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The value of a Principles for Responsible Investing designation: A setting for environmental social and governance natural experiments

Dan Daugaard

University of Tasmania, Australia

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Author contact information: Dan Daugaard, Tasmanian School of Business and Economics, University of Tasmania.

Office 108, Level 1, KPMG Building, 100 Melville Street, Hobart, TAS 7000.

Phone 03 6226 1434.

Email: dan.daugaard@utas.edu.au

Abstract

Fund flows determine assets under management and are therefore highly valued by investment managers. This article is concerned with whether the United Nation's Principles for Responsible Investing (PRI) can drive fund flows towards socially responsible investing (SRI) funds. If so, signing the PRI will be highly valued by investment managers are enable the PRI to influence investment practices and create a sustainable financial system.

There are significant endogeneity issues encountered in fund flow analysis, so innovative techniques are necessary. Natural experiments are considered the "gold standard" for addressing endogeneity problems. SRI fund flows are an ideal context for creating natural experiments using environmental, social and governance (ESG) events. Unfortunately, the results from these experiments raise doubts about the ability of the PRI to influence SRI fund flows. This outcome questions the value of signing the PRI for investment managers and implies the PRI has limited scope to contribute to sustainable developments.

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I. Introduction

Does signing the United Nation's Principles for Responsible Investment (PRI) increase fund flows to Socially Responsible Investing (SRI) funds? While there is a growing body of literature on fund flows, there is little treatment of the intersection of SRI fund flows and the agents that identify quality SRI investment processes (e.g., PRI). Where there is relevant literature, the results are subject to a significant econometric challenge. Fund flow analysis is fraught with endogeneity issues. Fortunately, SRI investing presents a unique opportunity for establishing natural experiments. A longitudinal collection of Environmental, Social and Governance (ESG) events acts as a series of exogenous ESG shocks on investor preferences. Highly publicized ESG events are likely to motivate the choice of SRI investments over more conventional investments. This article therefore builds an exogenous time series by systematically measuring the timing, magnitude and distributional characteristics of media coverage following each major ESG event. The resulting series

mitigates the confounding effect of endogeneity and enables a clear interpretation of the drivers for SRI fund flows.

The findings of this article dispute the proposition that signing the PRI increases fund flows. The results do not reveal any significant fund flows to the SRI funds managed by PRI signatories. Further, there is a negative impact for conventional retail funds where they are managed by PRI signatories. These findings, therefore, question the value of investment managers' signing the PRI, and they challenge the potential for PRI to effectively influence investment practices across the industry.

The PRI is a global initiative attempting to create a sustainable global financial system. The "principles" of the PRI encourage investment managers to incorporate ESG issues into their investment processes and facilitate implementation across the industry. If signing the PRI attracts more fund flows, then the PRI should be effective at influencing investment practices of SRI funds. Since its launch, the PRI has proven popular with investment managers and asset owners. The assets under management by PRI signatories grew to US$86.3 trillion by 2019. However, this initial growth will need to continue if the PRI is to significantly influence future investment activity.

The impact of professional SRI designations on funds flows is one of the many aspects of ESG related investing which is not well researched (Daugaard (2020)). This article contributes to the literature by tying together related strands of research, which provides a framework to evaluate this issue. The research therefore connects the literature on exogenous solutions to endogenous issues, using media as a measure of impact on investor decision-making, and understanding the motivations for SRI investing from fund flow analysis.

This article also makes a technical contribution to SRI fund flow analysis by establishing a series of exogenous shocks. These shocks represent natural experiments which disentangle the confounding elements of SRI fund flows. Analysis of fund flows suffers from potential endogeneity and related issues: missing explanatory variables, multicollinearity across the regressors, and simultaneity of flows and returns (confounded by a potentially non-linear relationship). With specific relevance to estimating the value of SRI designations, the variables that indicate a fund is managed by a PRI signatory are potentially correlated with unobserved regressors. For example, fund flows could be driven by a new and innovative management approach, increased marketing, or changing investor attitudes about fund credentials.

The standard econometric solutions for endogeneity are Instrumental Variables and GMM – but they are difficult to construct in the context of fund flows. These difficulties create significant scope for natural experiments to contribute a robust solution (Gippel, Smith and Zhu (2015)). Heider and Ljungqvist (2015) demonstrate the implementation of natural experiments to resolve the debate around how tax changes affect corporate leverage. Their approach can be applied and extended with interaction variables to test whether SRI designations affect investor choices. ESG events are therefore selected as the exogenous shocks that test the impact of the PRI signature on fund flows.

The main purpose of this article is to evaluate whether SRI funds designated by the PRI receive greater fund flows. However, in order to determine whether the exogenous shocks behave as successful natural experiments there is a preliminary research question to address: do ESG events trigger the choice of SRI funds over conventional funds? This underlying question therefore gives us the first testable hypothesis.

A. Hypothesis 1

Following an ESG event, the fund flow to SRI funds is greater than the flow to conventional funds.

An important dimension of building the ESG series is the likely timing of the ESG events on the decisions of SRI investors. Huberman and Regev (2001) reveal how there can be a delay between the publication of important scientific insights and a more complete dissemination of the information to the market. Further, Griffin, Jaffe, Lont and Dominguez-Faus (2015) document alternative hypotheses to understand how relatively obscure but important science papers might impact the market. While their findings indicate market prices are reasonably efficient, their article sets out an approach which can be applied to test the possibility that the impact is delayed until subsequent broad media coverage. This approach can therefore contribute to selecting the appropriate ESG events and the timing of those events in relation to their impact on SRI fund flows.

This article builds on the existing SRI fund flow literature. To date, this literature has provided significant insights into the attributes of SRI investors: they are more committed to their investments than conventional investors, their inflows are more sensitive to past positive returns, and their outflows are less sensitive to past negative returns (Benson and Humphrey (2008); Bollen (2007); Marti-Ballester (2015); Renneboog, Ter Horst and Zhang (2011)). The SRI fund flows are also more stable than conventional fund flows (Bollen (2007); Peifer

(2011)) and the investors are more loyal to their choices (Benson and Humphrey (2008); El Ghoul and Karoui (2017)). This article extends this literature by investigating the importance to investors of a high-profile agent (i.e., the PRI) who designates funds as being authentic SRI funds.

There is a growing body of literature covering the way fund ratings agencies (e.g., Morningstar) have a substantial influence on fund flows (Ammann, Bauer, Fischer and Müller (2019); Armstrong, Genc and Verbeek (2017); Barber, Huang and Odean (2016); Khorana and Servaes (2011); Nanda, Wang and Zheng (2004)). However, there is very little published research on fund flows and SRI designations (Hartzmark and Sussman (2019), and the influence of the PRI (Li and Humphrey (2017). Therefore, building upon the first hypothesis, this article examines the impact of the PRI designation on SRI fund flows through the following hypothesis.

B: Hypothesis 2

The fund flow to PRI designated SRI funds is greater than the flow to SRI funds not designated by PRI.

The PRI principles include an explicit ambition to facilitate the implementation of ESG concerns right across the investment industry. A natural extension of the second hypothesis therefore addresses this potential. Do ESG events motivate the selection of all funds (i.e., the combination of SRI and conventional funds) managed by PRI signatories? This question provides a third hypothesis.

C: Hypothesis 3

The fund flow to funds managed by PRI signatories is greater than the flow to those funds not managed by PRI signatories.

This hypothesis was tested by an interaction term combining the dichotomous variable for signing the PRI with the ESG binary indicator.

The article proceeds as follows. The next section describes how a PRI designated mutual fund data set can be constructed. This is followed by the creation of a longitudinal series of significant ESG events. The mutual fund data and the series of ESG events are then tested using integration terms in a time-series panel regression, with fixed effects for style, funds and time. Following a presentation of the results, the article concludes with a discussion of the implications of the findings.

