Thesis Title: Do the Principles for Responsible Investing activate fund flows to build a sustainable future? Using systematic methods to scope out the environmental, social and governance landscape and analyse the fund flow drivers.

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Abstract

Fund flows determine assets under management which is a primary concern for investment managers. In contrast to fund flows, current investment fund literature is dominated by research on return performance. This thesis therefore makes a concrete addition to the literature by researching fund flows. The practical concern for this research is whether the United Nation's Principles for Responsible Investing (PRI) drive fund flows towards socially responsible investing (SRI) funds. Consequently, this research focuses on SRI funds and funds managed by signatories to the PRI. There are significant endogeneity issues encountered in fund flow analysis, so innovative techniques are necessary. SRI fund flows are an ideal context for creating natural experiments using environmental, social and governance (ESG) events and implementing system Generalized Method of Moments (GMM). The results from these techniques raise doubts about the ability of the PRI to influence SRI fund flows. This outcome questions the potential for PRI and other intergovernmental initiatives to meaningfully contribute to sustainable developments.

Chapter 2 of this thesis applies a scientific and replicable methodology to reveal the underlying and emerging themes in the newly developing literature on ESG and SRI. The research to date has maintained a limited focus on return performance (Capelle-Blancard & Monjon, 2014). A wider range is necessary before research can properly inform investors, companies and regulators. This chapter contributes to this challenge by systematically exploring the literature to reveal a richer array of topics: the heterogeneous nature of ESG investing, its costs and motivations, and its management literature origins. In addition, five emerging themes are identified: the human element, climate change, fund flows, fixed income and the rise of non-Western players. While each theme has the potential to become a successful new stream of research, this systematic review has established a valuable research agenda for the current thesis – fund flow analysis.

Chapter 3 examines whether PRI designated SRI investment managers receive extra fund flows. While investors have a great appetite for SRI, there is significant cynicism of investment managers. Investors question whether investment managers are genuine about SRI and whether their investment processes are effective. Into this maelstrom of uncertainty enters the PRI: an intergovernmental initiative attempting to improve investment practices by signalling to investors which investment managers have quality SRI processes. Effective PRI signalling will attract more flows to the funds managed by PRI signatories, thus motivating investment managers to sign the PRI and maintain their inclusion as signatories. In turn, PRI could influence and improve the SRI processes of these investment managers. However, system GMM tests do

not demonstrate extra flows to the PRI designated investment managers. This result raises doubts about the PRI effectively attracting funds to their signatories. The discussion in this thesis therefore draws on signalling theory to provide insights as to why this result occurred as well as pathways to improve PRI's signalling power.

Fund flow analysis suffers from all three main forms of endogeneity: dynamic endogeneity, simultaneity and unobserved heterogeneity. Chapter 3 mitigates the effects of endogeneity by implementing a sophisticated econometric technique: system GMM. While this approach is well accepted in finance literature there is still the possibility that the current finding of no significant results could be due to simultaneity (Demsetz, 1983). An alternative to sophisticated econometrics is to employ natural experiments. Wintoki et al. (2012) describes natural experiments as the "gold standard" for addressing endogeneity problems. The most effective natural experiments collate many instances of the experiment (Heider & Ljungqvist, 2015). Chapter 4 therefore builds upon the methodology of Chapter 3 by establishing an experimental setting relevant for SRI fund flows.

Chapter 4 creates experiments using ESG events. SRI fund analysis is an ideal candidate for natural experimentation. A longitudinal collection of ESG events act as experimental shocks on investor preferences. A series of high profile ESG events are likely to motivate the choice of SRI funds over more conventional funds. The exogenous nature of these events should mitigate the confounding effects of endogeneity and thereby clarify our understanding of what drives SRI fund flows. This chapter demonstrates that the ESG events motivate the choice by investors of SRI over conventional funds. The result shows the ESG events create a successful natural experiment platform.

The focus of Chapter 4 is to test whether investment firms signing the PRI experience superior fund flows. The ESG natural experiments are therefore applied to test if investors prefer an SRI fund managed by a PRI signatory. The results do not reveal a significant additional flow to SRI funds managed by PRI signatories. Further, the natural experiments show a negative impact on conventional retail funds when managed by a PRI signatory. These findings raise doubts as to the value of investment managers signing the PRI and questions the potential for the PRI to effectively influence SRI investment practices. In a broader sense, the findings raise doubts that the PRI and other similar intergovernmental initiatives can meaningfully contribute to developing a sustainable world.

Statement of Originality

This work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

(Signed)_____ Date: _____4/04/2020_____

Daniel Walter Daugaard

Structure of Thesis

This thesis is structured around three major essays. All three essays are original studies making distinct contributions to the environmental, social and governance (ESG); and socially responsible investing (SRI) area of finance knowledge. The three studies represent material of a publishable quality. The first essay (Chapter 2) has also now been successfully published in an A ranked journal (Accounting and Finance). The second essay (Chapter 3) was successfully accepted for presentation at the PhD workshop of the Financial Markets and Corporate Governance 2020 conference La Trobe University, Melbourne. The second essay has also been successfully submitted to be discussed at the Manuscript Development Workshop for Business & Society and Journal of Business Ethics 2020 in Melbourne. The third essay was successfully accepted to be presented at the main conference of Financial Markets and Corporate Governance 2020. Unfortunately, due to the coronavirus, these conferences and workshops have been cancelled. The third chapter has also been submitted to the Global Research Alliance for Sustainable Finance and Investment 2020 to be held at Columbia University, New York (the original PhD research proposal was successfully accepted for discussion at the PhD workshop of the Global Research Alliance for Sustainable Finance and Investment 2019 held at University of Oxford).

Acknowledgements

I am truly grateful to Professor Martina Linnenluecke and Professor Tom Smith for their insightful guidance and supervision, my colleagues at Macquarie Business School for their constructive comments, Frank Song for his seminars and knowledgeable advice and the instructive guidance of my thesis examiners. I greatly appreciate the encouragement and feedback provided by the organisers and attendees at: the PhD workshop of the Global Alliance for Sustainable Finance and Investment Conference 2019, University of Oxford; and the ESG for Sustainability Symposium 2019, Victoria University. The generous provision of data by the United Nation's Principles for Responsible Investing is gratefully acknowledged. I also acknowledge and value the Higher Degree Research funding from Macquarie Business School, and grants from the Accounting and Finance Association of Australia and New Zealand, and the Global Alliance for Sustainable Finance and Investment. All errors remain my own.

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Chapter 1 Thesis Introduction

Contributing to a responsible and sustainable future is the key motivation for this thesis. It therefore focuses on the important topics of environmental, social and governance (ESG) issues and socially responsible investing (SRI). These topics are crucial for producing a responsible and sustainable world: ESG analysis is an effective lens to understand, monitor and manage the relevant issues; and SRI is the way investors can express their concerns on these issues.

This thesis appropriately begins with a comprehensive examination of the published research on ESG and SRI. The review successfully collates the themes of research beyond the single most dominant theme of performance. These additional themes include fund flows analysis, motivations for ESG investing and the heterogeneous nature of ESG investing. The lack of publications on these themes shows they are gaps in the literature. Such themes are therefore strong contenders for consequential research. This thesis contributes to the challenge by investigating the fund flows of SRI funds. The thesis also contributes to the gaps on the motivations and the heterogeneous nature of ESG investing.

Exploring fund flows also presents a unique opportunity to contribute to the development of empirical methods in finance literature. Fund flow modelling involves significant endogeneity problems. This thesis showcases the implementation of two innovative solutions to endogeneity: system Generalised Method of Moments (GMM) and natural experiments. Establishing a natural experiment setting provides an opportunity to incorporate the heterogeneous nature of ESG events and their impact on investor motivations.

The practical relevance of this thesis is drawn from its overarching concern: have the UN's Principles for Responsible Investing (PRI) activated SRI fund flows? This is an important question because it attests to the ability of the PRI and other intergovernmental initiatives to positively impact global investment practices and deliver sustainable outcomes for our world. Unfortunately, the results of the thesis do not find significant influence by the PRI. Consequently, the findings cast doubt on the current capabilities of the PRI to produce sustainable outcomes. Consequently, this thesis discusses strategies to improve the future influence of the PRI and other intergovernmental initiatives.

Emerging new themes in environmental, social and governance investing: a systematic literature review

Chapter 2 systematically examines the literature on ESG issues for SRI. As this literature is still in a development stage, this promising area of literature does not contain a wide range of major topics. Instead it is dominated by a preoccupation with performance (Benson & Humphrey,

2008; Bollen, 2007; Capelle-Blancard & Monjon, 2012; Friede et al., 2015). Chapter 2 establishes a richer agenda for ESG and SRI research.

Recent literature reviews largely echo the dominant theme of performance (Capelle-Blancard & Monjon, 2012; Chegut et al., 2011; Crifo & Mottis, 2016; Renneboog et al., 2008b; Viviers & Eccles, 2012). However, some reviews are beginning to add knowledge about the industry's institutional setting (Juravle & Lewis, 2008; Renneboog et al., 2008b; Sparkes & Cowton, 2004) as well as introducing new reviewing techniques. For example, Widyawati (2020) applied a Systematic Literature Review (SLR) to the related topic area of ESG measurement. SLR is a scientific and replicable method which establishes a thorough coverage of the relevant literature (Linnenluecke, 2017; Linnenluecke et al., 2017b; Linnenluecke & Griffiths, 2013).

The chapter uses the SLR approach to highlight the major citation patterns in the ESG investing literature. This process brings to light the following ancillary themes which are less obvious than the dominant theme: the heterogeneous nature of ESG investing, the costs from ESG investing, the motivations for ESG investing and the origins of this literature found in management literature. These themes interrelate and, together, provide a deeper understanding of ESG and SRI. For example, ESG's heterogeneous nature helps make sense of the puzzle about whether there is a cost from SRI investing. Theoretical and empirical literature differ on whether there is a cost. However, by recognising the heterogeneous nature of the participants and issues, research can identify whether there is a cost for individual investor types in relation to particular ESG issues.

In addition to the ancillary themes, the SLR approach has also identified a set of newly emerging themes. These nascent themes are the human element, the focus on climate change, the analysis of fund flows, the rise of non-western players and the new interest in fixed income. Each additional theme creates a new perspective and reveals new research trajectories. They can deepen our understanding of ESG investing issues, the purpose and impact of responsible investing, and the implications for society's future.

The comprehensive overview of the shape and composition of published ESG investing articles achieved in Chapter 2 sets up the empirical research of this thesis. The systematic mapping of ancillary and emerging themes successfully identifies significant gaps in the literature. These gaps include the newly emerging theme of fund flow analysis. Chapters 3 and 4 address this gap by examining the fund flows of SRI funds. Innovative empirical techniques (i.e. system GMM and natural experiments) are applied to examine the impact of ESG events and the role of organisations which authenticate SRI investing (e.g. the PRI). These chapters also contribute

knowledge across additional gaps in the literature – i.e. the ancillary themes of the heterogeneous nature of ESG investing and the motivations for ESG investing.

Do the Principles for Responsible Investing activate fund flows to socially responsible investing? This looks like a job for system generalised method of moments

Chapter 3 is the first stage in analysing fund flows in this thesis. Fund flows are an under researched dimension of ESG investing (Daugaard, 2020). This gap in the literature holds significant potential to improve our understanding of what motivates investor choices (Bollen, 2007). In particular, we can analyse SRI fund flows to evaluate whether the PRI is successful at signalling which funds have quality SRI investment processes to investors. This is important as it will determine whether the PRI is able to deliver on its mandate: creating a sustainable global financial system. More broadly, this research represents a litmus test for whether intergovernmental organisations (e.g. the UN) have a useful role in contributing to a sustainable society.

In addition to the practical concern over PRI's influence, fund flow analysis also has an important technical role in empirical finance. Fund flow analysis is a "text-book" example of endogeneity. Fund flow models typically contain all three main types of endogeneity: dynamic endogeneity, simultaneity and unobserved heterogeneity. Therefore, solving the endogeneity issues in the context of fund flows can represent a template for applying endogeneity solutions to many other areas of empirical finance.

Chapter 3 applies a system GMM approach to mitigate the inherent endogeneity in fund flow analysis. The SRI fund flow data is produced by combining data from the Centre for Research in Security Prices (CRSP) Mutual Fund Database with the PRI signatory list. The findings of this research indicate the PRI is not successful at attracting flows to the funds managed by PRI signatories. These findings cast doubt on the ability of PRI to positively impact future SRI processes. Potential strategies to respond to this issue can be sourced from the literature on intergovernmental organisations (IGO's). Strategies to increase the impact of the PRI (and other IGO initiatives) include: establishing IGO autonomy (Manulak, 2017), employing new frameworks to improve how IGO's signal quality SRI (Bergh et al., 2014), and improving the mechanisms for collaboration — ranging from information sharing to coordinated action and conflict resolution (Galaz et al., 2012). Signalling theory also provides a useful framework to find improvements. This theory identifies the key elements of effective signalling. These elements include the signal cost, the nature of the information problem, the signal confirmation process and the desired construct of optimal solutions.

Despite the capabilities of system GMM to address the fund flow's endogeneity issues, there remains a further solution. Wintoki et al. (2012) notes GMM does not resolve all endogeneity problems entirely and, when available, natural experiments are "the 'gold standard' for consistently identifying the effect of an explanatory variable on a dependent variable".

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

Chapter 4 extends upon the analysis of Chapter 3 by further analysing SRI fund flows but with the use of natural experiments. Building a natural experiment setting is recognised as the best way to satisfy endogeneity concerns (Gippel et al., 2015; Heider & Ljungqvist, 2015). Due to the presence of endogeneity and related econometric issues in fund flow modelling, fund flows are a worthy candidate for natural experimentation. The combined contexts of ESG and SRI creates a unique opportunity to develop experiments. A longitudinal collection of ESG events acts as a series of exogenous shocks on investor preferences. Highly publicised ESG events are likely to motivate the choice of SRI investments over more conventional investments. This chapter 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 resolves the confounding effect of endogeneity and enables a clear interpretation of the drivers for SRI fund flows.

Chapter 4 uses ESG natural experiments to extend the overarching concern raised in Chapter 3: does signing the PRI increase fund flows to SRI funds? Specifically, Chapter 4 employs exogenous shocks to examine whether signing the PRI is valuable to investment managers. The ESG events are employed with interactive terms to test three hypotheses: (1) Following an ESG event, the fund flow to SRI funds is greater than the flow to conventional funds; (2) The fund flow to the PRI designated SRI funds is greater than the flow to SRI funds not designated by the PRI; and (3) The fund flow to funds managed by PRI signatories is greater than the flow to those funds not managed by PRI signatories.

The results of this chapter support the first hypothesis: ESG events motivate investors to select SRI funds over conventional funds. This result validates the natural experiments. However, in relation to the second hypothesis, the results do not reveal any significant fund flows to the SRI funds managed by PRI signatories. These findings are consistent with those generated by system GMM in Chapter 3. The results in the current chapter also show a negative impact for conventional retail funds where they are managed by PRI signatories. This outcome questions the value of investment managers signing the PRI and challenges the potential for the PRI to effectively influence investment practices across the industry.

New research trajectories for ESG and SRI are identified in this thesis. These new research areas include fund flow analysis, the motivations for ESG investing and the heterogeneous nature of ESG investing. This thesis contributes to these gaps in the literature by analysing SRI fund flows, testing whether the UN's PRI motivates SRI investing, and incorporating heterogeneous ESG events in the analysis design.

Innovative methods are used to mitigate the endogeneity issues encountered in fund flow modelling: system GMM and natural experiments. The results from this testing unfortunately do not support the proposition that signing the PRI attracts more fund flows. This outcome raises concerns over whether the PRI (and other intergovernmental initiatives) are effective at building a sustainable world. This thesis therefore sets an agenda for future research to devise appropriate strategies to improve the impact of the PRI and other intergovernmental sustainability initiatives.

