitive to market movements compared to SRI funds.

Fama-French 3-Factor Model: Across all period factors in the Fama-French model the same trend appears with SRI funds both under performing by more and over performing by less when compared to Conventional funds. In terms of the SMB factor is positive for both but with the conventional funds leaning more towards small-cap stocks than SRI funds. For HML both are negative, but SRI funds have a larger tilt low book-to-market (growth) stock, Fama and French (1993).

Carhart 4-Factor Model: All other factors follow a similar trend in this model to their trends in CAPM and Fama-French, except for the Post-Crisis alpha (0.153) for SRI funds which is now slightly higher indicating a miniscule outperformance of SRI funds in this period. The WML factor gives us our biggest difference in the regression output in Table 2. With SRI Funds (0.246) being significantly positive and conventional funds having slightly negative coefficients (-0.07320). This indicates the SRI funds are more responsive to momentum stocks i.e. stocks that have performed well in the past. The conventional fund appears to prefer a contrarian strategy, or past losers. Which could compliment the favour for growth stocks. However, the effect is small and both variables are independent of each other.

The fit of all models is extremely high with the lowest R-squared being (0.858). Another positive indicator for the models reliability is the coefficients retaining direction and size even when new factors are introduced.

Fund-Flow Performance

SRI Regression (1)					**Number of obs**	**5148**
					F(15, 5132)	5.88
					Prob > F	0
					R-squared	0.0125
					Root MSE	0.15135
Flow	**Coef.**	**Robust Std. Err.**	**t**	**P>t**	**[95% Conf.**	
R_pos_Return_L1	0.1354767**	0.0417009	3.25	0.001	0.0537252	0.2172282
R_neg_Return_L1	0.0495119*	0.0275218	1.8	0.072	-0.0044427	0.1034664
C_Fund_Type						
Bond	-0.0023571	0.0080549	-0.29	0.77	-0.018148	0.0134339
Mixed Assets	-0.0242943***	0.0082394	-2.95	0.003	-0.0404469	-0.0081416
C_Regional_Focus						
Emerging Markets	0.0426937***	0.0132272	3.23	0.001	0.0167627	0.0686247
Global	0.0390321***	0.0104357	3.74	0	0.0185736	0.0594906
U.S.	0.0321014***	0.0077364	4.15	0	0.0169348	0.0472679
C_NS	0.026973***	0.0071935	3.75	0	0.0128706	0.0410754
C_II	-0.0007174	0.0080819	-0.09	0.929	-0.0165613	0.0151265
C_PS	0.005273	0.003694	1.43	0.154	-0.0019689	0.0125148
C_SRILanguage	0.0055799***	0.0018564	3.01	0.003	0.0019406	0.0092192
C_period						
Crisis	0.0151451***	0.0044903	3.37	0.001	0.0063423	0.0239479
Pre-crisis	0.025472***	0.0065632	3.88	0	0.0126053	0.0383388
_cons	-0.1310444***	0.0333003	-3.94	0	-0.1963272	-0.0657616

Table 2

The above table shows the results for the SRI regression used to implement Eq. (6). It is important to note the low level of fit for this regression as denoted by the R-Squared (0.0125).

There are several statistically significant results from this regression. R_pos_Return_L1 (0.1354767) denotes the sensitivities of money flows to returns following positive returns (Lagged one period *t*). It is statistically significant at the 1% level (p-value = 0.001), indicating positive return in the previous period significantly increases percentage fund flows. Specifically, a 1-unit increase in positive returns is associated with a 0.1355 increase in percentage fund flows. The issue is the R_neg_Return_L1 is also positive (0.0495119) albeit only at a 10% level of significance. The prospect of negative returns resulting in increased flows into funds at any time is highly unlikely if not nonsensical.

Mixed Assets (-0.0242943) is highly significant at the 1% level and its negative nature indicates a small outflow from funds composed of mixed assets. In regional focus emerging markets (0.0426937), Global (0.0390321) and US i.e Domestic funds (0.0321014) are all significant at the 1% level. This indicates that all three areas experienced increased fund flows. The presence of the NS indicator (0.026973), also positively influences fund flows, suggesting that funds which conduct negative screening are more attractive to investors. Use of SRI language in fund documentation positively impacts (0.0055799) fund flows, indicating that socially responsible investment themes resonate with investors. This effect is extremely small, however. Both SRI attributes are significant at the 1% level.