II. SRI Mutual Fund Data

The essence of this research is to determine whether investors are influenced by the signaling by industry bodies which designate quality SRI processes. The United Nation's PRI was selected as the designating body because it has a significant global reputation. The underlying fund data is also drawn from a source which has attained a significant reputation for maintaining a reliable and complete research data set, the Centre for Research in Security Prices (CRSP) Mutual Fund Database. This data set includes details of the investment managers who manage each fund. These details are therefore matched with the investment managers who have signed the PRI.

The PRI was initiated by Kofi Annan, Secretary-General of the United Nations, and officially launched in April 2006. Its aim is to achieve a sustainable global financial system by signatory investment managers and asset owners adopting six principles:

- incorporating ESG issues into investment analysis and decision-making processes,
- active ownership and incorporating ESG issues into ownership policies and practices,
- seeking appropriate disclosure on ESG issues by investee entities,
- promoting acceptance and implementation of the principles within the investment industry,
- working together to enhance the effectiveness of implementing the principles; and
- reporting their activities and progress towards implementing the principles.

Although the principles reflect a genuine concern about improving the sustainable impact of investing, they can be criticized for being too general. By allowing for subjective interpretation, the principles therefore present scope for industry agendas to influence the decisions and impact of the PRI. Investment professionals has always been closely involved in setting the policy agenda of the organization. From the initiation of the PRI, global investment managers represented a significant proportion of the investment experts appointed by Kofi Annan. The industry's main priority, of wealth maximization, continues to be reflected in the organization's mission statement: sustainability is described as necessary for achieving "long-term value creation". The presence of industry representation is a reason for investors to be cynical about the designating choices of the PRI. This research therefore seeks to clearly evaluate whether investors are cynical or, instead, are positively affected by the PRI designation.

The CRSP Mutual Fund Database maintains a comprehensive set of data for US funds. Data for equity funds were extracted for the US equity mutual funds using the CRSP style code for domestic equities across style and cap-based categories. Fund flows are measured by implying the flow which must have occurred to explain the change in the total net assets of the fund beyond investment returns experienced by the fund.

$$\text{fund flow}_{t,i} = \text{TNA}_{t,i} - \text{TNA}_{t-1,i}\left(1 + \text{return}_{t,i}\right)$$

Where

$\text{fund flow}_{t,i}$ is the dollar amount flowing into or out of fund i over month t

$\text{TNA}_{t,i}$ is the total net assets as at the last trading day of month t for fund i

$\text{return}_{t,i}$ is the monthly holding period return over month t for fund i

The fund data was cleaned by removing observations for: duplicates (523 observations), where total net assets recorded as either zero or -99 (24,098), and where implied ages (current month minus fund start date) were negative (423). Observations were also excluded for the last month prior to the closure of the fund (582 observations), where the funds' equity exposures were less than 60% (1,499 observations), where the assets under management were less than $100 thousand (16,676), and for observations below the 0.5 percentile and above the 99.5 percentile for total net assets (9,159), fund flows (23,317), percentage fund flow change (22,034), and management fee (259,700). The resulting data for the period beginning April 2006 through to February 2018 is summarized in Tables I and II.

Table I

Summary Statistics for Fund Types

This table presents the monthly mean and standard deviations (SD) for the fund variables across fund types. The data covers the period beginning April 2006 through to February 2018. The first column presents the statistics for all funds, the second column for retail funds and the third column for institutional funds. The statistics presented are flows in millions, returns in percentages, age in months, the natural log of total net assets (size) and the number of observations.

	Total funds (1)		Retail funds (2)		Institutional funds (3)	
	Mean	SD	Mean	SD	Mean	SD
Flows ($ million)	-0.5	16.5	-1.8	16.1	1.4	17.8
Return (%)	0.8	4.5	0.8	4.6	0.8	4.4
Fees (%)	0.6	0.3	0.7	0.3	0.6	0.3
Age (months)	137.4	107.0	160.4	124.6	105.4	75.9
Size (ln TNA)	4.4	2.2	4.4	2.2	4.3	2.2
Observations	654 939		316 859		270 650	

The negative average fund flows over this period reflect the flows moving from the mutual fund industry to the ETF market, predominantly from retail mutual funds, the large, small and micro-cap funds, and the growth funds. The monthly returns are consistent across the fund categories, whereas the management fees (presented on an annualized basis) are largest for the small and micro-cap funds. The average retail fund is 55 years older than the average institutional fund and the logged size is reasonably similar across funds categories.

Table II

Summary Statistics for Fund Styles

This table presents the monthly mean and standard deviations (SD) for the fund variables across fund styles. The data period is from April 2006 to February 2018. The first four columns present the statistics for micro-, large-, mid- and small-cap funds; the last three columns show statistics for growth, growth & income, and income funds. The statistics presented are flows in millions, returns in percentages, age in months, the natural log of total net assets (size), and the number of observations (obs).

style	Micro-cap		Large-cap		Mid-cap		Small-cap		Growth & income		Growth		Income	
	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
flows	-0.9	9.4	-1.4	17.6	0.0	16.3	-0.6	14.2	-0.4	17.7	-0.8	16.7	0.4	18.9
return	0.8	5.3	0.8	4.1	0.8	4.7	0.8	5.1	0.7	4.0	0.8	4.4	0.7	3.8
fees	0.9	0.3	0.2	0.1	0.7	0.2	0.8	0.3	0.5	0.3	0.6	0.3	0.6	0.2
age	150	87	157	74	129	83	133	87	152	146	136	104	129	102
size	3.8	1.9	5.4	1.8	4.4	2.1	4.2	2.1	4.6	2.2	4.4	2.2	4.7	2.1
obs	5 381		11 037		94 659		128 598		118 217		254 076		42 971	

The CRSP Mutual Fund Database records the full name of the fund, the management company name and the fund advisor name. All three of these descriptions were searched for the presence of the investment managers listed as signatories to the PRI. The fund names were then searched for word combinations which identified a fund as SRI. This search employed the key word choices developed in (Daugaard (2020)) and delivered 217 funds. Forty-two additional funds were added which were managed by a management company with the sole purpose of SRI. These companies included Domini, Pax, Trillium, Walden, Praxis, Parnassus and Calvert (except the Calvert conventional index funds). The fund names were then manually checked for names which matched the key words but were not actually SRI funds (e.g., the principal "sustainable" momentum index exchange-traded fund and the "green" century equity fund).

This step excluded 27 funds, which left 222 SRI funds. The cleaning approach described above removed 60 of these funds and the imposed date range removed another 26 funds. The remaining funds are plotted over time in Figure 1 alongside the total funds, those matched to the PRI signatories and the SRI funds matched to the PRI signatories.

The growth in the number of SRI funds managed by PRI signatories has been dramatic from 2006 to 2018. However, the growth across the entire funds management industry, the SRI sector of the market and the funds managed by PRI signatories have all similarly experienced dramatic growth. Therefore, the implementation of experiments will help to isolate the patterns associated with PRI signed SRI funds from the broader growth of the industry.