Chapter 2 Emerging new themes in environmental, social and governance investing: a systematic literature review

1. Introduction

Socially Responsible Investing (SRI) is all about making a positive impact on society and the world. Investments are therefore selected for non-financial reasons such as environmental concerns and social and governance issues. This form of investing is popular and has produced a vast and richly diverse global movement. Its size and influence are evident from the large number of industry players who publicly declare their commitment to Environmental, Social and Governance (ESG) investing principles. The number of organisations who are signatories to the Principles for Responsible Investment (PRI) has increased significantly from 63 in 2006 to 1714 in 2017 (Figure 2.1). The assets owned or under management by these signatories grew from US$ 6.5 trillion to US$ 68.4 trillion over this period.

The growth and size of this market has naturally attracted significant academic attention. More than 2000 published articles on ESG and financial performance are analysed by Friede et al. (2015). Unfortunately, the published academic research has failed to reflect the diversity of the actual investing and, instead, mainly focuses on a single topic - measuring performance (Benson & Humphrey, 2008; Bollen, 2007; Capelle-Blancard & Monjon, 2012). This is not surprising because financial performance is the most frequently encountered topic in the broader related literature (Capelle-Blancard and Monjon, 2012). However, this dominance means other important themes are not being adequately profiled, explored and published. This paper contributes to the literature by establishing a broader agenda for future academic research.

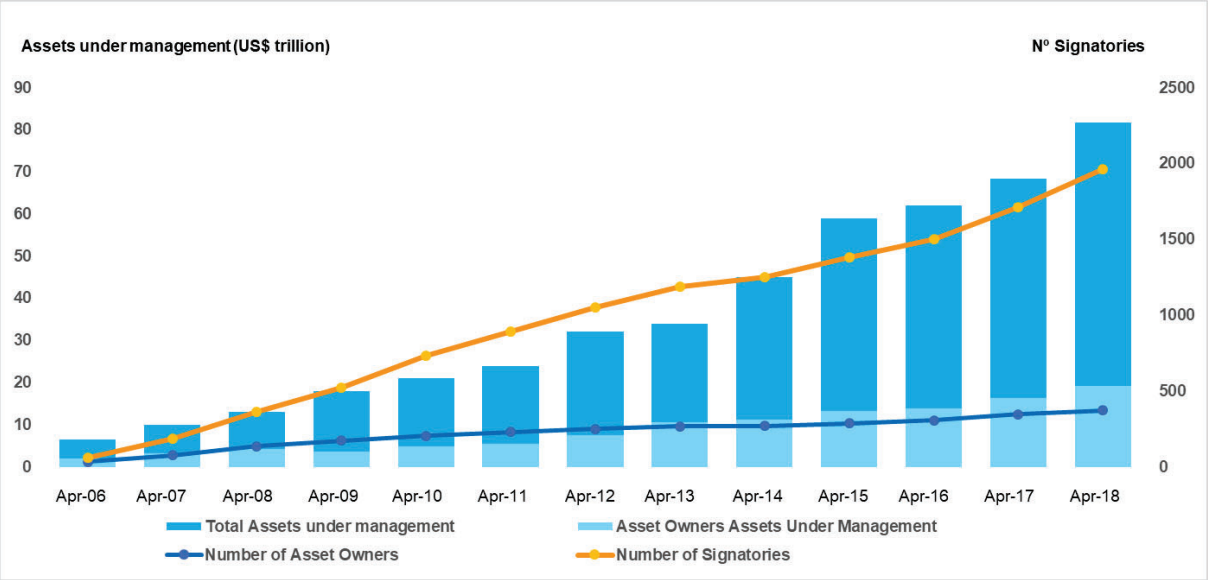


Figure 2.1 Number of PRI Signatories and Their Assets Under Management - Source PRI

Previous literature reviews described the institutional setting of the SRI industry (Juravle & Lewis, 2008; Renneboog et al., 2008b; Sparkes & Cowton, 2004) and evaluated the performance literature (Capelle-Blancard & Monjon, 2012; Chegut et al., 2011; Crifo & Mottis, 2016; Renneboog et al., 2008b; Viviers & Eccles, 2012) but have not thoroughly investigated a wider agenda for future research. Identifying a wider range of ESG investing topics is difficult because of the recent phenomenal growth in this literature. A methodology uniquely suited to this challenge is the Systematic Literature Review (SLR). Through a scientific and replicable approach, a thorough coverage of a large volume of relevant ESG investing literature is established. The SLR methodology highlights key citation patterns and significant themes across the literature. This provides a sound platform for planning future research projects and contributing to richer, more diverse and more relevant literature. In turn, this will deepen the insights on the purpose and potential impact of responsible investing, its relevance to society and its future trajectory.

This paper proceeds as follows. The first section details the methodology for conducting the review. The second section sets out the results of the review. The third section investigates the significant themes discovered across the most influential publications: the heterogeneous nature of ESG investing, the costs from ESG investing, the motivations for ESG investing and the origins of this literature found in management literature. Each significant theme creates a new perspective and reveals new issues to research. The fourth section highlights the newly emerging themes: the human element, the focus on climate change, the analysis of fund flows, the rise of non-western players and the new interest in fixed income. The paper concludes by collating the potential areas for future research.

2. Methodology: Mapping ESG Investing Literature

A systematic literature review enriches knowledge of the shape of research to date and helps discover areas which are missing or just beginning to attract attention. ‘Systematic reviews are literature reviews that adhere closely to a set of scientific methods that explicitly aim to limit systematic error (bias), mainly by attempting to identify, appraise and synthesize all relevant studies (of whatever design) in order to answer a particular question or set of questions’ (Petticrew & Roberts, 2008). The systematic methodology applied here is inspired by Massaro et al. (2016). The analysis is facilitated by a visual presentation of citation links produced in HistCite® (Garfield, 2004, 2009). The specific implementation follows that presented in Linnenluecke and Griffiths (2013); Linnenluecke (2017) and Linnenluecke et al. (2017a). This form of SLR emphasises articles, authors, titles and themes which have attracted the highest

citation scores. The validity for this approach lies in 'understanding which articles are cited more often is a proxy for the article's quality' (Massaro et al., 2016, p. 781).

This literature review is motivated by the need for an overview of the shape and composition of published ESG investment articles. The purpose of the review is to map the paths which publications have taken and thereby determine the major themes. Investigating these themes will help identify gaps for future potential research. The gaps will occur either within the established themes or, alternatively, represent new and emergent themes. The review will therefore contribute to future research by detecting the issues most relevant to ESG investing.

To identify future research that would most likely lead to publication, the literature search concentrates on articles published in journals (in contrast to industry reports and published books). The Web of Science® (WoS) was selected as the appropriate database for the search due to its reputation for maintaining a comprehensive collection of published journal articles and their respective citations. The Economics, Business, Management and 'Business, Finance' categories of the Social Sciences Citation Index (SSCI) were selected because of their relevant journal coverage.

2.1 Key Words and Concepts

There are many different activities which can be considered to be ESG investing. Further, many of these activities are known by different terms. This variety in terminology creates confusion for academics when researching ESG investing. For example, instead of the term 'environment' to describe an investment fund which makes positive environmental choices, the alternative investment terms 'sustainable', 'green' and 'eco' are sometimes used. Even the generic terms have evolved through time (Capelle-Blancard & Monjon, 2012). Initially, the term 'ethical' was a broadly acceptable description of this form of investing. 'Ethical' was then replaced by 'Socially Responsible Investing' (SRI). The broad relevance of the term 'Social' was then questioned and has been frequently replaced with 'Sustainable' or removed completely to leave the term 'Responsible Investing' (RI). To reduce confusion in this paper, the term ESG investing will typically be used to cover the broad nature of these investment activities unless there is a specific form of investing being examined. The reason ESG investing is preferred as the general descriptive term is because its individual components are a comprehensive reflection of both the range of related investment philosophies as well as the specific components of the implemented screening methodologies.

Table 2.1 Keywords for ESG Investing Concepts and Investment Management Terms

ESG Investing Concepts	Keywords	Investment Management Terms
ESG investing	ESG	investing
	environment* social* govern*	investment$
socially responsible investing	SRI	fund$
	social* responsi* investing	portfolio$
	social* responsi* investment$	money
	social* aware investing	"assets under management"
	social* aware investment$	sustainability theme investing
environmental investing	Eco	sustainability theme investment
	ecology*	sustainability thematic investing
	green	sustainability thematic investment
	environment*	ethical* managed investment strateg$
ethical investing	ethic$ investment$	ethical* managed investment fund$
	ethic$ investing	ESG screen*
	ethical investment$	negative screen*
	ethical investing	exclusionary screen*
	"ethical decision making" framework$	"exclusion of holdings"
responsible investing	responsible investing	positive screen*
	responsiveness investing	"best in class" screen*
	responsibility investing	ESG policies investing
	responsible investment	ESG investing criteria
	responsiveness investment	"low carbon" investing
	responsibility investment	"positive investment selection"
sustainable investing	sustainable investing	"best in class investment selection"
	sustainable investment$	"Norms based screening"
impact investing	impact investing	"integration of ESG factors"
	impact investment$	"ESG integration"
engagement	corporat* engagement	"Integrating ESG"
	company engagement	impact investment$
	engagement voting	impact investing
	engagement vote	community investment$
	"proxy voting"	community investing
	“shareholder action"	
	"active ownership"	

The keyword combinations were constructed to collate academic publications on ESG investing with specific relevance to the investment management context. The search screen therefore has two criteria. The first is the concept - i.e. ESG, SRI, environmental, ethical, responsible, sustainable and impact investing. This criterion is applied by using a string of keywords to represent each of the concepts (see the first two columns of Table 2.1). The second criteria (see the last column of Table 2.1) captures the investment management context. These keywords

represent descriptions of the implementation, applications, products and services associated with the activity of investment management. Some obvious examples include investing, portfolio management and assets under management. However, some terms are more specific to the ways in which ESG portfolios are managed, for example, ESG screens, exclusion of holdings, and sustainability thematic investing.

Keyword combinations for the ESG investing concepts were constructed from preliminary searches of ESG investment articles. The terms used to identify articles specific to the context of investment management were sourced from commentary on the industry (Australian Centre for Financial Studies, 2017; CFA Institute, 2017; GSIA, 2012; JP Morgan, 2016). It is possible that some relevant keywords were missed because of the limitations of the sample used to inform the list. Therefore, to test for completeness and accuracy, the keywords were reviewed and revised by academic experts in ESG investment research and relevant industry experts.

A keywords search was conducted across article titles, abstracts and keyword lists. Where there was a string of related keywords, the Boolean operator NEAR was employed to allow for variations in the order of the words. For example, instead of 'impact investing' the order in an abstract could be 'investing with impact'. Also, the asterisk (*) and dollar sign ($) wildcards were used to broaden the search to retrieve all the variants of a word stem, for example, social* to capture both social and socially. For some of the concept terms, the investment application terms in the second criteria were adapted to reflect the relevant portfolio management applications for that concept. For example, 'SRI investment strategies' was applied instead of 'ESG investment strategies'.

3. Search Results and Data Cleaning

Table 2.2 shows the number of articles identified for each of the ESG investing concepts. 'Socially Responsible Investing' generated the largest set of articles followed by 'Responsible Investing'. This is consistent with the 'craze for SRI' identified from article searches by (Capelle-Blancard & Monjon, 2012, p. 244). These authors also document a semantic shift from SRI to 'Sustainable Investing'. This shift is not fully evident from the current article count, however, the reasonably high count of 'Responsible Investing' is consistent with the semantic shifts they observed. After removing duplicates, this search identified 671 potentially relevant records.

Table 2.2 Number of Published ESG Articles for Each Concept

Concept	Number of Articles
Socially Responsible Investing	536
Responsible Investing	236
Environmental Social and Governance Investing	74
Ethical Investing	64
Engagement	38
Environmental Investing	15
Sustainable Investing	10

All these articles were checked for relevance to the key focus of ESG investment portfolio management. This meant that articles which dealt with ESG issues but were not specific to investment management were excluded. The articles were reviewed by reference to their titles, keywords, publishing journal, abstracts and, in the cases where further details were required to distinguish their relevance, the full text of the article. Two researchers carried out this manual review and contrasted their selection. Where the status of an article was not initially agreed, the researchers reviewed and discussed the selection until agreement was achieved. This review reduced the collection to 416 relevant papers.

3.1 Cited Reference Search

In addition to the citation patterns between the articles in a collection, HistCite also provides analysis of the citation links to papers which are not present in the collection. This enabled the identification of another 48 articles on ESG investing which had significant influence on the papers in the collection. These articles were not picked up in the initial searches for a variety of reasons including that they weren't published in journals listed in the SSCI or their text did not contain word combinations that satisfied the specific keyword screens applied. (Hamilton et al., 1993; Sparkes & Cowton, 2004; Statman, 2000) are all examples of highly cited articles which were not picked up in the WoS search, but which belong in the collection because of their focus on ESG investing. In contrast, HistCite identified other articles which were also highly cited across the collection, but were not considered relevant to the purposes of this article. The two main categories of highly cited articles not added to the collection were those which established fundamental finance principles but with general application (Carhart, 1997; Fama & French, 1993; Jensen, 1968; Markowitz, 1952; Merton, 1987) and those which were influential in contributing to understanding Corporate Social Responsibility from a firm perspective but not in relation to investment holdings (Griffin & Mahon, 1997; Margolis & Walsh, 2003; McWilliams & Siegel, 2001; Porter & Kramer, 2006; Waddock & Graves, 1997). The analysis of citations to external references also identified three influential books published in this topic area: Hawley

and Williams (2000), Domini (2001) and Sparkes (2002). Books which contained general management principles were not included (e.g. Freeman, 1984).

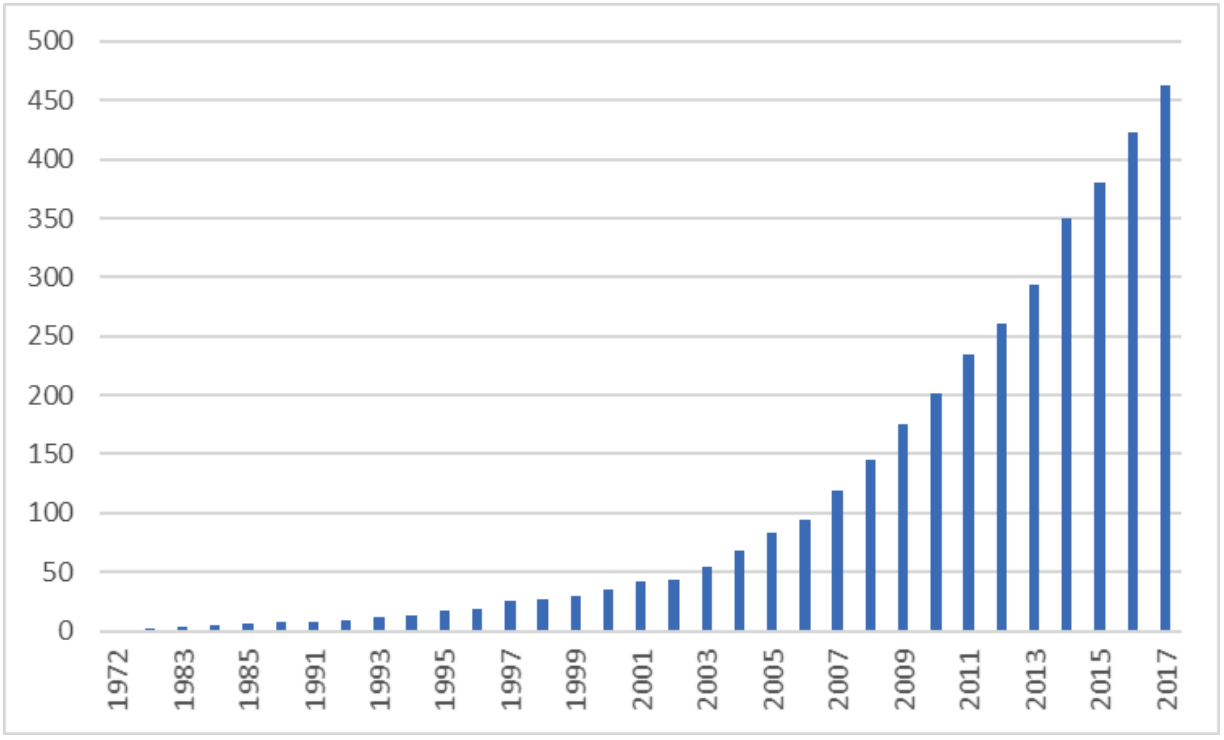


Figure 2.2 Cumulated Publication of Articles in the Collection

3.2 ESG Literature Collection

After including these additional articles and books, then removing two duplicate articles, the final ESG investing literature collection contained 463 articles and books. This literature is the product of 805 Authors publishing across 171 journals (or books) from 1972 to 2017. There is frequent citing across the collection (3 334 citations from other items in the collection) as well as from the broader literature universe (21 070 recorded citations to these articles globally). The literature has expanded rapidly but steadily over the past decade (see Figure 2.2). This pattern mirrors the growth of the industry (as represented by PRI signatories and their assets under management) for the same decade.