During crisis periods, fund flows increase (0.0151451), possibly due to a flight-to-safety or increased scrutiny on investment choices. In pre-crisis periods, fund flows are also higher (0.025472), which might reflect proactive investment behavior in anticipation of economic downturns, both at the 1% level. Although flight to quality is an aspect discussed in regard to the possible appeal of mutual funds to investors during a crisis period due to their increased active management, Glode (2011). However, the small nature of the coefficient indicates this effect is minimal and combined with the positive flow's pre-crisis, this indicates a more general trend of increased percentage flows into the SRI funds in general rather than a reaction to the periods themselves. The negative nature of the constant variable indicates a general outflow of funds from SRI mutual funds (-0.1310444).

Conventional Regression (1)						
					Number of obs	5,148
					F(9, 5138)	3.98
					Prob > F	0
					R-squared	0.0021
					Root MSE	0.22943
Flow	**Coef.**	**Robust Std. Err.**	**t**	**P>t**	**[95% Conf.**	
R_pos_Return_L1	0.0452188	0.0444241	1.02	0.309	-0.0418714	0.132309
R_neg_Return_L1	0.0184739	0.0336473	0.55	0.583	-0.0474892	0.0844369
C_Fund_Type						
Bond	0.0082431	0.0067759	1.22	0.224	-0.0050405	0.0215268
Mixed Assets	-0.0051006	0.0060528	-0.84	0.399	-0.0169667	0.0067655
C_Regional_Focus						
Emerging Markets	0.0203222**	0.0095566	2.13	0.034	0.0015872	0.0390573
Global	0.0392015***	0.0095186	4.12	0.000	0.020541	0.0578621
U.S.	0.0346173***	0.0095175	3.64	0.000	0.015959	0.0532755
C_period						
Crisis	-0.0024559	0.0066649	-0.37	0.713	-0.015522	0.0106101
Pre-crisis	0.0153586*	0.0090875	1.69	0.091	-0.0024568	0.033174
_cons	-0.0185057	0.0081463	-2.27	0.023	-0.0344758	-0.0025355

Table 3

The above table shows the results for the Conventional regression as denoted by the R-Squared (0.0021).

In regional focus emerging markets (0.0203222, 5% level), Global (0.0392015) and US i.e Domestic funds (0.0346173), both at the 1% level, are positively related to percentage fund flow. Like the SRI regression in Table 2, this indicates that Conventional funds focused on all three areas experienced increased fund flows. During the pre-crisis period funds flows were positive (0.0153586) at the 10% level of significance.

SRI Regression (2)					**Number of obs**	**5,148**
					F(9, 5138)	4.46
					Prob > F	0
					R-squared	0.0065
					Root MSE	0.15175

Flow	**Coef.**	**Robust Std. Err.**	**t**	**P>t**	**[95% Conf.**	**Interval]**
R_pos_Return_L1	0.1329046***	0.0421918	3.15	0.002	0.0501906	0.2156185
R_neg_Return_L1	-0.0032489	0.0273682	-0.12	0.906	-0.0569022	0.0504043
C_Fund_Type	-0.0083225**	0.0033359	-2.49	0.013	-0.0148623	-0.0017827
C_Regional_Focus	-0.0001946	0.0026655	-0.07	0.942	-0.0054202	0.0050309
C_NS	0.0182713***	0.0045327	4.03	0	0.0093854	0.0271573
C_II	0.002789	0.0085668	0.33	0.745	-0.0140056	0.0195835
C_PS	0.0050003	0.003545	1.41	0.158	-0.0019494	0.0119499
C_SRILanguage	0.0037897***	0.0014117	2.68	0.007	0.0010221	0.0065574
C_period	0.0047244	0.0036173	1.31	0.192	-0.002367	0.0118159
cons	-0.0596347**	0.0242726	-2.46	0.014	-0.1072193	-0.0120501

Table 4

Given some of the issues observed above, such as a positive R_neg_Return_L1, I ran both regressions again without expanding the categorical statistics, allowing the variables which were used as base variables, such as post-crisis period, to be included in the regression. It slightly reduces the fit for this regression (0.0065) but it was already extremely low in the previous regression. As you can see, the fund type is still significant and negative indicating a general outflow of funds for those fund types, now including equity focus funds. Negative screening and SRI language, being included in the prospectus have a small positive effect on the total or dollar amount fund flows (0.0037897 and 0.0182713). The interesting change when running this regression is the change of R_neg_Return_L1, although not significant it, is no longer positive.

Conclusion

Hypothesis 1:

The crisis period alpha is positive for both SRI and Conventional funds, indicating that both types of funds perform better than the risk-free rate during crises. However, the relative performance comparison between SRI and Conventional funds reveals that Conventional funds tend to outperform SRI funds even during crisis periods. This finding is consistent across the CAPM, Fama-French, and Carhart models, aligning with previous literature that suggests conventional funds may have better crisis resilience due to more diversified investment strategies and risk management practices.