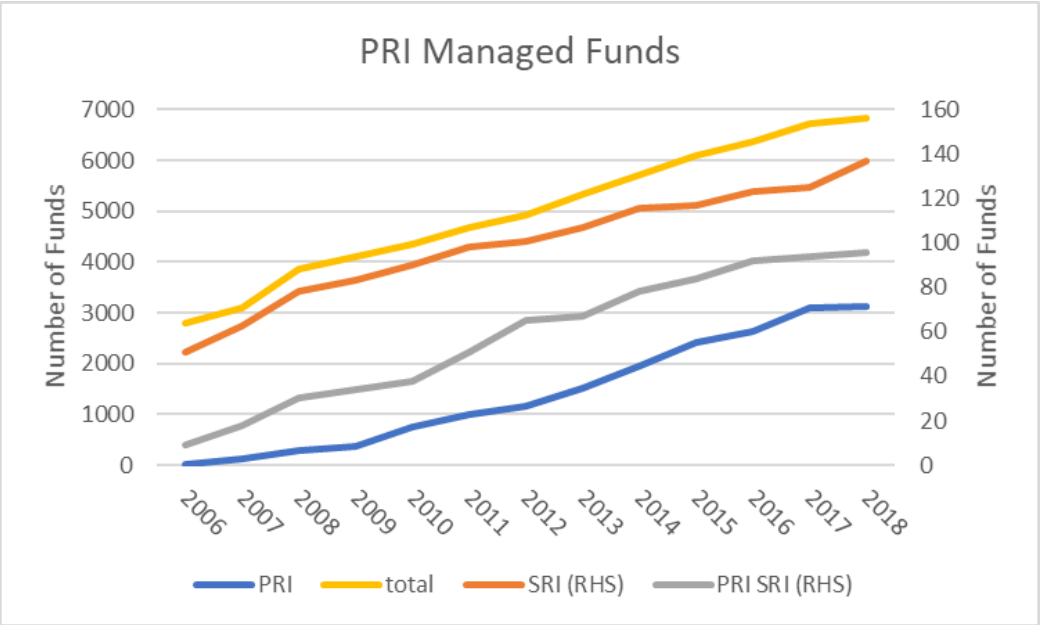


Figure 1 Growth in Managed Funds The figure shows the total number of US domestic equity funds (axis on LHS) at the end of the year from 2006 to 2018. The figure also shows the number of funds managed by PRI signatories (LHS), the number of SRI funds (RHS) and the number of SRI funds managed by PRI signatories (RHS).

III. Environmental, Social and Governance Events

The aim of this study is to measure the influence the PRI has on the SRI industry. Regression analysis is used to identify whether funds flow to an SRI fund if the fund's investment manager has signed the PRI. However, fund flow analysis suffers from many endogeneity issues, and a robust methodology is necessary for accurate interpretation of the results. Natural experimentation employs exogenous shocks to enable robust interpretation of relationships in financial models. "Studies using such events make a strong case for a causal interpretation of the results" (Gippel, Smith and Zhu (2015, p. 160)). In the case of fund flow modelling, ESG events are likely to have sources which are independent to the economic nature of the other variables which are associated with fund flow decisions. For example, oil spills are unlikely to be related to previous investment returns, fund flows and management

expense ratios. However, they will potentially heighten awareness of ESG issues across the investor community and thereby influence their subsequent fund preferences.

The events of interest in this study are therefore those which would likely cause investors to make the choice of a socially responsible investment fund (SIF) over a more conventional fund. The drivers for these preferences are richly diverse (Sandberg, Juravle, Hedesstrom and Hamilton (2009); Schwartz (2003)). To reflect this diversity a comprehensive collection of ESG events is created. To ensure a thorough sampling, the methodology underpinning MSCI's ESG Impact Monitor for investors is applied as the framework for identifying relevant events (Figure 2). MSCI's ESG Impact Monitor is built to achieve comprehensive coverage of ESG controversies across five category "pillars" with a total of 23 major ESG indicators (MSCI (2011)). Each indicator, and its category pillar, were employed as key words to search Factiva® for important ESG events. The Factiva search results list the companies and government agencies most frequently referred to (in connection with the ESG indicator) along with the time periods when significant media coverage occurred. From this descriptive information 159 specific ESG events were identified from January 1996 to October 2019. The fund data and PRI data sets for the current research objective are restricted to the period commencing in April 2006 through to February 2018. This reduces the ESG event count to 116.

MSCI ESG Controversies Coverage - Stakeholder 'Pillars' and 'Indicators'

ENVIRONMENT	CUSTOMERS	HUMAN RIGHTS & COMMUNITY	LABOR RIGHTS & SUPPLY CHAIN	GOVERNANCE
• Biodiversity & Land Use	• Anticompetitive Practices	• Impact on Local Communities	• Labor Management Relations	• Bribery & Fraud
• Toxic Emissions & Waste	• Customer Relations	• Human Rights Concerns	• Health & Safety	• Governance Structures
• Energy & Climate Change	• Privacy & Data Security	• Civil Liberties	• Collective Bargaining & Union	• Controversial Investments
• Water Stress	• Marketing & Advertising	• Other	• Discrimination & Workforce Diversity	• Other
• Operational Waste (Non-Hazardous)	• Product Safety & Quality		• Child Labor	
• Supply Chain Management	• Other		• Supply Chain Labor Standards	
• Other			• Other	

Figure 2 Framework for Identifying ESG Events The figure shows the five category pillars of ESG controversies and 23 major ESG indicators from MSCI's ESG Impact Monitor.

Factiva reports the number of media reports for each event. To ensure the set of ESG events focuses on the most significant events, the top twenty percentile of media counts (i.e., 22 events) have been selected. These events are presented in Table III. The selected ESG events are listed along with the event date, category and type of event and the media coverage. The list is comprised of seven Environment events including major environmental incidents such as the Deepwater Horizon oil spill in 2010, eight social events, including general strikes and mass shootings, and 11 Governance events such as corporate collapse and scandals. Some of the events are classified under more than one ESG category – for example, the Volkswagen emissions scandal in September 2015 was both an environmental issue as well as a corporate governance failure.

Table III

Major ESG Events

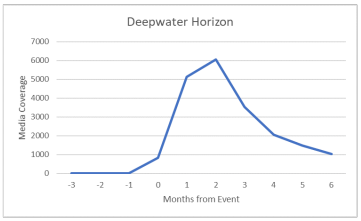
This table lists the major ESG events reported in the US press from April 2006. The events are listed according to their event type (where env indicates an environmental event, soc indicates a social event and gov indicates a governance event) and then in date order. The Category column shows further detail of the event type and the Media Coverage column details the number of times the event was recorded in the media according to Factiva.

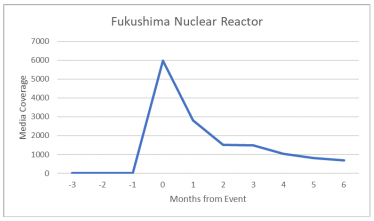
ESG Event	Date	Category	env	soc	gov	Media Coverage
Deepwater Horizon	Apr 2010	oil spill	1			24151
Fukushima Nuclear Reactor	Mar 2011	nuclear accident	1			17221
UN global warming	Nov 2014	Report	1			3297
Volkswagen emissions scandal	Sep 2015	corporate collapse and scandal	1		1	8809
Paris Climate Agreement	Nov 2016	Agreement	1			8509
Trump executive order on climate change	Mar 2017	laws and regulations	1			4203
Ford emissions scandal	Jan 2018	corporate collapse and scandal	1		1	8141
Virginia Tech shooting	Apr 2007	mass shootings		1		11543
Auto industry bailout	Dec 2008	corporate announcements		1		11287
Oakland	Nov 2011	general strike		1		2635

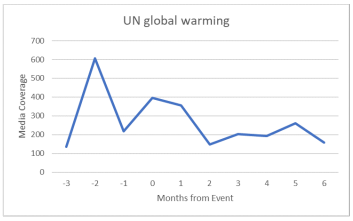
Sandy Hook Elementary School	Dec 2012	mass shootings	1		10550
GM vehicles recalls	May 2014	product recalls	1		8110
Equifax data security breach	Sep 2017	laws and regulations	1	1	5183
Presidential campaign ads by Russians	Oct 2017	corporate collapse and scandal	1	1	2976
Harvey Weinstein sexual assault accusations	Oct 2017	corporate collapse and scandal	1		21835
Bear Stearns	Mar 2008	corporate collapse and scandal		1	12481
Freddie Mac	Sep 2008	corporate collapse and scandal		1	14385
Lehman Brothers	Sep 2008	corporate collapse and scandal		1	18449
AIG	Sep 2008	corporate collapse and scandal		1	18967
Washington Mutual	Sep 2008	corporate collapse and scandal		1	6473
Bernie Madoff	Dec 2008	corporate collapse and scandal		1	5795
Uber criminal probe	May 2017	corporate collapse and scandal		1	2721