3.3 Citation Map

HistCite features a graphing capability which maps the highest cited items through time and displays their relative importance within the collection. Each item is represented by a node. The size of the node represents the number of times the item is cited within the collection. Earlier publications are plotted at the top of the graph and more recent articles towards the bottom. The connecting lines between the nodes map the citations between the 47 items. This number of citations was selected because it contained a reasonably high quantity of the top citations (the

default is 30 items) without including too many as to clutter the graph with densely overlapping links.

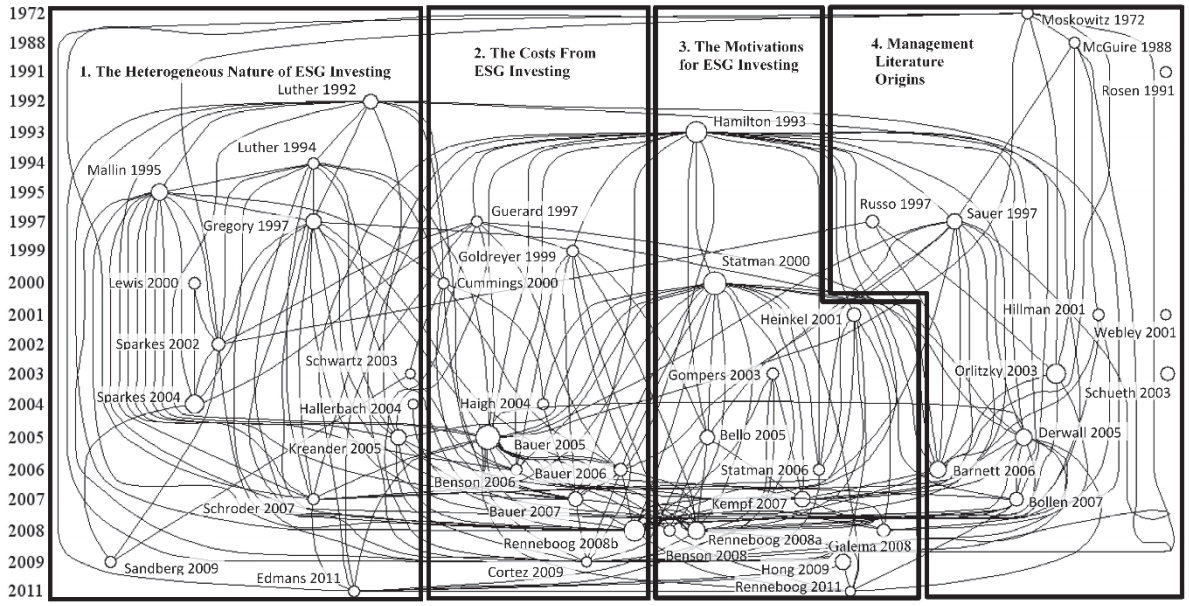


Figure 2.3 Citation Map

The citation map shows that there is a high degree of cross citation occurring in the ESG investing literature. The clustering of items is determined by the pattern of citation between the articles. However, a review of the articles is necessary to understanding the topics which are common amongst the clustered articles. The themes raised across the 47 articles form four significant partitions: (1) the heterogeneous nature of ESG investing, (2) the costs from ESG investing, (3) the motivations for ESG investing and (4) the management literature origins of this literature. The following sections describe the scope and issues raised in each partition as well as identify potential areas for future research. Throughout all four partitions (as well as across the underlying collection of articles) the topic of performance measurement occurs frequently. Therefore, a separate section is dedicated to this topic and the potential for future research relating to this topic.

Table 2.3 shows the author, year and journal details for each of the highly cited articles and books presented in Figure 2.3. This table also shows the number of citations each article receives both within the ESG literature collection (LCS) as well as globally reported (GCS) per the WoS. The high number of global citations shown in this table supports the argument that the articles in the citation map have considerable influence across finance literature.

Table 2.3 List of Highly Cited Articles

No.	Authors	Year	Journal	LCS	GCS
1	Moskowitz, M	1972	Business and Society Review/Innovation	30	200
2	Mcguire, JB; Sundgren, A; Schneeweis, T	1988	Academy of Management Journal	25	818
3	Rosen, BN; Sandler, DM; Shani, D	1991	Journal of Consumer Affairs	24	63
4	Luther, RG; Matatko, J; Corner, D	1992	Accounting, Auditing & Accountability Journal	41	67
5	Hamilton, S; Jo, H; Statman, M	1993	Financial Analysts Journal	85	189
6	Luther, RG; Matatko, J	1994	British Accounting Review	24	39
7	Mallin, CA; Gray, Rh; Power, DM; Sinclair, CD	1995	Journal of Business Finance & Accounting	52	88
9	Russo, MV; Fouts, PA	1997	Academy of Management Journal	33	1442
8	Gregory, A; Matatko, J; Luther, RG	1997	Journal of Business Finance & Accounting	49	108
11	Guerard, J	1997	Journal of Investing	26	64
10	Sauer, DA	1997	Review of Financial Economics	46	101
12	Goldreyer, EF; Diltz, JD	1999	Managerial Finance	28	59
14	Statman, M	2000	Financial Analysts Journal	103	207
13	Lewis, A; Mackenzie, C	2000	Human Relations	28	56
15	Cummings, LS	2000	Journal of Business Ethics	27	52
17	Hillman, AJ; Keim, G	2001	Strategic Management Journal	26	982
18	Webley, P; Lewis, A; Mackenzie, C	2001	Journal of Economic Psychology	23	55
16	Heinkel, R; Kraus, A; Zechner, J	2001	Journal of Financial And Quantitative Analysis	40	147
19	Sparkes, R	2002	Socially Responsible Investing (Book)	35	99
22	Orlitzky, M; Schmidt, F; Rynes, S	2003	Organization Studies	73	1857
21	Gompers, P; Ishii, J; Metrick, A	2003	The quarterly Journal of Economics	28	2011
23	Schueth, S	2003	Journal of Business Ethics	37	97
20	Schwartz, MS	2003	Journal of Business Ethics	23	47
24	Sparkes, R; Cowton, C	2004	Journal of Business ethics	69	195
25	Hallerbach, W; Ning, H; Soppe, A; Spronk, J	2004	European Journal of Operational Research	23	53
26	Haigh, M; Hazelton, J	2004	Journal of Business Ethics	24	70
27	Kreander, N; Gray, RH; Power, DM; Sinclair, CD	2005	Journal of Business Finance & Accounting	48	102
28	Bello, ZY	2005	Journal of Financial Research	42	88
29	Derwall, J; Guenster, N; Bauer, R; Koedijk, K	2005	Financial Analysts Journal	55	188
30	Bauer, R; Koedijk, K; Otten, R	2005	Journal of Banking & Finance	111	245
31	Statman, M	2006	Journal of Portfolio Management	25	60
33	Bauer, R; Otten, R; Touranirad, A	2006	Pacific-Basin Finance Journal	33	57
32	Barnett, ML; Salomon, R	2006	Strategic Management Journal	53	291
34	Benson, KL; Brailsford, TJ; Humphrey, JE	2006	Journal of Business Ethics	25	58
37	Bollen, NPB	2007	Journal of Financial and Quantitative Analysis	39	93
38	Bauer, R; Derwall, J; Otten, R	2007	Journal of Business Ethics	44	84
35	Schroder, M	2007	Journal of Business Finance & Accounting	26	63
36	Kempf, A; Osthoff, P	2007	European Financial Management	46	121
39	Renneboog, L; Ter Horst, J; Zhang, CD	2008	Journal of Corporate Finance	63	130
42	Renneboog, L; Ter Horst, J; Zhang, CD	2008	Journal of Banking & Finance	90	255
40	Benson, KL; Humphrey, JE	2008	Journal of Banking & Finance	24	41
41	Galema, R; Plantinga, A; Scholtens, B	2008	Journal of Banking & Finance	32	112
44	Hong, H; Kacperczyk, M	2009	Journal of Financial Economics	49	224
43	Sandberg, J; Juravle, C; Hedesstrom, TM; Hamilton, I	2009	Journal of Business Ethics	24	53
45	Cortez, MC; Silva, F; Areal, N	2009	Journal of Business Ethics	23	51
46	Edmans, A	2011	Journal of Financial Economics	27	157
47	Renneboog, L; Ter Horst, J; Zhang, CD	2011	Journal of Financial Intermediation	23	43

LCS = Local Citation Score GCS = Global Citation Score

4. Significant Themes

4.1 The Heterogeneous Nature of ESG Investing

ESG investing reflects a wide range of underlying ethical beliefs and concerns. Based on these beliefs and concerns, different investor types make different investment judgements (Luther et al., 1992) and implement their investment decisions in different ways (Sparkes & Cowton, 2004). This diversity is a result of a rich and varied history. 3,500-year-old Jewish restraints on

domestic and business activities illustrate ESG investing's ancient origins (Schwartz, 2003). Prohibitions over usury, weapons, slavery, tobacco, alcohol and gambling were then imposed by churches through the Middle Ages (Schwartz, 2003). In more recent history, investment choices were affected by the societal upheavals around the Vietnam War, South African apartheid and American racial discrimination. These civil rights movements, combined with consumer activism, elevated ESG investing to the global stage (Sparkes, 2002). The increased profile contributed to phenomenal growth and attracted a fresh set of issues: investor concerns over the environment, labour conditions, repressive regimes and product safety (Schwartz, 2003).

To understand and explain the heterogeneity of ESG investing, (Sandberg et al., 2009) examine diversity along the lines of terminology, definitions, strategies and practical implementation. They find significant diversity with respect to

- terminology attributable to cultural and ideological differences between regions; and
- strategies and practical differences explained by values, norms and ideologies between stakeholders.

There are calls for codes of practice (Schwartz, 2003) and standardisation of terminology and activities. However, ESG investing is likely to remain heterogeneous because cultural and ideological differences are important to investors (Sandberg et al., 2009). Investment firms will also continue to contribute to a diverse range of terms and practices by differentiating their fund offerings from competitors.

If heterogeneity remains, new and more relevant theories and techniques are crucial. 'What is required is an empirical example where models based on mixed motives (rather than economic self-interest, narrowly defined) may be appropriate and informative' (Lewis & Mackenzie, 2000, p. 180). Future research needs to contribute more sophisticated theory to accommodate the heterogeneous nature of ESG investing. This issue connects with the model development proposed in the subsequent partition on the motivations for ESG investing. The main challenge for future research is to create a theory which captures the multiple utility forms of the diverse ESG investor community. In addition to theory, new implementation techniques are also necessary. Hallerbach et al. (2004) present an example of what the future holds. They present a methodology for incorporating heterogeneous ESG concerns of individuals and institutions with the traditional portfolio objectives of wealth maximisation. Future research could leverage from this approach by incorporating big data and automated investment platforms.

4.2 The Costs From ESG Investing

Neo-classical finance theory infers a cost from ESG investing (Cortez et al., 2009; Cummings, 2000). Theory tells us 'ethical investing will underperform over the long term because ethical portfolios are subsets of the market portfolio which lack sufficient diversification' and 'that selecting stocks according to ethical screening can be an expensive practice that may ultimately have a negative impact on net return' (Bauer et al., 2006).

ESG investors also hold expectations of a cost. This is observed directly in surveys of ESG investors and implied from ESG investing fund flows. A 'trade-off between principles and money' is observed from surveying ethical investors (Lewis & Mackenzie, 2000). This is consistent with the behaviour of ESG investors demonstrated by analysing ESG investor fund flows (Renneboog et al., 2008b).

However, in contrast to theory and expectations, empirical results show little significant evidence that there is a cost from ESG investing (Bauer et al., 2005; Bauer et al., 2006; Cortez et al., 2009; Cummings, 2000; Goldreyer & Diltz, 1999; Guerard, 1997; Renneboog et al., 2008b). This contradiction motivates the view that socially responsible investing could be an effective way to bring about an improvement in corporate behaviour. Cummings (2000, p. 79) argues '[m]arket based mechanisms for corporate social accountability, such as ethical trusts, have the potential to provide an alternative perspective to both the traditional neo-classical position of non-regulatory interference in market processes, and the regulatory mechanistic approach'. Unfortunately, this promising idea is unlikely to be realised if the lack of cost is actually due to 'legitimising' behaviour by the ESG investors.

Haigh and Hazelton (2004, p. 67) argue the 'claim that investing in SRI funds promotes socially and environmentally desirable activities, and discourages detrimental activities, appears unfounded on several counts'. They argue that SRI won't impact corporate behaviour because it is too small a portion of the markets, there are sufficient alternative sources of capital, SRI trades are not useful trade signals for other investors, and SRI funds do not engage with other stakeholders (e.g. governments and NGOs) to coordinate their demands. They, therefore, propose a legitimacy perspective: the existence of SRI is an attempt by investors and fund managers to legitimise their other, more conventional, activities. This perspective could potentially explain why there is no empirical cost observed from ESG investing. If SRI is only a token activity or is offset by enough conventional investing activity, then its effectiveness is undermined.

This partition of articles identifies some clear and important directions for future research. First, there is an inconsistency to be investigated. Finance theory and investor expectations establish

there should be a cost from ESG investing, but the empirical results do not reveal a cost. This puzzle could be explained by using qualitative methods. Interviews and focus groups could bring to light the reasons investment managers do not encounter a cost from ESG investing. Secondly, this puzzle is linked to the question of whether ESG investing is merely a legitimising activity. Qualitative methods could be combined with quantitative fund flow analysis to test for legitimising behaviour and whether this behaviour explains the lack of cost.

4.3 The Motivations for ESG Investing

'Doing Well While Doing Good?' is the tantalising possibility raised by a number of authors (e.g. Hamilton et al., 1993). Disappointingly, Hamilton et al. (1993) find ESG investors actually do not do well. Consistent with the previous partition, they find no statistical evidence that returns from ESG investing are higher than those from conventional investing. The authors therefore discuss alternative motivations beyond returns. ESG investors may even be content with lower returns (i.e. a 'cost') because they receive non-financial utility by investing in a way which is consistent with their ethical and social values (Renneboog et al., 2008a). This idea is supported by the patterns of fund flows by ESG investors. Their fund choices demonstrate they are concerned about non-financial issues (Benson & Humphrey, 2008; Renneboog et al., 2011).

Investors' concerns about ESG issues should, therefore, be acknowledged when modelling investor utility. The different investor preferences identified by Hong and Kacperczyk (2009) suggest different utility models are required for ESG compared to non-ESG investors. This will produce better frameworks for building asset pricing models (Statman, 2000). New asset pricing models incorporating diverse utility frames will provide new insights into market dynamics.

Heinkel et al. (2001) offer an example of using a new utility model to understand the implications of ESG investing. They model the impact from excluding companies if the companies create unacceptable pollution. Their findings show that 'green' investors would need to represent 25% of the market before there would be a significant impact on the cost of capital of the polluting company and thereby cause a change in corporate behaviour. At the time of their research, they observed that green investors only made up 10% of the market. Recent substantial growth in ESG investing would suggest that further empirical research could test the accuracy of their model's predictions. Hong and Kacperczyk (2009) carry out similar modelling in relation to institutional investments in 'sin stocks', demonstrating that exclusion of these stocks by large institutions did significantly increase the cost of capital. This implies that useful insights would be gained by similar modelling across the other ESG issues.