Both fund types exhibit positive and significant coefficients for the market risk premium (MktRF), indicating that they move in the same direction as the market. The slightly higher sensitivity of Conventional funds to market movements could be a factor contributing to their superior performance during crises. This higher sensitivity is supported by evidence suggesting that conventional funds may have more aggressive asset allocations (Nofsinger & Varma, 2014).

The analysis suggests that Conventional funds may employ strategies that are more effective during crisis periods. Their preference for small-cap stocks (positive SMB factor) and a contrarian approach to momentum (negative WML factor) might offer better risk-adjusted returns during market downturns compared to the strategies employed by SRI funds. This is consistent with studies indicating that small-cap stocks often recover faster post-crisis and that contrarian strategies can exploit market inefficiencies during volatile periods (Jegadeesh & Titman, 1993; Fama & French, 1993).

Based on the evidence from the CAPM, Fama-French 3-Factor, and Carhart 4-Factor models, the hypothesis that SRI fund performance will be superior during crisis periods compared to Conventional funds is not supported. While both fund types outperform the risk-free rate during crises, Conventional funds consistently exhibit better performance relative to SRI funds during these periods. This conclusion is supported by the broader academic consensus that conventional funds have more robust performance metrics in times of financial distress due to their diversified and sometimes less constrained investment approaches (Humphrey & Tan, 2014).

Hypothesis 2:

The evidence suggests that SRI funds exhibit greater convexity in their fund-flow performance compared to conventional funds. The strong positive response to positive returns, coupled with unexpected positive responses to negative returns and significant influences from SRI-specific attributes, supports the hypothesis. SRI funds attract more flows under specific conditions, reflecting a non-linear relationship between performance and investor behavior. However, the overall negative trend in fund flows highlights the complexity of factors influencing SRI investments, indicating that while convexity is present, it operates within a broader context of investor preferences and market conditions.

Based on the model fit, and its poor power to explain Fund Flow Performance, as well as the counter intuitive result of negative and positive returns resulting in increased flows into funds at any time, pre-crisis and during a crisis, this is highly unlikely if not nonsensical. For these reasons I believe the analysis cannot claim that SRI funds exhibit greater convexity in their fund-flow performance compared to conventional funds.

Recommendation for Further Study

In research of SRI fund performance compared to conventional funds I would recommend similar research be conducted, incorporating SMB and HML factors based solely on Mutual Fund data rather than Fama-French general US factors. This would significantly enhance the model's ability to capture the size and value effects, which are pivotal in explaining stock returns and fund performance. By accounting for these dimensions, the analysis becomes more robust, offering deeper insights into the risk-return profile of funds and improving the accuracy of performance attribution. This, in turn, aids in making more informed decisions based on a comprehensive understanding of the underlying drivers of fund performance.

I believe a more recent time period would be superior in testing Hypothesis 2 as SRI & ESG data is more robust and consistent. This would help increase the sample size also and improve the regressions ability to test this hypothesis.

Appendices

Appendix 1:

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Pax World Balanced Fund, Inc. (the "Balanced Fund"), Pax World Growth Fund, Inc.
(the "Growth Fund") and Pax World High Yield Fund, Inc. (the "High Yield Fund")
(individually, a "Fund"; collectively, the "Funds") are mutual funds that seek
to make a contribution to world peace by investing in companies that produce
goods and services that improve the quality of life and that are not, to any
degree, engaged in manufacturing defense or weapons-related products or
companies that derive revenue from the manufacture of liquor, tobacco and/or
gambling products. To denote this endeavor, the Funds have adopted the name "Pax
World".
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Appendix 2:

Variable	Description
$\text{Flow}_{i,t}$	Dependent variable representing the flow of funds for fund i at time t
γ_0	Intercept term of the regression model
R^+	Indicator for positive returns
R^-	Indicator for negative returns
β_1	Coefficient for the interaction term involving positive returns with the lagged returns
β_2	Coefficient for the interaction term involving negative returns with the lagged returns
$\text{Return}_{i,(t-1)}$	Lagged return for fund i at time $t-1$
γ_1	Coefficient for the indicator variable II
II_i	Indicator variable II for fund i
γ_2	Coefficient for the indicator variable NS
NS_i	Indicator variable NS for fund i
γ_3	Coefficient for the indicator variable PS
PS_i	Indicator variable PS for fund i
γ_4	Coefficient for the indicator variable SRILanguage
SRILanguage_i	Indicator variable for the use of Socially Responsible Investment (SRI) language in fund i
γ_5	Coefficient for the fund type indicator
Fund_Type_i	Indicator variable for the type of fund i
γ_6	Coefficient for the regional focus indicator
Regional_Focus_i	Indicator variable for the regional focus of fund i

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