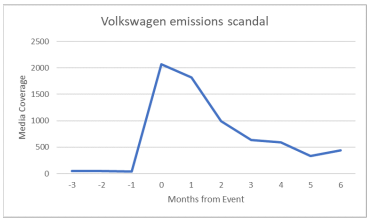
Factiva also enables a count of the relevant media reports for each month for each event. Figure 3 plots this data and reveals the pattern of media coverage for each of the three months prior to the event and for the six months following the selected ESG events. The

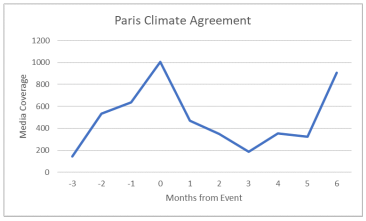
shape of the media coverage attests to the exogenous nature of the events. For most events there is a spike in media coverage at the time of the event, followed by gradual decrease in coverage. Griffin, Jaffe, Lont and Dominguez-Faus (2015) analyze the time it takes for a significant scientific publication to impact financial markets. They found that the bulk of the impact follows very soon after the timing of the scientific publication. As a result, an observation window of two months from the time of the ESG events is employed to monitor the event impact on fund choices.

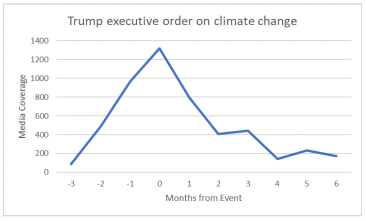

Deepwater Horizon
Media Coverage
Months from Event

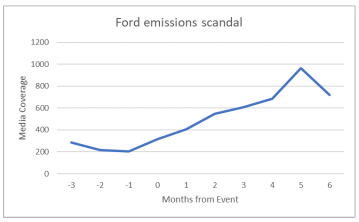

Fukushima Nuclear Reactor
Media Coverage
Months from Event

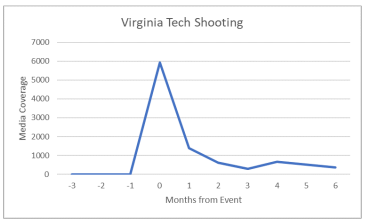

UN global warming
Media Coverage
Months from Event

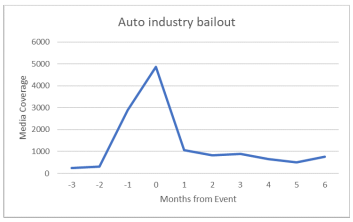

Volkswagen emissions scandal
Media Coverage
Months from Event


Paris Climate Agreement
Media Coverage
Months from Event

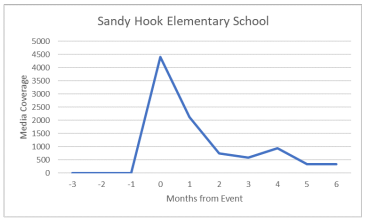

Trump executive order on climate change
Media Coverage
Months from Event

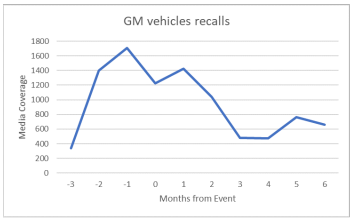

Ford emissions scandal
Media Coverage
Months from Event

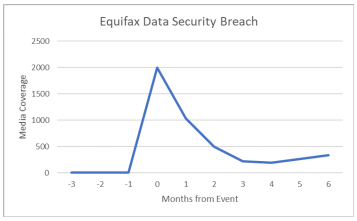

Virginia Tech Shooting
Media Coverage
Months from Event

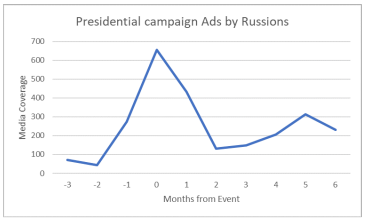

Auto industry bailout
Media Coverage
Months from Event

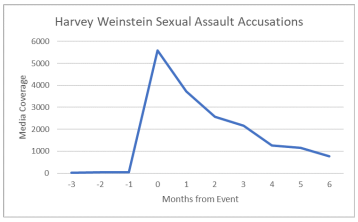

Oakland
Media Coverage
Months from Event


Sandy Hook Elementary School
Media Coverage
Months from Event

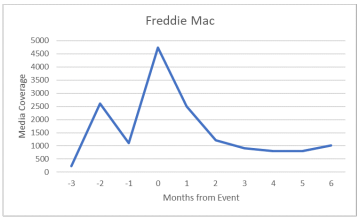

GM vehicles recalls
Media Coverage
Months from Event

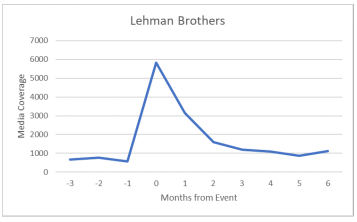

Equifax Data Security Breach
Media Coverage
Months from Event

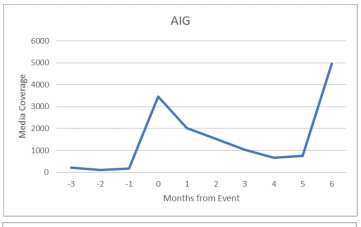

Presidential campaign Ads by Russions
Media Coverage
Months from Event

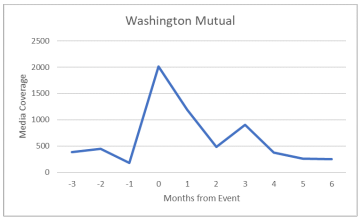

Harvey Weinstein Sexual Assault Accusations
Media Coverage
Months from Event

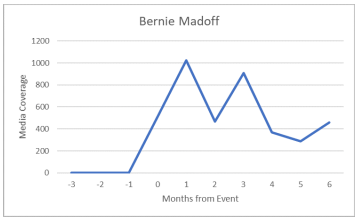

Bear Stearns
Media Coverage
Months from Event


Freddie Mac
Media Coverage
Months from Event


Lehman Brothers
Media Coverage
Months from Event


AIG
Media Coverage
Months from Event


Washington Mutual
Media Coverage
Months from Event


Bernie Madoff
Media Coverage
Months from Event

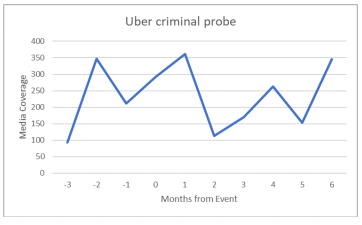

Uber criminal probe
Media Coverage
Months from Event

Figure 3 Monthly Media Coverage for Selected ESG Events The figure shows the media coverage for each major ESG events. The vertical axis is the number of media reports recorded by Factiva over the three months prior and the six months following each ESG event.

The purpose of the current research is to evaluate whether PRI designations have an impact on fund flows to SRI funds. However, because of the endogeneity issues around fund flow analysis, a reliable methodology is required. Therefore, an exogenous series of ESG events is created to enable a straightforward interpretation of the analysis.

IV. Time Series Panel Interaction Regression

To extract the full benefit from natural experiments, the mutual fund flows are modelled as a function of the exogenous ESG events and the interaction of these events and elements which make the target funds unique. These elements include indicators for the time over which the investment manager had signed the PRI and whether the fund was described as an SRI fund. The interaction terms should therefore discern whether ESG events motivate investors to prefer SRI funds and whether being designated as SRI by the PRI matters to investors.