The results from future modelling may reveal that ESG investing activity alone is not enough to effectively bring about good corporate behaviour. Statman (2000). describes ESG investing as 'swords in the battle' to change corporate behaviour if the investment has a successful impact. However, he describes them as merely 'banners' if their role is to be rallying points leading to political action in the form of imposing laws, regulations and taxes; or provoking consumer boycotts. He uses economic theory to demonstrate the potential impact of ESG investing on capital costs and corporate behaviour. His approach also indicates ESG investment action could raise expected returns for the non-ESG investors. Modelling by Heinkel et al. (2001) suggests a similar outcome. They point out that a wealth transfer to non-ESG investors could reduce the impact desired by the ESG investor. Therefore Statman (2000) presents an alternative where political action drives good corporate outcomes. This would result in any extra returns directed to the Government instead of to the non-ESG investors. Future research on clarifying investor motivations, building relevant utility models and mapping market outcomes will help investors understand whether market forces can achieve their desired outcomes or if political solutions are the best strategy.

4.4 Management Literature Origins

Moskowitz (1972) is a significant origin paper for the entire collection:

> Back in 1972 Milton Moskowitz argued that socially responsible investing might produce superior financial returns. Since 1996 the US Social Investment Forum has awarded the prestigious Moskowitz prize named in his honour, for the best article on the subject of the financial impact of socially responsible investing. (Sparkes, 2002, p. 245)

This simple but influential paper depicts a common theme for this partition of articles which draw upon business management literature to explain why good Corporate Social Performance (CSP) is good for investors. The theoretical basis for this claim is stakeholder theory (how the value of the firm is affected by the claimants beyond shareholders and bondholders) to explain shareholder outcomes (McGuire et al., 1988). For example, Barnett and Salomon (2006) link stakeholder theory and modern portfolio theory to reveal a curvilinear relationship between the intensity of screening and fund performance. They show that returns initially fall as a fund manager increases their screening intensity from weak to medium but then returns rise again as the screening intensity becomes higher. This result demonstrates the unique perceptions (e.g. the curvilinear pattern) which can be obtained by combining theories from related disciplines and therefore motivates further cross-disciplinary research.

Developing relationships with key stakeholders could potentially differentiate a company when raising capital. Hillman and Keim (2001) investigate the premise that stakeholder management

contributes to shareholder value because it represents a competitive advantage for the company. Their findings suggest activities directly tied to primary stakeholders can increase shareholder wealth whereas participating in purely social issues adversely affects shareholder wealth. This research could be extended by investigating how sub-categories of stakeholders (e.g. employees, customers and suppliers) and socially related activities (e.g. charitable giving and tax avoidance) impact company value. This could reveal whether company value is improved by specific corporate behaviour. Russo and Fouts (1997) also focus on a company's competitive advantage and demonstrate how CSP affects economic performance by explicitly incorporating intangible concepts (e.g. corporate culture). This line of research implies future research could employ additional management theories (e.g. business ecosystems) as well as investigate a more extensive range of intangible elements (e.g. staff loyalty and customer attitudes).

Although potentially beneficial, there are some significant challenges that arise from studying the CSP and CFP relationship. Firstly, the direction of the relationship between CSP and CFP is not clear. 'CSP is positively correlated with CFP' (Orlitzky et al., 2003, p. 405). However, 'correlation does not elucidate causation' (Renneboog et al., 2008b, p. 1733). Therefore 'it may be more fruitful to consider financial performance as a variable influencing social responsibility than the reverse' (McGuire et al., 1988, p. 869). This concern over the direction of the relationship, therefore, confounds the results and motivates a greater emphasis on techniques to solve for the inherent endogeneity issues.

Secondly, measuring CFP frequently relies on accounting metrics – for example, McGuire et al. (1988) employ return on asset and operating income growth. While CSP is more highly correlated with accounting measures (Orlitzky et al., 2003), it is the market-based measures (e.g. market returns and valuations) which are directly relevant to investors. Therefore, future research could extend the use of market-based measures of CFP with more granular elements of ESG performance to better understand the links between corporate ESG activities and investment outcomes.

4.5 Performance Measurement

The conflicting results and measurement issues of earlier empirical articles are well documented by Chegut et al. (2011). The divergent results generated articles attempting to explain the phenomenon (e.g. Revelli & Viviani, 2015). The more recent conclusion from the empirical literature is more consistent: there is no statistical difference in risk-adjusted performance between ESG and conventional investing (Friede et al., 2015; Humphrey & Lee, 2011; Revelli & Viviani, 2015). However, in addition to the recent results being different from the early results, there is another source of confusion when interpreting performance.

Despite the bulk of empirical literature establishing there is not a significant difference in return, there is a small but persistent stream which implies that actively managed ESG portfolios can achieve extra returns (Guerard, 1997; Sparkes, 2002). The empirical support for this idea is not based on actual portfolio experience but on simulated portfolio performance (Gompers et al., 2003; Guerard, 1997; Kempf & Osthoff, 2007). Future research should challenge this contradictory claim and clarify whether the simulated results were due to actual skill or data mining (Revelli & Viviani, 2015).

The measurement techniques applied to ESG investing mirror the developing methodologies of the wider investment literature. For example, the single market model used in earlier papers was succeeded by the Fama and French three-factor approach and then by the Carhart four-factor model. As the number of factors increase, there is more multi-collinearity between the variables and therefore difficulty interpreting the impact of ESG issues. The trend towards more factors also reiterates the overriding criticism of the ESG investing literature. The techniques are becoming more complex, but the focus has continued to stay on performance. This suggests it is the availability of return data that is dictating the scope of published research. Capelle-Blancard and Monjon (2012) argue 'that the academic literature on SRI is mostly data driven: the famous "looking for the keys under the lamppost syndrome"'.

The focus on ESG investment performance also poses a paradox. Modelling returns is a highly precise discipline. This is a challenge in the context of ESG issues because investor preferences and measuring Corporate Social Performance are both highly subjective and imprecise. There is scope to shift the research focus away from performance to elements which demand less precision and are potentially more closely connected to the actual preferences of ESG investors. For example, there are only a few articles which address investors' fund flows with respect to ESG investing (Benson & Humphrey, 2008; Bollen, 2007; Renneboog et al., 2008b). The following sections, therefore, highlight the areas of research which are currently emerging from the literature to represent paths to counterbalance the previous predominant focus on performance.

5. Emerging Themes

A review of the full collection of ESG investing articles reveals five emerging themes. First, there is an increasing focus on the human element. This includes both individual investors as well as the people affected by corporate activity (e.g. employees). Secondly, climate change is emerging from the reasonably long history of environmental research. Thirdly, analysis of fund flows is revealing what actually motivates the decisions of ESG investors. The fourth theme is the rise of non-western players including emerging markets and Islamic funds. The final theme is

fixed income. Research on fixed income investing is starting to be published but is still overshadowed by the volume of literature dedicated to equity investing. A detailed review of each of these themes indicates new areas for future research.

5.1 The Human Element

The research on the human dimensions of ESG investing has mainly focused on the attitudes and attributes of individual investors. This research has established a thorough understanding of who the investors are and how they think. They are younger and better educated than conventional investors (Perez-Gladish et al., 2012; Rosen et al., 1991), and are more likely to be women (Nath et al., 2013; Nilsson, 2008; Save-Soderbergh, 2010). Their social values matter when they make an investment (Diouf et al., 2016), as do their social identity (Bauer & Smeets, 2015) and their social conscience (Perez-Gladish et al., 2012). The investor's reasoning has been investigated with respect to ethical frameworks (Viviers et al., 2008), psychological processes (Bénabou & Tirole, 2010; Rubaltelli et al., 2010) and behavioural influences (Bilbao-Terol et al., 2016; Glac, 2009; Pilaj, 2017).

There is some scope to continue to extend this stream of research. For example, there is a significant range of ethical frameworks (ethical egoism, utilitarianism, deontological ethics, ethics of care, virtue theory, conventional ethics and emotivism) but only a limited number have been empirically investigated and in only a limited range of geographical locations and cultures. Similarly, only a few of the behavioural biases have been applied to understand ESG investor choices. 'Moral intensity' is also a potentially rich topic for future empirical research. Investor perspectives on moral intensity (e.g. magnitude of consequences, probability of effect, temporal immediacy, concentration of effect, proximity and social consensus) are likely to improve our understanding of what motivates the ESG investor (McLachlan & Gardner, 2004a).

However, the extensive investigation of the humans making ESG investment decisions is in stark contrast to the small amount of research dedicated to the humans on the other side of the investment coin. There are opportunities to address this bias with detailed analysis of how humans are impacted by corporate activities and how ESG investing changes that impact. The few articles on human rights provide a glimpse of the relevant and interesting research which could be pursued. Laplante and Nolin (2014) address the importance of respecting the rights of Indigenous residents. Holliday (2005) evaluates how corporations should interact with regimes which violate human rights. Setting a much broader scene, Posner (2016) maps the evolution of human rights in the business activity context. He traces the human rights movement through three stages (state centred, enforcement and globalisation) across six key areas including the investment community. This structure could be applied in future research to achieve a much

more granular and nuanced approach, covering a wider range of issues, for rating the social impact of corporations.

Related to the issue of human rights is the concern over conditions for employees. The articles in this space reveal a variety of pathways open for new research. Waring and Edwards (2008) observe the impact ESG investing has on human resource management. In the opposite direction, Cohen et al. (2017) examine the impact good labour outcomes have on investment decisions and Edmans (2011) demonstrates the positive impact employee satisfaction has on shareholder returns. The dual direction of these papers could be extended to other humans affected by corporations. For example, the contribution ESG investing has made to gender mainstreaming, documented by Grosser and Moon (2005), could form the basis of determining whether gender mainstreaming is having a subsequent impact on investment returns and investment choices.

5.2 Climate Change

Climate change is a globally recognised sustainability issue. However, the impact of carbon emissions is only just beginning to receive attention in the investment literature. To date, there have been contradictory views on the potential impact of ESG investing. It is possible that significant positive impact will not be achieved without further steps (e.g. behavioural change, regulation and the pricing of 'co-benefits').

Dam (2011) perceives environmental pollution as a conflict between the relatively short time horizon of investors and the longer-term effect of pollution on later generations. Given the forward-looking nature of stock markets, traded stock prices can potentially capture the expected future cost of pollution and thereby resolve this conflict. There is some empirical support for the view that markets can bring about positive carbon and climate outcomes (Chava, 2014). In contrast, Harmes (2011) and Ritchie and Dowlatabadi (2014) find there is not a strong theoretical case for companies to engage in climate change mitigation. They argue that funds directing investment away from heavy carbon emitters are unlikely to bring about a significant reduction in emissions. Unfortunately, there is also empirical support for these negative views (Fisher-Vanden & Thorburn, 2011) and therefore the possibility that forces beyond the business case (e.g. behavioural change and increased regulation) are necessary before significant change can be achieved (Doane, 2005).

In an attempt to recast the business case question, Rashidi et al. (2017) investigated the economic value of climate and development 'co-benefits' (including energy security, health impacts and water quality). While they found that direct climate benefits had little effect on projects' financial viability, the monetization of the co-benefits did significantly improve their viability.

Future research could, therefore, resolve the conflicting theoretical views and reconcile the small amount of empirical evidence published to date. This research should incorporate the monetizing of co-benefits to achieve a holistic understanding of the outcomes. The results would inform policy on the best mix of market forces, regulation and behavioural management necessary to achieve better climate change outcomes.

5.3 Fund Flows

Fund flows reveal a lot about investors. For example, fund flows show ESG investors 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 & Humphrey, 2008; Bollen, 2007; Marti-Ballester, 2015a; Renneboog et al., 2011). ESG fund flows are more stable than conventional funds (Bollen, 2007; Peifer, 2011) and ESG investors are more loyal to their choices (Benson & Humphrey, 2008; El Ghoul & Karoui, 2017). Future research could extend these insights by including more granular categories. This could disclose which ESG elements (e.g. carbon emissions) attract greater commitment and by which types of investors (e.g. millennials). Combining sub-categories with longitudinal analysis could also map underlying trends across investor types and ESG concerns.

Fund flows also reveal the skills and preferences of different categories of investors. Testing for the 'smart money' effect has produced mixed results. Renneboog et al. (2008a) found ESG investors could not identify funds that subsequently outperform but they could identify funds that were going to underperform. Renneboog et al. (2011) subsequently found no evidence of the effect, but then Munoz et al. (2014) did find evidence of the smart money effect amongst the profit-seeking ESG investors. Comparing different time horizons across different fund types (e.g. profit-seeking, religious, screening categories etc.) could reconcile and explain these divergent results. Incorporating additional fund details would extend this analysis to reveal further dimensions of investor motivations (e.g. the importance of external rating agents).

5.4 Non-Western Players: Emerging Markets

ESG investing in emerging markets is a small element of the literature with two main discourses: performance, and the cultural impact of ESG investing. There is a very small amount of literature analysing the performance of ESG investing in emerging markets. However, this research reveals important insights for investing. For example, Ortas et al. (2012) discovered ESG issues are more challenging in Brazil during a financial crisis. There is scope to further analyse the risk characteristics of ESG investing across a broader range of emerging markets and under different market conditions.

The other discourse is about how wealthier nations are potentially influencing the culture of lower income countries. Soederberg (2007) provides an informative example. She documents how the California Public Employees Retirement System (CalPERS) invests in emerging markets. The fund maintains a 'Permissible Country Index' of emerging countries based on ESG criteria. Developing countries need to satisfy the ESG criteria to access funds. This implies wealthy states can potentially dictate the direction of economic, social and political development in emerging countries. Socially responsible investing could, therefore, lead to exploitation and domination. To investigate the potential for this impact, future research could conduct interviews and focus groups to contrast countries receiving ESG funds with those that do not. Research could also evaluate potential solutions such as active engagement between the investing funds with local communities, Governments and NGOs.

There is an important link between the theme of cultural impact and the processes by which companies in emerging markets achieve inclusion into ESG indices. Hsu and Chang (2017) applied a 'decision-making trial and evaluation laboratory method' to the approaches adopted by seven Taiwanese electronics companies to isolate the critical factors necessary for inclusion in a sustainability index. They found five critical factors: support from top management, launching a cross-function project team, understanding the sustainability questionnaire, educating employees and learning sustainability from the benchmarks. These factors would typically be viewed as a mechanism by which SRI can positively influence corporate behaviour in emerging countries. However, the factors also reiterate the potential for wealthier nations (by setting the ESG criteria) to influence behaviour in lower-income countries. Future research could, therefore, investigate which elements of ESG criteria potentially conflict with local cultural values, and provide guidance for developing countries when deciding whether to conform to the criteria.

5.5 Non-Western Players: Islamic Funds

Islamic funds are a unique and emerging community. They have experienced significant growth and profile in financial markets. Islamic financial assets exceed US$1 trillion (Reddy et al., 2017) and have over 800 dedicated Islamic equity indices published by Dow Jones, MSCI and FTSE (Abdelsalam et al., 2017). The distinguishing feature of Islamic funds is their religious rules (Hayat & Kraeussl, 2011). The published literature mainly covers issues concerning these rules with very few articles covering wider-ranging topics.

Islamic funds apply prohibitions on usury (e.g. charging interest), gambling and excessive riskiness (Abdelsalam et al., 2017; Reddy et al., 2017). Ullah et al. (2014) conducted interviews to investigate the monitoring frameworks for Islamic funds. They found consistency in applying 'required' aspects but some inconsistencies with respect to 'desired' aspects. The authors warn

that these inconsistencies may create reputational risk. However, future research could investigate whether the desired aspects simply enable some subjective judgement in the same way that subjective judgement occurs in mainstream ESG investing.

Erragraguy and Revelli (2015) compared the impact of Islamic decisions with mainstream ESG screens and considered integrating the two paradigms. Although there were consistent results from the application of both Islamic and mainstream ESG screens, they identified performance improvements by adding Governance criteria to Islamic screens. However, before Islamic funds contemplate incorporating mainstream screens, future research should investigate the potential for cultural distortions (per Soederberg, 2007 in the previous section).

As Islamic funds avoid investments which charge interest, the funds should be immune to the influence of interest rates. Shamsuddin (2014) investigated whether Islamic indices are sensitive to interest rates and conclude they are successfully immune to interest rates. This form of research could be extended to consider whether the other Islamic prohibitions are also effective.

Further research could also explain the diversifying benefits of Islamic Funds (Al-Khazali et al., 2014; Nainggolan et al., 2016). Research could identify whether the diversification qualities are attributable to anti-herding behaviour (Stavroyiannis & Babalos, 2017) or other characteristics.

5.6 Fixed Income

Articles on fixed income investing are noticeably absent from the ESG investing literature (Derwall & Koedijk, 2009). The few published articles focus on the topic which dominates the wider ESG literature, i.e. performance, as well as the closely related topic of portfolio construction. This means there are many topics not yet covered in this space. Topics yet to be pursued include those which overlap the previous emerging themes: individual bond investor attitudes and attributes, bond portfolio fund flows, and the impact of social and green bonds.

The results on bond fund performance differ from the bulk of the ESG performance articles. Although Derwall and Koedijk (2009) initially found similar performance (between ESG bond funds with conventional bond funds) seven years later Henke (2016) found ESG funds outperformed. The author attributed the result to risk reduction (particularly in times of financial crisis). Further research could reconcile these divergent results across the ESG fixed income articles and between fixed income articles and the ESG equities literature.

There are also significant differences in performance attributed to different ESG indicators (Scholtens, 2010). Future research could connect these ESG indicators with types of bond investors and thereby reveal the preferences of different types of investors. The results would

enable bond portfolio construction to better personalise ESG exposures (Bilbao-Terol et al., 2014; Drut, 2010; Vargas et al., 2014).

6. Conclusion and Future Directions for Research

ESG investing has flourished into a large, dynamic and multifaceted industry. In contrast, the academic literature on ESG investing has concentrated on only a limited number of themes (Capelle-Blancard & Monjon, 2012). The critical review presented here reveals the majority of the published research focuses on just one theme i.e., the performance of ESG investing compared to conventional investing. Given the growth and importance of ESG investing, this paper therefore identifies significant themes beyond performance to help expand the limited research agenda.

By collating the relevant literature and analysing the dominant citation patterns, this paper identifies four additional significant themes: the heterogeneous nature of ESG investing, the costs from ESG investing, the motivations for ESG investing, and the management literature origins of this research. There are conflicts and crossovers between these themes that could be better understood by using one theme to interpret another, and by introducing new research methodologies. For example, the heterogeneous nature of ESG investing could help unravel a puzzle in relation to the costs from ESG investing. The theoretical and empirical literature disagree on whether there is a cost from ESG investing. By acknowledging the heterogeneous nature of the participants and issues, future research could identify whether there is a cost for individual investor types for particular ESG issues. Qualitative methods, including interviews and focus groups, could contrast the expectations of a cost across the wide variety of investor types. The qualitative results could be combined with quantitative methods at a more granular level to clarify if specific ESG issues actually incur a cost.

An expanded research agenda could also shed light on the debate over whether market forces can actually achieve good corporate behaviour or if socially responsible investing is merely a ‘legitimizing’ activity. To potentially resolve this conflict, new models with diverse utility frames are needed to assess the likely impact on company behaviour. This modelling could reveal different outcomes for different categories of ESG issues. The results would therefore inform which ESG issues should attract regulation and which issues would benefit from less regulated market structures.

There is evidence that integrating closely related disciplines (e.g. finance and management) is successfully producing new insights on ESG investing. For example, combining stakeholder theory and portfolio theory has revealed the ideal extent of diversification across ESG screens (Barnett & Salomon, 2006). Further collaboration across relevant finance, management,

economics and marketing theories has the potential to broaden our understanding of the complex trade-offs arising from ESG investing.

This article has also revealed recently emerging but still under-developed themes: the human element, climate change, fund flows, the rise of non-western players, and a new interest in fixed income investing. Examining each of these five emerging themes highlights fertile areas for future research and potential publication.

1. The research on the human element has mainly focussed on the investor - describing their socio demographic profiles and their psychological motives. While there is potential to further extend the research on individual investors (e.g. concerning moral intensity and behavioural biases), the other human players (employees, customers and communities affected by corporate activities) are not yet well represented in the literature. They therefore represent a more plentiful source of research topics. Future research is also needed on related topics of gender issues, indigenous rights, employee conditions and rights violating regimes.

2. Climate change is a key example of a specific ESG issue where future research will guide policy action. There is disagreement from both the theoretical and empirical literature on climate change. Theoretically, there are arguments for and against the idea that investment action should achieve improvement in reducing carbon emissions. Empirically, there are two challenges: valuations need to include 'co-benefits' alongside direct benefits to justify the business case for carbon action, and investment activity has not always been effective. Future research could therefore resolve the theoretical debate, confirm the preliminary empirical findings, and provide guidance on the most effective ways to achieve positive outcomes.

3. Analysis of fund flows has demonstrated the commitment ESG investors have to their fund choices. This form of research holds the key to revealing what investors actually prefer (in contrast to what investors say in surveys). Future research could incorporate sub-categories of ESG elements and different types of investment funds. The findings from this research would directly influence the creation of new investment products and identify areas where Government regulation will be necessary because the necessary volume of funds flows is unlikely.

4a. Emerging markets is an underrepresented area of research. Future research will be useful to both investors and the countries receiving the capital flows. The performance patterns of ESG investments in lower income countries is a practical concern to investors seeking to diversify their portfolio risk. For low income countries receiving funds, there is a need to understand the potential for socially responsible investing to negatively impact their domestic activities and culture. Further investigation of this impact is required across a wider range of emerging countries.

4b. Islamic investment funds have experienced significant growth and are just starting to attract academic interest. Further research is necessary on how Islamic rules are implemented. This should reveal whether the subjective elements of decision making are consistent with that of mainstream ESG investing or, alternatively, if a reputational risk is looming for these funds. Islamic investors will also be interested to know if the funds are able to effectively immunise exposure to the issues underpinning the Islamic investing prohibitions. Whereas, the wider investment community will be interested to know what causes the diversification benefits associated with Islamic funds.

5. Fixed income investing is another area with very few published articles. The potential for research includes extending the main themes (e.g. identifying the motivations of investors and observing the impact on corporate behaviour) as well as research which overlaps the other emerging themes (e.g. using fund flows to reveal investors' true preferences). In addition to these extensions, future research on fixed income could also be uniquely diverse and innovative (e.g. the impact of green and social bonds).

This paper has identified gaps within the developed literature and an array of newly opening research paths. These pathways suggest research into ESG investing has the potential to continue its exponential growth but in richer and more relevant directions. The results of this future research will be exciting as ESG holds the potential to transform the world we live in.

Chapter 3 Do the Principles for Responsible Investing activate fund flows to socially responsible investing? This looks like a job for system generalized method of moments

1. Introduction

Significant debate persists over whether intergovernmental organizations (IGOs) can successfully activate capital market support for socially responsible investing (SRI). Unfortunately, there is an absence of empirical research to inform this debate. This chapter attempts to fill this research gap by analysing the impact of a major IGO initiative, the United Nation (UN) Principles for Responsible Investing (PRI), on attracting investment into SRI funds. In doing so, this task highlights an important technical issue that is hampering the ability of academic research to contribute to significant global debates. Empirical methods have not usually accounted for endogeneity problems. Therefore, it is likely that empirical literature misinforms key stakeholders and decision-makers. In contrast, this chapter adopts a sophisticated econometric technique to resolve the endogeneity concern, thereby producing robust answers to the critical question: do IGOs drive SRI fund flows? The results of this chapter raise doubts that the PRI initiative has been effective in advancing SRI.

There is considerable debate over whether IGOs are effective mechanisms to achieve positive societal outcomes. Criticisms of IGOs' range from arguments that IGOs are merely the instruments for domination by stronger states (Pauly, 1999) through to contentions that IGOs are tools for other countries to control stronger states like the United States (Call et al., 2017). Berringer (2012) argues that IGOs failings (with respect to climate change initiatives) can be attributed to "the conflicts of interests between the intergovernmental governance structures and their member states". In contrast to these criticisms, there is considerable argument that IGOs have been a catalyst for SRI (Bengtsson, 2008a, 2008b; Sandberg et al., 2009). There is also some emerging empirical evidence suggesting the major IGO initiative for SRI investing, the PRI, has been successful (Kim & Yoon, 2020; Li & Humphrey, 2017; Motta & Uchida, 2018). However, this evidence is either limited to the period immediately following the launch of the PRI or has the potential for endogeneity concerns which undermine their findings. In contrast, by analysing the flows over a longer horizon period following the PRI's inception and incorporating endogeneity solutions, this chapter casts doubt on the PRI's capacity to influence fund flows. These empirical findings inform our understanding of the impact of IGOs. Specifically, the findings point to the failure of the PRI to attract SRI investment. These findings, therefore, motivate the search for new strategies to improve the effectiveness of the PRI and other IGOs. Potential strategies identified in this chapter include establishing IGO autonomy (Manulak, 2017), employing new frameworks to improve how IGOs signal quality SRI (Bergh et al., 2014),

and improving the mechanisms for collaboration, ranging from information sharing to coordinated action and conflict resolution (Galaz et al., 2012).

The PRI are a deserving target for analysis because of their size and potential. Kofi Annan, the then UN Secretary-General, launched the PRI with the express aim of motivating investment managers to create a sustainable global financial system. The six principles of the PRI focus on incorporating environmental, social, and governance (ESG) issues into the signatories' investment processes and promoting similar implementation across the industry. Since their launch, the PRI have proven popular and assets under management by PRI signatories grew to US$86.3 trillion by 2019. However, this initial momentum will need to be maintained if the PRI are to achieve significant influence over the investment industry. This chapter attempts to identify the value to fund managers of signing the PRI and thereby measure their influence on investors and the industry. The results have important implications for how IGOs approach initiatives like the PRI and for the strategic decisions of investment managers.

Endogeneity is an issue that potentially undermines the contribution by academic research to the important challenges facing society. Accommodating for endogeneity is dramatically recasting existing knowledge of how capital markets work (Griffin et al., 2015; Schultz et al., 2010; Wintoki et al., 2012). Fund flow analysis is especially susceptible to endogeneity. Fund flow modelling exhibits all the main forms of endogeneity: dynamic endogeneity, simultaneity, and unobserved heterogeneity. This chapter applies a system generalized method of moments (GMM) approach with instruments selected to mitigate the three main forms of endogeneity.

The purpose of this chapter is to ascertain whether the PRI will continue to be successful in marshalling funds toward SRI. The results indicate whether the PRI have an ongoing role in progressing SRI investment practices. Fund flow data are constructed by merging the comprehensive set of fund data from the Center for Research in Security Prices (CRSP) Mutual Fund Database with the names of the PRI investment manager signatories. All the funds described as SRI funds (e.g., environmental, responsible, and ethical) are also identified. Therefore, the sample reveals the drivers behind flows to those funds managed by PRI signatories and those specifically targeting SRI investors.

This chapter paves the way for further evaluation of whether IGOs successfully motivate capital market support for progressive environmental and social development. The chapter demonstrates a more reliable methodology than is typically used in empirical literature. System GMM is applied to resolve the endogeneity issues encountered in finance research. The findings indicate that the PRI are not successful in attracting flows to the funds managed by PRI signatories. In addition to contributing more robust findings, this chapter also applies an innovative framework

to understand the issue of IGO effects on capital markets. Signalling theory enables a deeper understanding of what will improve the success of IGO initiatives such as the PRI. The theory identifies key aspects of successful signalling: the signal cost, the information problem, signal confirmation and Pareto optimizing solutions (Bergh et al., 2014). Breaking down the process into these elements enables successful strategies to be identified to improve the PRI's signalling.

The following section reviews the relevant literature and establishes the contributions of this chapter. Section 3 details the sourcing and preparation of the SRI mutual fund data. Sections 4 and 5 examine the endogeneity concerns and link them to the appropriate system GMM structure. Finally, Sections 6 and 7 present the empirical results and discuss their relevance.

2. Literature review

The world is undergoing a dramatic re-prioritization of environmental and societal concerns. This has motivated a reassessment of the role and impact of financial markets. The key concern is whether investing activity can exert positive effects on environmental, social and governance issues worldwide. IGOs such as the UN reflect these global concerns and are actively trying to facilitate change. The UN PRI attempt to effect change by identifying which investment managers are committed to change. This chapter evaluates whether a fund receives additional flows if it is managed by a PRI signatory. The tests thereby evaluate whether the PRI designation provides a strong signal to investors about the quality of a manager's SRI processes. However, the nature of the data raises significant econometric issues. Fund flow analysis attracts endogeneity issues, which potentially undermine the validity of the modelling. Therefore, this chapter draws upon innovative solutions to endogeneity issues to clearly ascertain whether the PRI signal affects fund choice.

IGOs have contributed to the global rise of good corporate social responsibility (CSR) through promoting consistent rules, expectations and norms (Jandhyala & Phene, 2015; Laidroo & Sokolova, 2015). SRI is the investment aspect of the CSR equation. A successful SRI process selects companies with good CSR performance. Although recognized literature exists regarding the impact of IGOs on CSR, there are only limited studies investigating how IGOs interrelate with SRI. For example, Motta and Uchida (2018) documented the improved environmental ratings of portfolios held by Japanese institutional investors following the launch of the PRI. They imply that PRI motivated improved performance by the investee companies. However, these authors do not examine whether funds managed by PRI signatories received subsequent investor support. This chapter extends the existing literature by conducting a longer-term evaluation of the impact of signing the PRI on SRI fund flows. In addition to contributing to this

nascent empirical literature, this chapter also utilizes new frameworks and theories to deepen the knowledge of how IGOs interrelate with SRI.

Matten and Moon (2008) applied institution theory to comprehend the channels through which SRI is legitimized and institutionalized. They specifically used UN initiatives to illustrate three channels of legitimization: coercive isomorphism (e.g., facilitating self-regulation), mimetic processes (e.g., informing best practice) and normative pressures (e.g., symbolizing professional authorities). The empirical tests in the current chapter specifically contribute to understanding whether the first of these three channels is viable. Coercion can occur through setting criteria by which acceptable SRI activities are assessed. An example of PRI setting criteria is their publication of "A Practical Guide To ESG Integration For Equity Investing" (Sloggett, 2016). Investment managers potentially conform to these criteria when conducting investment analysis and security selection, and thereby conform to coercion. However, conformity will depend on whether signing the PRI successfully attracts funds. The results of the current research contribute to this area of literature by examining whether the UN PRI initiative successfully attracts SRI funds. The findings will potentially validate institutional theory's channel of coercive isomorphism.

Signalling theory is also a relevant framework applicable to the current analysis. It is a well-established framework in strategic management research and has become popular for understanding market behaviour (BliegeBird et al., 2005). The central question in signalling theory is: how can decision-making uncertainty be reduced in situations of incomplete and asymmetrical information? "In response, stakeholders seek out signals—observable actions that provide information about unobservable attributes" (Bergh et al., 2014, p. 1335). This theory appears equally relevant to the context of an investor selecting an SRI fund. Bergh et al. (2014) provided an example wherein if only high-quality new ventures secure venture capitalist funding, then this funding is a signal for distinguishing between high- and low-quality ventures. In a similar way, the designation of an SRI fund by a designating agent (e.g., the US Forum for Responsible and Sustainable Investing and the PRI) can distinguish high- and low-quality SRI processes. The decision-making uncertainty of SRI investors is due to the incomplete information about SRI fund processes. This uncertainty could potentially be resolved by the PRI signalling the authenticity of SRI processes.

Mutual funds are a relatively novel application for signalling theory. There are few published articles that use the theory to understand mutual funds (Rozeff, 1998) and none yet published in the context of SRI mutual funds. This is surprising because the greenwashing challenge faced by SRI investors akin to avoiding "lemons" (Akerlof, 1978) and the potential for greenwashing is

well documented (Capelle-Blancard & Monjon, 2010; Laufer, 2003; Revelli, 2017). In the current analysis, if the PRI are demonstrated to drive fund flows, signalling theory could enable an understanding of the equilibrium structure around SRI preferences. Even if the PRI are not demonstrated to drive fund flows, signalling theory can equally be useful for identifying the potential reasons for signalling failure - e.g., signal reliability, strength, visibility, frequency, and consistency, or receiver attention and interpretation (Connelly et al., 2011).