The panel nature of fund flow data provides the opportunity to apply time series regression methods. This method enables the use of variables which have already been found to provide good explanation of fund flows. Examples of these variables include lagged returns and fees. The panel approach can also mitigate issues such as unobserved regressors across funds or through time. However, in this article, natural experiments are implemented to more completely resolve these issues. The time series panel regression takes the form

$$\text{fund flow}_{t,i} = \beta_0 + \beta_1 \text{ESG} + \beta_2 \text{PRI} + \beta_3 \text{SRI} + \beta_4 \text{ESG} \times \text{PRI} + \beta_5 \text{ESG} \times \text{SRI} + \beta_6 \text{PRI} \times \text{SRI} + \beta_7 \text{ESG} \times \text{PRI} \times \text{SRI} + \beta_8 \text{return}_{t,i} + \beta_9 \text{return}_{t-1,i} + \beta_{10} \text{fees}_{t,i} + \beta_{11} \text{size}_{t,i} + \beta_{12} \text{age}_{t,i}$$

Where

fund flow$_{t,i}$ is the dollar amount flowing into or out of fund i over month t
ESG is a binary indicator variable for the six month window following an ESG event
PRI is a dichotomous variable which branches from 0 to 1 if the fund's investment manager signs the PRI and back to 0 if the manager is subsequently excluded from the list of PRI signatories
SRI is a fixed effect variable for funds described as Socially Responsible Funds
ESG × PRI, ESG × SRI, PRI × SRI and ESG × PRI × SRI are interactive terms
return$_{t,i}$ is the monthly holding period return over month t for fund i
fees$_{t,i}$ are the management fees over month t for fund i
size$_{t,i}$ is the log of total net assets at the beginning of month t for fund i
age$_{t,i}$ is the age of fund i at the beginning of month t

Contemporaneous monthly returns have a positive influence on the fund flows for the same month. This is possibly because "Investors are quick to recognize the high performing funds and money follows" (Benson, Faff and Smith (2010, p. 65)). Lagged returns similarly have a positive impact (Carhart (1997); Chevalier and Ellison (1997); Goetzmann and Peles (1997); Gruber (1996); Ippolito (1992); Sirri and Tufano (1998)). "Mutual fund consumers chase returns, flocking to funds with highest recent returns" (Sirri and Tufano (1998, p. 1590)). Lagged fund flows is sometimes encountered as a regressor in fund flow literature with a positive coefficient (Chiang and Huang (2017); Coval and Stafford (2007); Warther (1995)), but is not employed here. Gruber (1996) uses lagged fund flows as a proxy for "other variables besides past performance that might account for future cash flows" such as marketing effort and general reputation. However, due to the likelihood of biased standard errors from using the lagged dependent variable in a time series regression (Nickell (1981)), the regression employed here use fund fixed effects. These fixed effects will accommodate for variables which are constant through time but differ across funds or fund types. This will include the variables that the lagged fund flows proxied for (e.g., manager reputation). In this structure, the SRI variable is necessarily omitted because it is effectively a fund fixed effect. Time effects are also included to accommodate for variables which are constant across funds

but change through time. For example, tax changes and consumption preferences can make investing more or less attractive in different periods.

Control variables are also employed to accommodate for the way fees, size and age influence fund flow patterns. “Consumers are fee-sensitive in that lower-fee funds and funds that reduce their fees grow faster” (Sirri and Tufano (1998, p.1590)). Size (logged) is included because it is likely to affect fund flows either directly or by impacting performance (Bollen (2007); Pollet and Wilson (2008); Renneboog, Ter Horst and Zhang (2011); Sirri and Tufano (1998)). Berk and Green (2004) argue that size negatively impacts fund flows because either successful funds raise their fees, or their performance is affected by diseconomies of scale. The age of a fund is also a commonly employed control variable in the fund flow literature (El Ghoul and Karoui (2017); Pollet and Wilson (2008)). Analysis by (Bollen (2007)) reveals the average fund flows on younger funds is greater than the average on older funds. Negative coefficients are anticipated across all these control variables.

The time series panel regression is applied to as many categories of investor types and fund styles as possible. This is to recognize that there are many different potential motivations for SRI investing (Sandberg, Juravle, Hedesstrom and Hamilton (2009)). Results are presented for retail funds compared to institutional funds, and for the full range of different CRSP styles of funds (e.g., growth compared to income, etc).

V. Results

The overarching research question is whether SRI funds designated by the PRI receive greater fund flows than SRI funds which are not recognized by the PRI. To answer this question in a robust manner, natural experiments have been designed around ESG events. These events are exogenous in nature and are anticipated to influence investor preferences. This means there is an important aspect of the experiments to validate before the main research question can be addressed: do ESG events trigger the choice of SRI funds over conventional funds? A further question naturally follows: do ESG events motivate the selection of funds managed by the PRI signatories compared to those which are not? This

question therefore addresses the extent of the PRI's influence across the complete set of funds (i.e., SRI and conventional).

Hypothesis 1. The fund flow to SRI funds is greater than the flow to conventional funds following an ESG event. This hypothesis was tested by an interaction term combining the binary indicator variable for ESG events with the fixed effect variable for SRI funds.

Hypothesis 2. The fund flow to PRI designated SRI funds is greater than the flow to the SRI funds not designated by the PRI. This hypothesis was tested by an interaction term combining the dichotomous variable for PRI signing with the ESG binary indicator and the SRI fixed effect variable.

Hypothesis 3. The fund flow to funds managed by PRI signatories is greater than the flow to those funds not managed by PRI signatories. This hypothesis was tested by an interaction term combining the dichotomous variable for signing the PRI with the ESG binary indicator.

Table IV displays the extent to which funds flow to SRI funds managed by PRI signatories following ESG events. Time series panel regressions have been run where the dependent variable was monthly US equity fund flows. The regressors were indicator variables for: ESG event windows, funds managed by PRI signatories, and funds described as SRI and interaction terms for these variables. The regressions included contemporaneous and lagged monthly returns; control variables for fees, size and age; and fund fixed effects. The coefficients from regressing all funds are detailed in Column (1), and the following two columns show the results for retail funds and institutional funds. Separate regressions were performed on retail and institutional funds (and the individual styles of funds shown in Table V below) to reflect the heterogeneous nature of the SRI community (Sandberg, Juravle, Hedesstrom and Hamilton (2009)). The coefficients for the contemporaneous and lagged returns, and the control variables, are not presented in the table, but all have signs and significance which were reasonably consistent with previous literature.

Table IV

Impact on Fund Flows to PRI Designated SRI Funds following ESG Events

This table shows how ESG events and PRI designations impact the fund flows of SRI and conventional funds. The dependent variable is monthly US equity fund flows, which have been regressed on indicator variables for: ESG event windows, funds managed by PRI signatories, and funds described as Socially Responsible Investing (SRI). Time series panel regressions were applied with interaction terms for ESG events, PRI signatories and SRI descriptions. The regressions included contemporaneous and lagged monthly returns; control variables for fees, size and age; and fund fixed effects. Column (1) shows the results regressed across all funds, Column (2) for retail funds and Column (3) for institutional funds. The data period commenced from April 2006 because this is when the PRI was launched. Standard errors have been clustered by month and fund, and t-statistics are presented in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	All funds	Retail funds	Institutional funds
	(1)	(2)	(3)
ESG event	0.0500	-0.0177	0.0833
	(0.0479)	(0.0658)	(0.0828)
PRI	0.735***	0.740**	0.951***
	(0.219)	(0.341)	(0.334)
ESG event x PRI	-0.349***	-0.877***	-0.0274
	(0.112)	(0.166)	(0.181)
ESG event x SRI	0.831***	1.182***	0.576**
	(0.221)	(0.363)	(0.238)
PRI x SRI	2.995**	3.246*	2.514
	(1.276)	(1.849)	(1.966)
ESG event x PRI x SRI	0.148	-0.0681	0.913
	(0.381)	(0.552)	(0.578)

Monthly observations	632,733	308,099	258,953
Number of funds	6,766	2,828	3,324
Number of PRI funds	3,077	1,213	1,612
Number of SRI funds	136	66	62
Number of PRI/SRI funds	95	50	40

The ESG event interaction term with SRI funds (i.e., ESG event x SRI) has a positive coefficient of 0.831. This represents 831 thousand dollars per month and is statistically significant at the 0.01 level. The result supports the Hypothesis 1 and provides evidence that ESG events trigger increased fund flows to SRI funds. This result is consistent across retail and institutional funds, although the SRI fund flow following an ESG event is more economically and statistically significant for retail funds with a 1.182 coefficient (i.e., 1.182 million dollars per month at the 0.01 level) compared to institutional funds with a 0.576 coefficient (i.e., 576 thousand dollar coefficient at the 0.05 level).