Endogeneity has proven a major challenge to the validity of past empirical literature (Griffin et al., 2015; Schultz et al., 2010; Wintoki et al., 2012). It is a challenge because "endogeneity leads to biased and inconsistent parameter estimates that make reliable inference virtually impossible" (Roberts & Whited, 2013). Fund flows are particularly vulnerable to endogeneity issues (Frino et al., 2009; Qian et al., 2014). However, the existing literature does not contain many examples of applying methods that resolve endogeneity issues regarding fund flows (Benson et al., 2010). Further, applying endogenous solutions to SRI fund flows is a largely missed opportunity. System GMM is a sophisticated solution for addressing endogeneity (Lahouel et al., 2019; Roodman, 2009a). This chapter, therefore, contributes to the existing literature by applying a sophisticated endogeneity solution to the context of SRI fund flows.

Empirical literature on mutual funds has predominantly focused on return performance (Benson & Humphrey, 2008; Bollen, 2007; Capelle-Blancard & Monjon, 2012). In contrast, literature on fund flows is an emerging theme (Daugaard, 2020). The literature to date shows fund flows are influenced by investor sentiment (Indro, 2004), expense ratios (Sirri & Tufano, 1998), size (Bollen, 2007; Pollet & Wilson, 2008; Renneboog et al., 2011; Sirri & Tufano, 1998) and age (Bollen, 2007; El Ghoul & Karoui, 2017; Pollet & Wilson, 2008). A significant proportion of this literature has focused on the flow to performance relationships (Berk & Green, 2004; Fant & O'Neal, 2000; James & Karceski, 2006). This research includes both contemporaneous returns (Benson et al., 2010) as well as lagged returns (Carhart, 1997; Chevalier & Ellison, 1997; Goetzmann & Peles, 1997; Gruber, 1996; Ippolito, 1992; Sirri & Tufano, 1998) and the "smart money" effect (Jiang & Yuksel, 2017; Keswani & Stolin, 2008; Sapp & Tiwari, 2004). More recently the fund flow literature has contributed to knowledge on SRI funds.

The broader range of SRI related literature has contributed insights on its drivers (Schueth, 2003) and the ways SRI can impact corporate behaviour (Johnsen, 2003; Schepers & Sethi, 2003; Statman, 2000). However, as with the mutual fund literature, this stream of literature has also been dominated a performance preoccupation (Capelle-Blancard & Monjon, 2012; Chegut et al., 2011; Cortez et al., 2012; Crifo & Mottis, 2016; Renneboog et al., 2008b; Viviers & Eccles, 2012). Therefore, fund flow analysis provides a fresh lens to understand SRI funds. For example

fund flow analysis demonstrated that SRI investors are willing to trade off principles and money (Benson & Humphrey, 2008; Renneboog et al., 2008a; Renneboog et al., 2011). Fund flow analysis has also revealed SRI investors 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 & Humphrey, 2008; Bollen, 2007; Marti-Ballester, 2015a; Renneboog et al., 2011). SRI fund flows are more stable than conventional funds (Bollen, 2007; Peifer, 2011) and these investors are more loyal to their choices (Benson & Humphrey, 2008; El Ghoul & Karoui, 2017). However, this research seldom accommodates for endogeneity in a robust manner and is therefore potentially fraught with misinterpretation. This chapter extends this literature by incorporating robust endogeneity solutions and extending fund flow analysis to understand the impact of PRI signalling on SRI investors.

Literature on PRI has mainly been descriptive (Majoch et al., 2017; Sparkes, 2008). Although, a few articles directly link this IGO initiative to SRI funds (Martin, 2008) and analyse its impact on conventional mutual funds (Kim & Yoon, 2020). This chapter contributes to the literature by drawing together the streams on fund flow analysis, socially responsible investing and the PRI. The main role of the PRI in this confluence is to act as a signal to investors of authentic SRI. The relevant hypothesis tying these themes together is:

Hypothesis: An investment manager who signs the PRI will attract additional fund flows to their SRI fund than an investment manager who does not sign.

Through the application of a system GMM approach, the testing will discern whether the flows are actually attributable to signing the PRI and not to other potentially correlated activities (e.g. marketing or other reputational and profile building activities). The results will therefore contribute to our knowledge of whether the PRI is successful at signalling authentic SRI. If the signal is not successful, this result is also important because it indicates for the IGO to adopt alternative strategies to improve its impact on the investment industry.

3. Socially responsible investing mutual fund data

The fund flow data for this chapter were compiled by merging the CRSP Mutual Fund Database with the list of investment manager signatories for the UN PRI to produce fund data for funds managed by PRI signatories. The data include monthly observations for total net assets (TNA), holding period returns, fund expense ratios, dates of inception, and flags for closed funds. The CSRP Mutual Fund Database style code is used to identify the funds categorized as US domestic equity funds. The relevant styles include large-, mid-, small-, and micro-cap, growth, income, and growth and income.

The PRI maintain a comprehensive list of investment manager signatories, retaining information regarding when they signed the PRI and, if they were subsequently excluded, the dates that they were removed from the list[1]. The names of the investment managers on the PRI list (identified as account IDs) were matched to the three relevant columns of the CSRP Mutual Fund Database: the full name of the fund, the management company name, and the fund advisor name. In some cases, the fund name and the fund advisor columns identified investment managers contributing to the management process (in addition to the listed management company). If there was a PRI signatory contributing to the fund's investment process, this warranted that the fund be included as a PRI fund. This is due to the extensive scope of SRI commitment that each manager makes when they sign the PRI.

Funds described as SRI funds were identified by searching the CSRP Mutual Fund Database fund names. The key search terms were based on the systematic literature review conducted by Daugaard (2020) and included terms such as ESG, values, social, impact, sustainable, and ethical. Shortened forms were used to capture related word structures (e.g., "sustain" to capture "sustainable", "sustainably", "sustainability" and so on). Entire fund suites for some management companies were included when those firms specialized in only offering SRI funds. For example, investment managers who are exclusively SRI managers include Domini, Pax, Trillium, Walden, Praxis, Parnassus, and Calvert. The search results were reviewed to remove funds that were identified by the search terms but were not SRI funds. For example, the search term "sustain" captured Principal's "sustainable momentum index" exchange-traded fund (ETF); however, the ETF follows a momentum strategy and is not an SRI fund.

Data were cleaned by removing 24,098 observations wherein TNA and expense ratios were not recorded (i.e., stored as –99 or 0 in the CSRP Mutual Fund Database). A further 523 observations were removed that contained duplicate fund IDs and dates. The TNA observations were trimmed at the 0.5th and 99.5th percentiles to remove outliers. The expense ratios were trimmed at the 99.5th percentile and any values less than zero were removed.

The merged CSRP Mutual Fund Database and PRI databases create a unique sample of US equity funds. The funds managed by PRI signatories and those described as SRI funds were identified with relevant indicator variables. This collection of data is appropriate for applying regression analysis with PRI and SRI indicator variables. Table 3.1 reports the number of funds with PRI and SRI indicators. The funds not identified as PRI or SRI are classified as

[1] The PRI signatory list is maintained at https://www.unpri.org/signatories/signatory-resources/signatory-directory with new and delisted signatories reported regularly per https://www.unpri.org/annual-report-2018/how-we-work/new-and-delisted-signatories.

conventional funds. These data are relevant for examining the impact of signing the PRI on both conventional and SRI funds.

Table 3.1
Number of funds per year

Year	All funds (1)	PRI (2)	SRI (3)
Panel A. Number of funds			
2006	3175	17	68
2007	3574	129	82
2008	3845	294	90
2009	4037	401	95
2010	4280	745	101
2011	4615	1022	102
2012	4968	1208	108
2013	5432	1586	112
2014	5809	2011	112
2015	6260	2611	131
2016	6719	2871	150
2017	7370	3489	173
2018	7294	3430	172

Table 3.1 shows the number of funds categorized as US domestic equity funds in the Center for Research in Security Prices (CRSP) Mutual Fund Database from 2006 to 2018. The style categories include large-cap funds, mid-cap funds, small-cap funds, micro-cap funds, growth and income funds, growth funds and income funds. Column 1 shows all funds, Column 2 shows the number of funds managed by Principles for Responsible Investing (PRI) signatories and Column 3 shows the number of funds described as socially responsible investing (SRI) funds.

The fund numbers documented in Table 3.1 show the significant growth of domestic equity mutual funds has been plateauing. This slowdown in growth can be attributed to the rise in popularity of exchange traded funds (Hill et al., 2015). There are uniquely divergent patterns observed for funds managed by PRI signatories compared to SRI funds. At the inception of the PRI, there were understandably few funds managed by PRI signatories. However, this number has experienced phenomenal growth over the period analysed. In contrast, the number of funds identified as SRI has continued to represent only a small proportion of the total market. Despite earlier hopes for sustained growth in the SRI market (e.g. Renneboog et al. (2008b)), the numbers remain relatively low. This may be due to the more conventional funds responding to the demands by investors for more sustainable investment practices (Hartzmark & Sussman, 2019).

4. Endogeneity in fund flow analysis

Endogeneity is a critical challenge in financial research. Significant empirical "truths" have been debunked through recognition of endogeneity (Griffin et al., 2015; Schultz et al., 2010; Wintoki et al., 2012), and empirical finance frequently encounters endogeneity issues that undermine the identification and interpretation of the true causal relationships (Roberts & Whited, 2013). There

are three major forms of endogeneity encountered in finance literature: dynamic endogeneity, simultaneity, and unobserved heterogeneity (Schultz et al., 2010; Wintoki et al., 2012). All three forms are relevant to this chapter because they are all encountered in fund flow analysis.

Dynamic endogeneity arises when prior values of the dependent variable influence regressor values, which then affect the current value of the dependent variable. An example of this is lagged fund flows. They are employed to model fund flow regressors such as returns (Renneboog et al., 2011; Wermers, 2003). Further, lagged fund flows are frequently employed to directly explain fund flows (Chiang & Huang, 2017; Coval & Stafford, 2007; Warther, 1995). In this context, Gruber (1996, p. 800) suggested that lagged fund flows are actually proxying for "other variables besides past performance that might account for future cash flows" (e.g., marketing effort and general reputation).

The second major form of endogeneity is simultaneity. This occurs when two variables are simultaneously affected by each other. Stock and Watson (2015) describe this form of endogeneity in terms of causality running forward from regressors to the dependent variable as well as backwards from the dependent variable to the regressors. In the current context, returns are a likely source of simultaneity. Contemporaneous returns positively influence fund flows while fund flows also impact contemporaneous returns (Edelen & Warner, 2001; Warther, 1995).

The final major form of endogeneity, unobserved heterogeneity, is encountered across most econometric applications. It occurs if the relationship between the dependent variable and regressors is affected by unobserved variables. This will typically result in the causal effect of regressors varying for different entities (Stock & Watson, 2015). In the present modelling, there may be additional missing regressors that explain both the regressors and model errors (e.g., changes in pension regulations affecting both expense ratios and fund flows).

The principal solution for endogeneity is the use of instrumental variables (Baum, 2006). The two criteria for an effective instrument are that the instrument is correlated with the model's endogenous variables and that the instrument is uncorrelated with the model's error term. This chapter applies instruments within the system GMM methodology. System GMM is preferred because of its improved treatment of endogenous issues compared to pooled ordinary least squares (OLS), fixed effects panel and difference GMM. System GMM contains the benefits of difference GMM (in which the differencing eliminates fixed effects) and adds the benefit of additional instruments (by combining a differenced version of the model with a levels version). Internal (rather than external) instruments are implemented because of their ready availability within the existing regressor and dependent variable data sets. The dynamic endogeneity issue is resolved by including lagged fund flows in the regression model. However, including the lagged

dependent variable in panel regressions is likely to create biased standard errors (Nickell, 1981). The choice of system GMM will accommodate for this bias through the appropriate choice of lagged regressors as instruments (Arellano & Bond, 1991).

The first criteria for a successful instrument (i.e., correlation with the model's endogenous variables) is a typical trait for many of the instruments generated. For example, there is likely correlation between current returns and lagged fund flows. However, the more critical issue is to identify those instruments that are uncorrelated with the model's errors. Therefore, to identify the best potential instruments, the regressors are grouped according to their relationship with the errors: are they endogenous, exogenous, or predetermined regressors? Endogenous variables are assumed to be correlated with the model's error term (Woolridge, 2009). Contemporaneous fund returns is a variable encountered in literature that is assumed to be endogenous (Benson et al., 2010). While endogenous variables clearly contribute to the model's endogeneity, lags of these variables can potentially mitigate endogeneity issues.

Exogenous variables are assumed to be uncorrelated with model errors; they can potentially produce the most effective instruments for removing endogeneity. Age is a control variable encountered in fund flow literature (Bollen, 2007; El Ghoul & Karoui, 2017; Pollet & Wilson, 2008) that is assumed to be exogenous. This is because it is determined by time passing and not determined by other variables. Unfortunately, finding further exogenous variables is difficult because of the many forms of endogeneity. Some indicator variables are argued to be exogenous (e.g., fund style categories). In the present case, the SRI variable (indicating that a fund is an SRI fund) might be argued to be exogenous because it could represent the original and continuing nature of the investment vehicle. In contrast, the PRI variable (indicating that a fund is managed by a PRI signatory) is more likely to be endogenous. The choice to sign the PRI is potentially influenced by lagged fund flows and, therefore, correlated with model errors. Specifically, poor fund flows can potentially motivate an investment manager to sign the PRI in the hope of subsequently attracting more funds. This argument could also be potentially levelled at the SRI indicator. For example, a series of poor fund flows could motivate an investment manager to rename the fund an SRI fund. However, whether the indicator variables are defined as endogenous or exogenous, they are excluded from the instrumentation process because their persistence is likely to contribute to further bias in the coefficient estimates (Roodman, 2009a).

In contrast to being assumed to be completely exogenous, many variables can more easily be assumed sequentially exogenous. This only requires their lag values to be uncorrelated with current errors. The lag values of these variables would, therefore, produce useful instruments for managing endogeneity. Sequential exogeneity is commonly assumed for predetermined

regressors. In the context of fund flows, predetermined regressors include lagged fund flows (Chiang & Huang, 2017; Coval & Stafford, 2007; Gruber, 1996; Warther, 1995), lagged returns (Benson et al., 2010; Carhart, 1997; Chevalier & Ellison, 1997; Goetzmann & Peles, 1997; Gruber, 1996; Ippolito, 1992; Sirri & Tufano, 1998), and control variables such as size (Berk & Green, 2004; Bollen, 2007; Pollet & Wilson, 2008; Renneboog et al., 2011; Sirri & Tufano, 1998) and fees (Sirri & Tufano, 1998).

Table 3.2 lists the regressors categorized as endogenous, exogenous or predetermined regressors. The table also identifies the most appropriate lags to be applied to each category for instrumenting following Roodman (2009a) and (Schultz et al., 2010). To generate the most appropriate instruments from the endogenous variables, the second and subsequent lagged variable levels are used in the differences equation and the first and subsequent lagged differences are used in the levels equation. For the exogenous variables, the most appropriate instruments are derived from the contemporaneous variables for both the differences and levels equations. For the predetermined variables, the most appropriate instruments are derived from the first and subsequent lagged variable levels in the differences equation and the contemporaneous and subsequent lagged differences in the levels equation.