The results for Hypothesis 2 and 3 are not as positive. The interaction term linking the ESG events, the PRI signing and SRI funds (i.e., ESG event x PRI x SRI) does not have a statistically significant coefficient. This lack of significance is contrary to Hypothesis 2, and suggests the PRI signature does not attract more flows to SRI funds. Further, the interaction term combining the ESG events and funds managed by PRI signatories (i.e., ESG event x PRI), has a statistically significant negative coefficient. The coefficient represents -349 thousand dollars per month (at the 0.01 level). This result is completely contrary to Hypothesis 3 and suggests the PRI signature is associated with a negative impact on fund flows. It is worth noting that the negative coefficient is only significant for retail funds and not for institutional Funds. The Hypothesis 2 and 3 findings conflict with existing literature and are therefore addressed more fully in the following section.

Although the primary focus of this article is to use natural experiments to establish robust conclusions about SRI investors' preferences, the regressions imply some secondary fund flow patterns. There is a positive and significant coefficient of 0.735 (at the 0.01 level) for all funds managed by PRI signatories. On the surface, this suggests PRI signed investment

managers are preferred by conventional investors. However, it is not as clear cut as the findings directly associated with the natural experiments (i.e., interacting with ESG events). The positive PRI coefficient could be associated with other characteristics of these investment managers. For example, it might be the proactive and adaptive nature of a manager which attracts new funds and just happens to coincide with the PRI signing. Other potential examples of alternative explanations include the marketing effort and general reputation of the investment managers (Gruber (1996)). There is also a significant positive coefficient of 0.2995 (at the 0.05 level) for SRI funds which are managed by PRI signatories. As with the PRI designation, this result is not considered robust because it, too, is not explicitly interacting with the natural experiments.

Table V presents results for applying the regression across each fund style: large-, medium-, small- and micro-cap; and income, growth and growth & income combined. The results for the small-cap, growth and growth & income funds present evidence for Hypothesis 1. There is a positive coefficient for the interaction between ESG events and SRI description of 0.592 (at the 0.01 level) for small-cap funds, 1.056 (at the 0.01 level) for growth funds and 0.452 (at the 0.10 level) for growth & income funds. Hypothesis 2 is not supported by any of the individual fund styles, and Hypothesis 3 is contradicted by the results for the small-cap, income and growth & income funds.

Table V

Fund Flow Impact for PRI Designated SRI Funds of Different Types Following ESG Events

This table shows the fund flow effect of ESG events, PRI designations and SRI descriptions across different styles of funds. Fund flows were regressed on ESG event, PRI signing, and SRI description indicator variables and interaction terms. The regressions included contemporaneous and lagged monthly returns; control variables for fees, size and age; and fund fixed effects. The data period commenced from April 2006, Standard errors have been clustered by month and fund, and t-statistics are presented in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Large-cap funds	Mid-cap funds	Small-cap funds	Micro-cap funds	Growth funds	Income funds	Growth & income funds
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ESG event	-1.160***	0.274**	0.0947	-0.0687	-0.0723	0.401*	0.0575
	(0.369)	(0.133)	(0.0994)	(0.259)	(0.0746)	(0.224)	(0.119)
PRI	-0.987	1.228**	0.153	0.0957	0.412	0.542	2.207***
	(1.359)	(0.515)	(0.404)	(0.682)	(0.377)	(1.032)	(0.555)
ESG event x PRI	0.572	-0.355	-0.445*	1.121	0.0257	-0.996**	-0.749***
	(1.012)	(0.249)	(0.243)	(0.863)	(0.184)	(0.481)	(0.270)

ESG event x SRI		0.604	0.592***		1.056***	1.239	0.452*
		(1.385)	(0.110)		(0.352)	(1.404)	(0.268)
PRI x SRI		7.171***			2.411**	32.06***	
		(0.918)			(1.182)	(3.480)	
ESG event x PRI x SRI			0.757		-0.248	-2.097	
			(0.493)		(0.500)	(2.401)	
	(4.239)	(1.380)	(0.782)	(1.413)	(0.658)	(1.440)	(1.124)
Observations	10,691	91,478	124,244	5,230	245,181	41,522	114,387
Number of funds	100	970	1,339	53	2,736	511	1,334

Table VI

Fund Flow Impact for PRI Designated SRI Funds Following Environmental, Social and Governance Events

This table shows the fund flow effect of ESG events, PRI designations and SRI descriptions for the three individual sets of environmental (column 1), social (column 2) and governance (column 3) events. Fund flows have been regressed on ESG event, PRI signing, and SRI description indicator variables and interaction terms. The regressions also included contemporaneous and lagged monthly returns; control variables for fees, size and age; and fixed effects. The data period commenced from April 2006, standard errors were clustered by month and fund, and t-statistics are presented in parentheses. The superscripts *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	(1) Environmental events	(2) Social events	(3) Governance events
ESG event	-0.105*	-0.434***	0.317***
	(0.0606)	(0.0534)	(0.105)
PRI	0.603***	0.692***	0.640***
	(0.218)	(0.218)	(0.219)
ESG event x PRI	0.223*	-0.427***	-0.0846
	(0.126)	(0.135)	(0.208)
ESG event x SRI	0.958***	-0.0284	0.823
	(0.230)	(0.326)	(0.706)
PRI x SRI	3.202**	2.981**	3.166**
	(1.285)	(1.279)	(1.282)
ESG event x PRI x SRI	-0.820*	0.951*	-0.619
	(0.454)	(0.502)	(0.920)
Observations	632,733	632,733	632,733

Number of funds	7,043	7,043	7,043

Table VI shows the regression results for each of the three event categories: environmental, social and governance. Drilling down into each of the three elements of the ESG events reveals Hypothesis I is significant (at the 0.01 level) for only the environmental events. At this level of detail, there is mixed results for Hypothesis 2. The social events provide some limited support with a positive coefficient of 0.951 (at an 0.10 level) and, in contrast, the environmental events have a negative coefficient of -0.820 (at an 0.10 level). This more granular level of analysis also reveals that the negative coefficient observed overall for Hypothesis 3 may be attributed to the social events with a negative coefficient of -0.427 (at an 0.01 level). This result can be distinguished from the positive coefficient of 0.223 (at an 0.10 level) observed for the environmental events. This means that the environmental results provide some limited support for Hypothesis 3.

This article applies time series dynamic panel regression analysis across US domestic equity mutual funds. This analysis reveals mixed results from applying natural experiments based on ESG events. The first hypothesis is positively affirmed: the natural experiments work successfully. This is demonstrated by a significant positive fund flow to SRI funds following ESG events. However, the second hypothesis is not satisfied. The natural experiments do not show that SRI funds designated by the PRI receive greater fund flows than those not designated by the PRI. Further, the results refute the third hypothesis. There is a negative fund flow following ESG events for funds managed by PRI signatories.