Table 3.2
Endogenous, exogenous and predetermined regressors variables

Regressors variables	Endogenous, exogenous or predetermined categorization	Instruments for difference equations	Instruments for levels equations
PRI	Indicator variable not used for instrumentation.	No instruments generated because persistent indicators can contribute to further bias in estimating coefficients.	
SRI	Indicator variable not used for instrumentation.	No instruments generated because persistent indicators can contribute to further bias in estimating coefficients.	
Return	Endogenous. Contemporaneous returns and fund flows simultaneously affect each other.	2nd lag and deeper.	1st lag and deeper.
Age	Exogenous. Fund age is determined by time and not by other variables and is therefore uncorrelated with model errors.	Contemporaneous.	Contemporaneous.
Expense	Predetermined. Lagged fund expense ratios are assumed to be correlated with past errors but exogenous to the error term.	1st lag and deeper.	Contemporaneous and deeper.
Size	Predetermined. Fund size is assumed to be correlated with past errors but exogenous to current errors.	1st lag and deeper.	Contemporaneous and deeper.
Lagged fund flow	Predetermined. Past fund flows affect current returns which affect current fund flows. Therefore, lagged fund flows should affect current errors.	1st lag (which will become 2nd lag of fund flow) and deeper.	Contemporaneous (which will become 1st lag of fund flow) and deeper.
Lagged return	Predetermined. Missing regressors (e.g., fund style categories) could cause correlation between past return and current return. This, combined with simultaneity between contemporaneous return and fund flows, makes lagged returns an endogenous variable.	1st lag (which is the same as the 2nd lag of return) and deeper.	Contemporaneous (which is the same as the 1st lag of return) and deeper.

Table 3.2 lists the regressors employed in the fund flow model and categorizes their regressor type. Specifically, the regressors are categorized according to whether they are endogenous, exogenous, or predetermined variables. The reasoning for each categorization is presented along with the appropriate lags of each variable for instrumentation. PRI is an indicator variable for funds managed by investment managers who have signed the Principle for Responsible Investing and have not been excluded from the signatory list; SRI is in an indicator variable for funds described as socially responsible investing funds; return is the monthly holding period return; age is the age of the fund; expense is the expense ratio; size is the log of the fund's total net assets; lagged fund flow is the dollar amount flowing into or out of a fund over the previous month; and lagged return is the return over the previous month.

The dynamic system GMM model contains both a levels equation and a differences equation:

$$\begin{aligned} f_{t,i} &= \boldsymbol{d'}_{t,i}\boldsymbol{\alpha} + \boldsymbol{e'}_{t,i}\boldsymbol{\beta} + \boldsymbol{g'}_{t,i}\boldsymbol{\gamma} + \boldsymbol{h'}_{t,i}\boldsymbol{\delta} + \varepsilon_{t,i} \\ \Delta f_{t,i} &= \Delta\boldsymbol{d'}_{t,i}\boldsymbol{\alpha} + \Delta\boldsymbol{e'}_{t,i}\boldsymbol{\beta} + \Delta\boldsymbol{g'}_{t,i}\boldsymbol{\gamma} + \Delta\boldsymbol{h'}_{t,i}\boldsymbol{\delta} + \Delta\varepsilon_{t,i} \end{aligned} \quad (1)$$

where $f_{t,i}$ is the dollar amount flowing to fund i over month t, $\boldsymbol{d'}_{t,i}$ is a vector of endogenous variables (e.g., return), $\boldsymbol{\alpha}$ is a vector of coefficients for the endogenous variables, $\boldsymbol{e'}_{t,i}$ is a vector of exogenous variables (e.g., age), $\boldsymbol{\beta}$ is a vector of coefficients for the exogenous variables; $\boldsymbol{g'}_{t,i}$ is a vector of predetermined variables (e.g., expense), $\boldsymbol{\gamma}$ is a vector of coefficients for the predetermined variables; $\boldsymbol{h'}_{t,i}$ is a vector of predetermined lagged variables (e.g., lagged returns), $\boldsymbol{\delta}$ is a vector of coefficients for the predetermined lagged variables, $\varepsilon_{t,i}$ and $\Delta\varepsilon_{t,i}$ are the relevant error terms, and Δ is the time-differencing operator.

The moment conditions from this system of equations produce the following instruments:

$$g_T = \frac{1}{N}\sum \begin{bmatrix} \left(\Delta f_{t,i} - \Delta \boldsymbol{d}'_{t,i}\boldsymbol{\alpha} - \Delta \boldsymbol{e}'_{t,i}\boldsymbol{\beta} - \Delta \boldsymbol{g}'_{t,i}\boldsymbol{\gamma} - \Delta \boldsymbol{h}'_{t,i}\boldsymbol{\delta}\right)\cdot \boldsymbol{d}_{t-2,i} \\ \vdots \\ \left(\Delta f_{t,i} - \Delta \boldsymbol{d}'_{t,i}\boldsymbol{\alpha} - \Delta \boldsymbol{e}'_{t,i}\boldsymbol{\beta} - \Delta \boldsymbol{g}'_{t,i}\boldsymbol{\gamma} - \Delta \boldsymbol{h}'_{t,i}\boldsymbol{\delta}\right)\cdot \boldsymbol{d}_{t-j,i} \\ \left(\Delta f_{t,i} - \Delta \boldsymbol{d}'_{t,i}\boldsymbol{\alpha} - \Delta \boldsymbol{e}'_{t,i}\boldsymbol{\beta} - \Delta \boldsymbol{g}'_{t,i}\boldsymbol{\gamma} - \Delta \boldsymbol{h}'_{t,i}\boldsymbol{\delta}\right)\cdot \boldsymbol{e}_{t,i} \\ \vdots \\ \left(\Delta f_{t,i} - \Delta \boldsymbol{d}'_{t,i}\boldsymbol{\alpha} - \Delta \boldsymbol{e}'_{t,i}\boldsymbol{\beta} - \Delta \boldsymbol{g}'_{t,i}\boldsymbol{\gamma} - \Delta \boldsymbol{h}'_{t,i}\boldsymbol{\delta}\right)\cdot \boldsymbol{e}_{t-k,i} \\ \left(\Delta f_{t,i} - \Delta \boldsymbol{d}'_{t,i}\boldsymbol{\alpha} - \Delta \boldsymbol{e}'_{t,i}\boldsymbol{\beta} - \Delta \boldsymbol{g}'_{t,i}\boldsymbol{\gamma} - \Delta \boldsymbol{h}'_{t,i}\boldsymbol{\delta}\right)\cdot \boldsymbol{g}_{t-1,i} \\ \vdots \\ \left(\Delta f_{t,i} - \Delta \boldsymbol{d}'_{t,i}\boldsymbol{\alpha} - \Delta \boldsymbol{e}'_{t,i}\boldsymbol{\beta} - \Delta \boldsymbol{g}'_{t,i}\boldsymbol{\gamma} - \Delta \boldsymbol{h}'_{t,i}\boldsymbol{\delta}\right)\cdot \boldsymbol{g}_{t-l,i} \\ \left(\Delta f_{t,i} - \Delta \boldsymbol{d}'_{t,i}\boldsymbol{\alpha} - \Delta \boldsymbol{e}'_{t,i}\boldsymbol{\beta} - \Delta \boldsymbol{g}'_{t,i}\boldsymbol{\gamma} - \Delta \boldsymbol{h}'_{t,i}\boldsymbol{\delta}\right)\cdot \boldsymbol{h}_{t-2,i} \\ \vdots \\ \left(\Delta f_{t,i} - \Delta \boldsymbol{d}'_{t,i}\boldsymbol{\alpha} - \Delta \boldsymbol{e}'_{t,i}\boldsymbol{\beta} - \Delta \boldsymbol{g}'_{t,i}\boldsymbol{\gamma} - \Delta \boldsymbol{h}'_{t,i}\boldsymbol{\delta}\right)\cdot \boldsymbol{h}_{t-m,i} \\ \left(f_{t,i} - \boldsymbol{d}'_{t,i}\boldsymbol{\alpha} - \boldsymbol{e}'_{t,i}\boldsymbol{\beta} - \boldsymbol{g}'_{t,i}\boldsymbol{\gamma} - \boldsymbol{h}'_{t,i}\boldsymbol{\delta}\right)\cdot \Delta\boldsymbol{d}_{t-1,i} \\ \vdots \\ \left(f_{t,i} - \boldsymbol{d}'_{t,i}\boldsymbol{\alpha} - \boldsymbol{e}'_{t,i}\boldsymbol{\beta} - \boldsymbol{g}'_{t,i}\boldsymbol{\gamma} - \boldsymbol{h}'_{t,i}\boldsymbol{\delta}\right)\cdot \Delta\boldsymbol{d}_{t-n,i} \\ \left(f_{t,i} - \boldsymbol{d}'_{t,i}\boldsymbol{\alpha} - \boldsymbol{e}'_{t,i}\boldsymbol{\beta} - \boldsymbol{g}'_{t,i}\boldsymbol{\gamma} - \boldsymbol{h}'_{t,i}\boldsymbol{\delta}\right)\cdot \Delta\boldsymbol{e}_{t,i} \\ \vdots \\ \left(f_{t,i} - \boldsymbol{d}'_{t,i}\boldsymbol{\alpha} - \boldsymbol{e}'_{t,i}\boldsymbol{\beta} - \boldsymbol{g}'_{t,i}\boldsymbol{\gamma} - \boldsymbol{h}'_{t,i}\boldsymbol{\delta}\right)\cdot \Delta\boldsymbol{e}_{t-o,i} \\ \left(f_{t,i} - \boldsymbol{d}'_{t,i}\boldsymbol{\alpha} - \boldsymbol{e}'_{t,i}\boldsymbol{\beta} - \boldsymbol{g}'_{t,i}\boldsymbol{\gamma} - \boldsymbol{h}'_{t,i}\boldsymbol{\delta}\right)\cdot \Delta\boldsymbol{g}_{t,i} \\ \vdots \\ \left(f_{t,i} - \boldsymbol{d}'_{t,i}\boldsymbol{\alpha} - \boldsymbol{e}'_{t,i}\boldsymbol{\beta} - \boldsymbol{g}'_{t,i}\boldsymbol{\gamma} - \boldsymbol{h}'_{t,i}\boldsymbol{\delta}\right)\cdot \Delta\boldsymbol{g}_{t-p,i} \\ \left(f_{t,i} - \boldsymbol{d}'_{t,i}\boldsymbol{\alpha} - \boldsymbol{e}'_{t,i}\boldsymbol{\beta} - \boldsymbol{g}'_{t,i}\boldsymbol{\gamma} - \boldsymbol{h}'_{t,i}\boldsymbol{\delta}\right)\cdot \Delta\boldsymbol{h}_{t-1,i} \\ \vdots \\ \left(f_{t,i} - \boldsymbol{d}'_{t,i}\boldsymbol{\alpha} - \boldsymbol{e}'_{t,i}\boldsymbol{\beta} - \boldsymbol{g}'_{t,i}\boldsymbol{\gamma} - \boldsymbol{h}'_{t,i}\boldsymbol{\delta}\right)\cdot \Delta\boldsymbol{h}_{t-q,i} \end{bmatrix} \quad (2)$$

where Δ is the time-differencing operator, $f_{t,i}$ is the dollar amount flowing to fund i over month t, $\boldsymbol{d}'_{t,i}$ is a vector of endogenous variables, $\boldsymbol{\alpha}$ is a vector of coefficients for the endogenous variables, $\boldsymbol{e}'_{t,i}$ is a vector of exogenous variables, $\boldsymbol{\beta}$ is a vector of coefficients for the exogenous variables, $\boldsymbol{g}'_{t,i}$ is a vector of predetermined variables, $\boldsymbol{\gamma}$ is a vector of coefficients for the predetermined variables, $\boldsymbol{h}'_{t,i}$ is a vector of predetermined lagged variables; $\boldsymbol{\delta}$ is a vector of coefficients for the predetermined lagged variables, j, k, l and m are the maximum lag lengths of instruments created for the $\boldsymbol{d}$, $\boldsymbol{e}$, $\boldsymbol{g}$, and $\boldsymbol{h}$ groups of regressors for the differences equations, and n, o, p and q are the maximum lag lengths of instruments created for the $\boldsymbol{d}$, $\boldsymbol{e}$, $\boldsymbol{g}$, and $\boldsymbol{h}$ groups of regressors for the levels equations.

When applying the GMM method, the empirical context usually delivers more instruments than there are regressors. This means that when estimating the model, there are more equations than there are unknown coefficients. This system is described as overidentified and cannot be exactly solved. The GMM method, therefore, identifies coefficients that minimize their combined correlation with the model errors. This can be done by solving the problem:

$$\min[\mathrm{g}_T^{T} M \mathrm{g}_T] \tag{3}$$

where M is a weighting matrix of the correlations between coefficients and the model errors.

To derive efficient estimates for the coefficients α, β, and γ from Equation 2, M must be the inverse of the variance–covariance matrix, Ω^{-1}. This creates lower weights for the conditions that have the greatest contribution to variance. GMM uses a simple homoscedastic estimate of Ω to identify consistent estimates of the coefficients (assuming independent and identically distributed errors). These coefficients are employed to better estimate Ω and thereby re-estimate the coefficients. This two-step estimation procedure is attributed to Hansen (1982). It produces consistent and efficient coefficient estimates (which allow for heteroskedasticity and serial correlation) and is robust to the potential unobservable heterogeneity, simultaneity, and dynamic endogeneity (Roodman, 2009a).

Holtz-Eakin et al. (1988) developed the accepted method for creating the matrix of internal instrument variables. It contains individual instruments from every lag for every time period. Where there is a missing observation, zeros are included to fill the matrix. Since the instrumenting variables are only used at one observation period, when combined with lags of the instrumenting variables, many zeros are required to fill the matrix. This process produces a matrix that is predominantly zeros (Roodman, 2009b). A similar pattern emerges for the instrument matrix created for the levels equation (although only one lag is typically used for each period).

One of the challenges of implementing system GMM is the choice of how many instruments to incorporate; “The number of instruments in difference and system GMM tends to explode with T” (Roodman, 2009a, p. 128). In the present case, the monthly data commence in April 2006 and can, therefore, generate thousands of instruments. While the literature does not contain specific guidance on how many instruments to select, Mátyás (1999) demonstrated that additional instruments only improve asymptotic efficiency if they contribute extra information to that contained in the existing moment conditions. This is likely to motivate the imposing of constraints on the instrument choice when the instruments are considered unlikely to provide further explanatory power. Therefore, lags of the instrumented variables are limited to those most likely to improve estimation efficiency.

Roodman (2009b) and Bontempi and Mammi (2015) provided suggestions regarding how to impose constraints. In addition to limits on the number of lags employed, the instrument variable matrix can be collapsed to a single vector. This adds the selected lagged variables for each time period and has the effect of squashing the matrix and removing many of the zeros.

Therefore, endogeneity is addressed by using instrumental variables in the system GMM structure. However, the problem of significantly overidentifying the required coefficients (by having far too many instruments) is managed by adding the instruments across time periods and limiting the instrumenting lags. The predetermined variables (i.e., expense and size) have instruments commencing at the first lag to the fifth lag for the difference equation and, therefore, from the second to the sixth lag for the levels equation. Lagged fund flows and returns are likely to be less static than expense and size and a longer series of lags has the potential to provide more explanatory information. Therefore, lags commencing at the first lag through to the eighth lag are employed for lagged fund flows. The lag series is extended by an additional lag for returns because the lags are instrumenting for both the contemporaneous and lagged return values. This combination enables a workable solution for fund flow analysis and addresses the endemic endogeneity issues of dynamic endogeneity, simultaneity, and unobserved heterogeneity.

5. System generalized method of moments regression model

The main aim of this analysis is to evaluate whether signing the PRI is advantageous for investment managers. Specifically, the hypothesis driving this research is: An investment manager who signs the PRI will attract additional fund flows to their SRI fund than an investment manager who does not sign. The structure of the regression model therefore ascertains if there is a positive flow of funds attributable to the PRI designation. Of note, the method applied here accommodates for the three main forms of endogeneity: dynamic endogeneity, simultaneity, and unobserved heterogeneity. In accommodating for these econometric issues, it is possible that the results differ to and improve upon those in previous literature.