VI. Discussion and Conclusion

The aim of this study is to determine the impact of the PRI on fund flows to SRI funds. ESG events are employed as natural experiments on the decision-making of investors. This natural experiment setting assumes that ESG events motivate investors to consider investing in SRI funds rather than conventional funds. The validity of this assumption is the focus of the first hypothesis: flows to SRI funds are greater than those to conventional funds following an ESG event. This study's aim then follows, as a second hypothesis: SRI funds

managed by PRI signatories receive greater fund flows than other SRI funds. To then gain a better understanding of the PRI's influence, a final hypothesis is proposed: that fund flows to funds managed by PRI signatories are greater than those to other funds. Time series panel regressions measure the interaction of ESG events, PRI designations and funds flowing to SRI funds. There is a positive statistically and economically significant fund flow to SRI funds motivated by ESG events. However, the experiments do not provide evidence that SRI funds with the PRI designation are preferred to those without the PRI designation. Further, there is evidence of a negative impact following an ESG event on fund flows to conventional funds managed by PRI signatories.

There is a significant positive coefficient for the interaction term combining ESG events with funds flowing to SRI funds. This is a critical first hurdle for the structure of the testing because it validates the natural experiments. The result demonstrates that a longitudinal set of major ESG events is successful at driving investor preferences towards socially responsible objectives. This is consistent with existing literature, which documents that social preferences, social signaling, and moral intensity motivates SRI investing. Riedl and Smeets (2017) used experiments to demonstrate "investors' intrinsic social preferences and, to a lesser extent, social signaling are major factors determining the likelihood of holding SRI equity funds." Further, McLachlan and Gardner (2004) employed questionnaires to demonstrate that moral intensity can distinguish socially responsible investing from conventional investing. Moral intensity has six dimensions: magnitude of consequences, probability of effect, temporal immediacy, concentration of effect, proximity and social consensus. These dimensions have considerable overlap with the methods used to select ESG events presented earlier. This article therefore contributes to the literature by employing an ESG lens to understand what motivates investors choosing SRI funds.

The effectiveness of the natural experiments is consistent across both retail and institutional funds, although the influence on retail fund flows is larger and more statistically significant. This is likely to be due to retail investors being able to change their fund choices more easily than institutional investors. However, the experiments are only successful for

environmental events. This suggests high-profile environmental events drive the selection of SRI over conventional funds, but that social and governance events do not.

By regressing across individual styles of funds, the natural experiments are found to be effective across small-cap, growth, and growth & income fund categories. The relevance of the experiments for small-cap funds is consistent with the small-cap focus of SRI funds described in previous literature. Luther, Matatko and Corner (1992) observed a small company bias in ethical portfolios, and explained it on the basis that large diversified companies are more likely to have some subsidiary activities which may be classified as unethical. In contrast, the narrower range of activities of small companies means they are less likely to encounter this challenge. This reasoning raises the question as to why there are no SRI funds in the micro-cap space. However, the micro-cap sector has an extremely low number of funds and therefore unlikely to receive enough investor demand. In contrast, all the sectors where the experiments were successful have large collections of funds (i.e., 1,330 small-cap funds, 2,736 growth funds and 1,334 growth & income funds).

These natural experiments represent a platform for re-evaluation of ESG and SRI related research. Much of the published research does not explicitly accommodate for endogeneity biases or employs questionable solutions. The approach presented here can therefore enable more robust and conclusive results (Gippel, Smith and Zhu (2015)). The specific application for the experimental setting in this article is to evaluate the influence of the PRI designation on SRI funds. The results do not demonstrate that PRI signing affects SRI fund choice. The interaction between PRI signing, funds with an SRI purpose, and an ESG event (i.e., ESG event x PRI x SRI) was not significantly different from zero. This finding was consistent across fund styles and conflicts with the findings of a previous event study. Li and Humphrey (2017) found a positive fund flow to SRI funds in the event window following PRI signing. Although they employed a difference in differences approach, their results did not benefit from the additional rigor of natural experiments. It is therefore possible their findings are biased by endogeneity issues. For example, the fund flows they observed around the PRI signing might actually be attributable to omitted factors such as intense marketing of the reputation and capabilities of the investment manager coinciding with

signing the PRI. Further application of natural experiments could potentially identify why their results differ from those reported here. Further research could also attempt to resolve a disparity of results for environmental events (with a negative impact) and social events (with a positive impact).

The natural experiments show a further finding which differs from those of previous literature. The interaction between the ESG events and funds managed by PRI signatories (i.e., ESG event x PRI) was significantly negative. However, this negative impact on fund flows is only significant for retail funds. This implies that conventional retail investors reject funds managed by PRI signatories after an ESG event. This result conflicts with Hartzmark and Sussman (2019). They found investors prefer funds which had higher Morningstar ESG ratings. This discrepancy could be resolved by examining retail funds managed by PRI signatories to determine their Morningstar ESG ratings. This research should particularly focus on the fund categories where the negative impact was observed: small-cap, income, and growth & income funds. Further, the focus of this testing should highlight the event windows following social events (in contrast to environmental and governance events).

A negative fund flow impact on retail PRI managed funds follows events about social concerns (e.g., human rights infractions). These events could trigger a change in social awareness by retail investors. Such investors may be re-evaluating the accountability of the funds management industry in response to heightened social concerns. Specifically, the negative fund flow affect could represent a decrease of trust in those investment managers who have promoted their responsible capabilities alongside their PRI credentials. Further qualitative analysis should be pursued to verify this conclusion. However, if correct, this fund flow affect should motivate investment managers to clearly communicate their philosophy and capabilities about responsible investing immediately following ESG events.

In addition to the results attributable to the natural experiments, there is an unconditional result worth noting. There is a positive unconditional coefficient for funds managed by PRI signatories. This suggests that PRI investment managers might be preferred by more conventional investors. However, this result conflicts with the results discussed in the previous paragraph and suffers from the issues outlined earlier i.e., endogeneity biases

could persist where natural experiments have not been implemented. The PRI indicator could be contemporaneous with other desirable traits of these investment managers. Qualitative interview methods could potentially resolve this puzzle. Investors could be interviewed to discern what specific attributes motivate their fund choices and whether being a PRI signatory acts as a proxy for these attributes.

The fund flows being driven towards SRI funds following ESG events are statistically significant but not economically substantial (i.e., $831 thousand per month). This result indicates that the impact of ESG events on SRI preferences is not an economically exploitable pattern. Investment managers are unlikely to be motivated to open new SRI funds based on this level of fund flow. In addition, the unconditional flows on conventional funds managed by PRI signatories are also not economically significant (i.e., $735 thousand per month). This suggests being a PRI signatory is not, of itself, a profitable strategy for an investment manager. These findings therefore extend our knowledge of the dynamics of the investment industry and raise important questions. Why do investment managers offer SRI funds? Why are investment managers signing the PRI? The results imply that the SRI component of the market is likely to remain small. They also imply that PRI is not likely to bring about significant positive influence on the industry's investment practices. Future research is therefore necessary to investigate why investors are not attracted to SRI funds and PRI designated funds in economically material quantities. This will necessarily include contrasting the PRI with other industry bodies (e.g., The Forum for Sustainable and Responsible Investment) and ESG ratings agencies (e.g., Morningstar, MSCI, and Sustainalytics). Research is also necessary to investigate how investors might be guided by the PRI, or alternative mechanisms by which the PRI can positively improve investment practices. This research is likely to involve qualitative methods to directly observe the motivations, desires and requirements of SRI investors.

Responsible investors are motivated by ESG events. However, when they choose SRI funds, their choice is not influenced by the PRI. This has been robustly demonstrated by monitoring SRI fund selection following natural experiments. This is an important finding because it questions the purpose of the PRI and the effectiveness of its current practices. The

finding suggests industry bodies such as the PRI currently have limited scope to bring about positive and significant impact on the industry's investment practices. This insight contributes to our understanding of the barriers facing SRI investing. Understanding these barriers can facilitate creating better solutions for the many environmental, social and governance issues facing the world.

The influence of fund ratings agencies on fund flows has been previously established (Ammann, Bauer, Fischer and Müller (2019); Armstrong, Genc and Verbeek (2017); Barber, Huang and Odean (2016); Khorana and Servaes (2011); Nanda, Wang and Zheng (2004)). This literature has demonstrated that positive ratings lead to substantial positive fund flows for conventional funds. By contrast, the current research shows the SRI fund space is different. The impact of positive designation by industry bodies does not have the same power. This discovery is a novel contribution to the literature on designating agents. If designating agents are not important in the SRI industry, then the motivations for SRI investing reduces to a simpler list of concerns. Those documented in the literature include: the standard utility elements of return (beyond an anticipated cost), and risk, plus the non-financial environmental, social and governance concerns particular to the investor's culture and ideology (Daugaard (2020)).

In the broader context of fund analysis, research to date has focused on return performance. This article therefore contributes to the literature by increasing the facets by which we can understand the nature, drivers and stakeholders of investment vehicles.

This article reviews the outcome of a natural experimental setting which was designed to solve for the endogeneity issues which plague SRI fund analysis. A longitudinal collection of ESG shocks was identified to act as a motivation for selecting SRI funds over conventional funds. The experiments were applied to see whether SRI funds managed by PRI signatories attract more funds than those not managed by PRI signatories. While the experiments were successfully validated, there was no evidence that SRI investors prefer the PRI designated funds. Further, the natural experiments revealed a negative impact on conventional funds if the funds were managed by a PRI signatory. These results suggest further experiments and qualitative methods are appropriate to reveal the nuances and motivations of SRI investing.

The results also point to the need for the PRI to investigate more innovative strategies to achieve a sustainable global financial system.

References

Ammann, Manuel, Christopher Bauer, Sebastian Fischer, and Philipp Müller, 2019, The impact of the morningstar sustainability rating on mutual fund flows, *European Financial Management* 25, 520-553.

Armstrong, Will J, Egemen Genc, and Marno Verbeek, 2017, Going for gold: An analysis of morningstar analyst ratings, *Management Science* 65, 2310-2327.

Barber, Brad M, Xing Huang, and Terrance Odean, 2016, Which factors matter to investors? Evidence from mutual fund flows, *The Review of Financial Studies* 29, 2600-2642.

Benson, Karen L, Robert W Faff, and Tom Smith, 2010, The simultaneous relation between fund flows and returns, *Australian Journal of Management* 35, 51-68.

Benson, Karen L, and Jacquelyn E Humphrey, 2008, Socially responsible investment funds: Investor reaction to current and past returns, *Journal of Banking & Finance* 32, 1850-1859.

Berk, Jonathan B, and Richard C Green, 2004, Mutual fund flows and performance in rational markets, *Journal of political economy* 112, 1269-1295.

Bollen, Nicolas PB, 2007, Mutual fund attributes and investor behavior, *Journal of Financial and Quantitative Analysis* 42, 683-708.

Carhart, Mark M, 1997, On persistence in mutual fund performance, *The Journal of finance* 52, 57-82.

Chevalier, Judith, and Glenn Ellison, 1997, Risk taking by mutual funds as a response to incentives, *Journal of Political Economy* 105, 1167-1200.

Chiang, Min-Hsien, and Hsin-Yi Huang, 2017, Do mutual fund flows drive the disposition behaviour of fund managers? *Investment Analysts Journal* 46, 311-323.

Coval, Joshua, and Erik Stafford, 2007, Asset fire sales (and purchases) in equity markets, *Journal of Financial Economics* 86, 479-512.

Daugaard, Dan, 2020, Emerging new themes in environmental, social and governance investing: A systematic literature review, *Accounting & Finance*, 60(2), 1501-1530.

El Ghoul, Sadok, and Aymen Karoui, 2017, Does corporate social responsibility affect mutual fund performance and flows? *Journal of Banking & Finance* 77, 53-63.

Gippel, Jennifer, Tom Smith, and Yushu Zhu, 2015, Endogeneity in accounting and finance research: Natural experiments as a state-of-the-art solution, *Abacus* 51, 143-168.

Goetzmann, William N, and Nadav Peles, 1997, Cognitive dissonance and mutual fund investors, *Journal of financial Research* 20, 145-158.

Griffin, Paul A, Amy Myers Jaffe, David H Lont, and Rosa Dominguez-Faus, 2015, Science and the stock market: Investors' recognition of unburnable carbon, *Energy Economics* 52, 1-12.

Gruber, Martin J., 1996, Another puzzle: The growth in actively managed mutual funds, *The Journal of Finance* 51, 783-810.

Hartzmark, Samuel M., and Abigail B. Sussman, 2019, Do investors value sustainability? A natural experiment examining ranking and fund flows, *The Journal of Finance*, Advance Online Publication.

Heider, Florian, and Alexander Ljungqvist, 2015, As certain as debt and taxes: Estimating the tax sensitivity of leverage from state tax changes, *Journal of Financial Economics* 118, 684-712.

Huberman, Gur, and Tomer Regev, 2001, Contagious speculation and a cure for cancer: A nonevent that made stock prices soar, *The Journal of Finance* 56, 387-396.

Ippolito, Richard A, 1992, Consumer reaction to measures of poor quality: Evidence from the mutual fund industry, *The Journal of Law and Economics* 35, 45-70.

Khorana, Ajay, and Henri Servaes, 2011, What drives market share in the mutual fund industry? *Review of Finance* 16, 81-113.

Li, Yong, and Jacquelyn E Humphrey, 2017, Commitment to change or greenwashing? How signing the principles for responsible investment affects flow to mutual funds, UQ Business School Working Paper.

Luther, Robert G, John Matatko, and Desmond C Corner, 1992, The investment performance of uk “ethical” unit trusts, *Accounting, Auditing & Accountability Journal* 5.

Marti-Ballester, Carmen-Pilar, 2015, Can socially responsible investment for cleaner production improve the financial performance of spanish pension plans? *Journal of Cleaner Production* 106, 466-477.

McLachlan, Jonathan, and John Gardner, 2004, A comparison of socially responsible and conventional investors, *Journal of Business Ethics* 52, 11-25.

MSCI, 2011, ESG impact monitor methodology.

Nanda, Vikram, Z. Jay Wang, and Lu Zheng, 2004, Family values and the star phenomenon: Strategies of mutual fund families, *The Review of Financial Studies* 17, 667-698.

Nickell, Stephen, 1981, Biases in dynamic models with fixed effects, *Econometrica: Journal of the Econometric Society* 1417-1426.

Peifer, Jared L, 2011, Morality in the financial market? A look at religiously affiliated mutual funds in the USA, *Socio-Economic Review* 9, 235-259.

Pollet, Joshua M, and Mungo Wilson, 2008, How does size affect mutual fund behavior? *The Journal of Finance* 63, 2941-2969.

Renneboog, Luc, Jenke Ter Horst, and Chendi Zhang, 2011, Is ethical money financially smart? Nonfinancial attributes and money flows of socially responsible investment funds, *Journal of Financial Intermediation* 20, 562-588.

Riedl, Arno, and Paul Smeets, 2017, Why do investors hold socially responsible mutual funds? *The Journal of Finance* 72, 2505-2550.

Sandberg, Joakim, Carmen Juravle, Ted Martin Hedesström, and Ian Hamilton, 2009, The heterogeneity of socially responsible investment, *Journal of Business Ethics* 87, 519-533.

Schwartz, Mark S, 2003, The "ethics" of ethical investing, *Journal of Business Ethics* 43, 195-213.

Sirri, Erik R., and Peter Tufano, 1998, Costly search and mutual fund flows, *The Journal of Finance* 53, 1589-1622.

Warther, Vincent A, 1995, Aggregate mutual fund flows and security returns, *Journal of financial economics* 39, 209-235.