Fund flows are measured in dollars units (rather than percentage change). The reasons for this choice are motivated by the work of Fant and O'Neal (2000). The results thereby reveal the full dollar impact of investors responding to the PRI signature across funds and for the industry. This measure should also avoid biases from scaling (Kim, 1999). However, the use of dollar fund flows requires heteroskedasticity-consistent standard errors (White, 1980). Therefore, the fund flows are calculated as:

$$\text{fund flow}_{t,i} = \text{TNA}_{t,i} - \text{TNA}_{t-1,i}\left(1 + \text{return}_{t,i}\right) \quad (4)$$

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 TNA as at the last trading day of month t for fund i, and $\text{return}_{t,i}$ is the monthly holding period return over month t for fund i.

The main focus of regression equations used in fund flow literature has been modelling flow to performance relationships (Berk & Green, 2004; Fant & O'Neal, 2000; James & Karceski, 2006). In this context, the primary regressors have been contemporaneous and lagged returns, and lagged fund flows. Contemporaneous returns are expected to have a positive influence on fund flows because "investors are quick to recognize the high performing funds and money follows" (Benson et al., 2010, p. 65). Lagged returns also have a positive impact (Carhart, 1997; Chevalier & Ellison, 1997; Goetzmann & Peles, 1997; Gruber, 1996; Ippolito, 1992; Sirri & Tufano, 1998), and according to Sirri and Tufano (1998), "Mutual fund consumers chase returns, flocking to funds with highest recent returns" (Sirri & Tufano, 1998, p. 1590). Lagged fund flows is also considered a regressor in fund flow literature (Chiang & Huang, 2017; Coval & Stafford, 2007; Gruber, 1996; Warther, 1995). Time effects are also included to accommodate for other variables that 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.

Conventional control variables for fund flow analysis found in the literature include expense ratios, size, and age. Sirri and Tufano (1998) stated that "consumers are fee-sensitive in that lower-fee funds and funds that reduce their fees grow faster" (Sirri & Tufano, 1998, p.1590). Size (logged) is included because it is likely to affect fund flows either directly or by affecting performance (Bollen, 2007; Pollet & Wilson, 2008; Renneboog et al., 2011; Sirri & Tufano, 1998). Berk and Green (2004) argued that size negatively affects 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 & Karoui, 2017; Pollet & Wilson, 2008). Analysis by Bollen (2007) revealed that average fund

flows for younger funds are greater than average fund flows for older funds. Negative coefficients are therefore anticipated across all these control variables.

The dynamic system GMM model introduced in the previous section contains two equations: differences and levels. For fund flow analysis, the components of the endogenous (i.e., PRI, SRI and return), exogenous (i.e., age), and predetermined (i.e., expense, size, lagged fund flow, and lagged return) variable groups take the form:

$$\begin{gathered}\text{fund flow}_{t,i} = \beta_1 \text{PRI}_{t,i} + \beta_2 \text{SRI}_{t,i} + \beta_3 \text{PRI}_{t,i} \times \text{SRI}_{t,i} + \beta_4 \text{fund flow}_{t-1,i} + \beta_5 \text{return}_{t,i} + \beta_6 \text{return}_{t-1,i} \\ + \beta_7 \text{expense}_{t,i} + \beta_8 \text{size}_{t-1,i} + \beta_9 \text{age}_{t,i} + \varepsilon_{t,i} \\ \Delta\text{fund flow}_{t,i} = \beta_1 \Delta\text{PRI}_{t,i} + \beta_2 \Delta\text{SRI}_{t,i} + \beta_3 \Delta\text{PRI}_{t,i} \times \Delta\text{SRI}_{t,i} + \\ \beta_4 \Delta\text{fund flow}_{t-1,i} + \beta_5 \Delta\text{return}_{t,i} + \beta_6 \Delta\text{return}_{t-1,i} + \beta_7 \Delta\text{expense}_{t,i} + \beta_8 \Delta\text{size}_{t-1,i} + \beta_9 \Delta\text{age}_{t,i} + \Delta\varepsilon_{t,i}\end{gathered} \quad (5)$$

where fund $\text{flow}_{t,i}$ is the dollar amount flowing into or out of fund i over month t, β_z is the coefficient for the zth regressor, $\text{PRI}_{t,i}$ is an indicator variable for funds managed by investment managers who have signed the PRI and have not been excluded from the signatory list[2], and $\text{SRI}_{t,i}$ is an indicator variable for funds described as socially responsible investing funds. Further, $\text{PRI}_{t,i} \times \text{SRI}_{t,i}$ and $\Delta\text{PRI}_{t,i} \times \Delta\text{SRI}_{t,i}$ are relevant interaction variables[3], $\text{return}_{t,i}$ is the monthly holding period return, $\text{expense}_{t,i}$ is the expense ratio over the month, $\text{size}_{t-1,i}$ is the log of fund size at the beginning of month t, $\text{age}_{t,i}$ is the age of fund at the beginning of month t, $\varepsilon_{t,i}$ and $\Delta\varepsilon_{t,i}$ are the relevant error terms, and Δ is the time-differencing operator. The instrumental variables are:

$$\Delta\text{age}_t, \text{expense}_{t-1 \text{ to } t-5}, \Delta\text{expense}_{t-2 \text{ to } t-6}, \text{size}_{t-2 \text{ to } t-6}, \Delta\text{size}_{t-3 \text{ to } t-7}, \text{fund flow}_{t-1 \text{ to } -8}, \Delta\text{fund flow}_{t-2 \text{ to } -9}, \text{return}_{t-2 \text{ to } -9}, \Delta\text{return}_{t-3 \text{ to } -10}$$

To ensure the robustness of the results, the tests are performed across sectors of the fund universe: retail and institutional investor types, investment styles (e.g., growth, income), and investment categories (e.g., small caps, large caps).

The coefficients for the $\text{PRI}_{t,i}$ indicator variable and the $\text{PRI}_{t,i} \times \text{SRI}_{t,i}$ interaction variable are the key results of this chapter. They indicate whether signing the PRI attracts additional funds to 1) the full set of an investment manager's funds, and 2) the SRI funds managed by the

[2] The PRI variable has a value of 1 if a fund is managed by a current signatory to the PRI and a value of 0 if the manager is not a PRI signatory. Managers can be subsequently excluded from the signatory list if: they do not complete annual progress reports (Gibson et al., 2019), they do not pay their fee, or because the manager was acquired by another firm (Häßler & Jung, 2015). The value of the PRI variable becomes 0 once a manager is excluded from the list of signatories.

[3] Specifically, $\text{PRI}_{t,i} \times \text{SRI}_{t,i}$ is the interaction term between the indicator variable for funds managed by PRI signatories and the indicator variable for socially responsible investing funds for the levels equation and $\Delta\text{PRI}_{t,i} \times \Delta\text{SRI}_{t,i}$ is the interaction term between the change in the PRI indicator and the change in the SRI indicator for the differences equation.

investment manager. The results thereby reveal whether it is advantageous for investment managers to sign the PRI.

6. Empirical results

If signing the UN PRI attracts new fund flows, more investment managers will be motivated to sign. This will pave the way for the PRI to successfully influence investment decision-making processes across the funds management industry. This chapter attempts to estimate the value of signing the PRI. However, there are significant econometric challenges with identifying the causational forces driving fund flows. The three major forms of endogeneity (i.e., dynamic endogeneity, simultaneity, and unobserved heterogeneity) are all encountered in fund flow analysis. This chapter resolves these concerns by applying a system GMM approach to understand what really drives fund flows.

Univariate analysis

The univariate statistics for the regressor variables and the correlation coefficients between these variables are presented in Table 3.3. The mean monthly returns are similar for all funds, PRI funds, and SRI funds. This is consistent with empirical literature comparing SRI and conventional fund returns (Daugaard, 2020) and also consistent with the non-significant correlation between the SRI indicator and the return variable. There is a negative average monthly fund flow observed across the full collection of funds. This is consistent with the trend away from mutual funds to ETFs occurring over the past decade. However, PRI and SRI funds have achieved positive average fund flows in the face of that industry-wide trend. SRI funds are generally younger than other funds. This explains their smaller size (despite their larger average fund flows).

The fund flow correlation statistics broadly align with existing literature and suggest positive coefficients for the PRI and SRI indicator variables. Fund flows are positively correlated with returns. This is consistent with the flow–performance relationship documented in empirical literature (Berk & Green, 2004; Ferreira et al., 2012). Fund flows are negatively correlated with the control variables (consistent with the empirical literature documented in the previous section). The flows are positively correlated with the SRI and PRI indicator variables. This relationship is the focus of the current regression analysis. Specifically, this chapter tests whether this relationship is causal: does signing the PRI cause increased fund flows for SRI and conventional funds?

Table 3.3
Descriptive statistics and correlation coefficients for regressor variables

	N	Mean	St. dev.	Median	Skew	Kurtosis
Panel A. Descriptive statistics for all funds						
Return	672,071	0.01	0.04	0.01	-0.61	5.82
Fund flow	672,071	–0.14	16.69	-0.03	0.81	22.19
SRI	672,071	0.02	0.15	0.00	6.44	42.53
PRI	672,071	0.26	0.44	0.00	1.08	2.16
Expense	672,071	0.01	0.01	0.01	0.24	2.73
Age	671,337	124.03	108.31	104.00	3.12	20.1
Size	672,071	4.12	2.33	4.25	–0.23	2.56
Panel B. Descriptive statistics for PRI funds						
Return	176,936	0.01	0.04	0.01	–0.34	5.05
Fund flow	176,936	0.30	17.98	–0.02	1.11	20.29
SRI	176,936	0.05	0.22	0.00	4.18	18.51
PRI	176,936	1.00	0.00	1.00	.	.
Expense	176,936	0.01	0.01	0.01	0.27	2.47
Age	176,869	132.16	106.23	118.00	3.01	20.7
Size	176,936	4.18	2.42	4.35	–0.22	2.49
Panel C. Descriptive statistics for SRI funds						
Return	15,099	0.01	0.04	0.01	–0.66	5.51
Fund flow	15,099	0.43	10.75	0.00	2.61	44.75
SRI	15,099	1.00	0.00	1.00	.	.
PRI	15,099	0.57	0.49	1.00	–0.29	1.09
Expense	15,099	0.01	0.01	0.01	0.41	2.76
Age	15,099	115.61	84.60	102.00	1.25	5.60
Size	15,099	3.71	1.95	3.70	–0.04	2.73

	Return	Fund flow	SRI	PRI	Fund expense	Age	Size
Panel D. Pearson correlation coefficients between regressor variables for all funds							
Return	1.00						
Fund flow	0.02***	1.00					
SRI	0.00	0.01***	1.00				
PRI	0.03***	0.02***	0.11***	1.00			
Expense	–0.01***	–0.07***	0.01***	–0.16***	1.00		
Age	0.01***	–0.17***	–0.01***	0.04***	0.05***	1.00	
Size	0.01***	–0.03***	–0.03***	0.02***	–0.30***	0.38***	1.00

Table 3.3 presents the univariate statistics and correlation coefficients for regressor variables. The data cover monthly observations from April 2006 to February 2018. The statistics presented include the number of observations (N), mean average, standard deviations (St. dev.), median average, skew and kurtosis. Panel A shows univariate statistics for all 7628 funds. Panel B shows statistics for the 3553 funds managed by signatories to the Principles of Responsible Investing (PRI). Panel C shows statistics for the 175 funds described as socially responsible investing (SRI) funds. Panel D shows the Pearson correlation coefficients across the regressor variables for all the funds. Correlation coefficients significant at the one percent level are indicated by ***. Returns are calculated as holding period returns per month. Fund flows are measured as the monthly change in total net assets adjusted for monthly returns. SRI and PRI are indicator variables for funds described as SRI funds and funds managed by PRI signatories, respectively. Expense is the expense ratio from the most recent reporting period. Age is the number of months since the fund's inception. Size is the natural log of the fund's total net assets.

Multivariate regression analysis

To estimate the value of signing the PRI, fund flows are regressed against an indicator variable for funds managed by PRI signatories. An indicator variable is also included for funds described as SRI funds and an interaction term to ascertain whether SRI funds place a special value on the PRI signature. The significance of the coefficients on these variables should indicate the value of signing the PRI to conventional and SRI investors.

Table 3.4 shows the results of regressing funds flows employing a system GMM approach[4]. The coefficients for the PRI indicator variable and the PRI x SRI interaction term are not significantly different from zero. These results are supported by robustness tests performed across fund types, styles and investment categories (see Appendix 3B). The main hypothesis, that an investment manager who signs the PRI will attract additional fund flows to their SRI fund than an investment manager who does not sign, is not supported. These results therefore imply that a fund managed by a PRI signatory does not attract funds from either conventional or SRI investors. This contrasts with the results from the baseline regressions using pooled OLS and dynamic panel methods. Those two approaches yield positive coefficients for the PRI indicator variable (at a one percent level for OLS and a five percent level for the dynamic panel). There is also a significant coefficient for the PRI x SRI interaction term under the dynamic panel approach (at a one percent level). However, the baseline methods do not completely accommodate for the endogeneity issues encountered in fund flow analysis. The OLS method is susceptible to biases from dynamic endogeneity, simultaneity, and unobserved heterogeneity. While the panel regression does correct for unobserved heterogeneity, its coefficients are potentially biased by dynamic endogeneity and simultaneity. Therefore, it is likely that the apparently positive coefficients of the baseline methods are not reliable indications of the importance of the PRI signature. The system GMM results provide evidence that, after accommodating for the existing exogenous issues, signing the PRI does not attract additional fund flows. These results are preferable to the baseline findings; however, it is important to note that Demsetz (1983) predicted there would be no significant results if simultaneity is present. The true relationship will be disguised in panel analysis unless applied at a granular level (e.g., each fund potentially experiences a different effect for its manager signing the PRI). Less

[4] Note that the coefficients for levels of the variables (i.e. specified in the first of the two system equations) are the only set of variables typically presented by statistical software (e.g. the xtabond2 command in Stata etc). This is because the coefficients for differenced variables are conceptually equivalent to the coefficients for the levels variables. Roodman (2009) explains that "The GMM formulas and the software treat the system as a single-equation estimation problem because the same linear relationship with the same coefficients is believed to apply to both the transformed and untransformed variables." See exemplars presented in Roodman (2009a), Wintoki et al. (2012) and Schultz et al. (2010).

sophisticated econometric techniques can also be applied. For example, Wintoki et al. (2012) suggests natural experiments can potentially be used. Chapter 4 of this thesis therefore builds extends the analysis by designing and implementing a unique natural experimental setting based on exogenous shocks relevant for SRI fund flows.

Despite potential improvements from a natural experiment, the main results obtained in this chapter are consistent with recent literature. Hartzmark and Sussman (2019) document an industry-wide shift towards funds which have portfolios with higher ESG ratings. However, Gibson et al. (2019) shows the portfolios with higher ESG scores are managed by non-signatories to the PRI. The combination of these two papers therefore explains why the PRI designation does not attract significant fund flows in the current chapter. It appears investors are not cognisant of whether the investment manager is a PRI signatory. The investors are only concerned with the actual ESG score of the funds (Hartzmark & Sussman, 2019).

The system GMM results also suggest that there are not significant fund flows attributable to funds described as SRI funds. This is consistent with the baseline results. However, it should be noted that these insignificant results could be due to positive preferences for SRI funds (i.e., from SRI investors) being counterbalanced by negative preferences from conventional investors. A more convincing test would, therefore, take the form of natural experiments. The experiments would link exogenous events with SRI choices. An exogenous time series of ESG events could be selected based on their likely impact on SRI fund selection. This would enable a more direct test of SRI fund preferences.

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. Interpreting the combined results of Gibson et al. (2019) and Hartzmark and Sussman (2019) above suggests investors do not pay attention to whether a fund manager signs the PRI. However, further research could test to see if the motivations of the investors are even bleaker. It is possible investors are 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 previously promoted their responsible capabilities and legitimacy using 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.

Table 3.4
Mutual fund flows and the impact of Principles for Responsible Investing signatures

	System GMM	OLS	Dynamic panel
	(1)	(2)	(3)
PRI	8.422	0.215***	0.326***
	(7.133)	(0.0389)	(0.131)
SRI	41.062	–0.0717	
	(210.6)	(0.170)	
PRI x SRI	–197.7	0.370	1.865**
	(269.6)	(0.225)	(0.721)
Adjusted R-squared		0.289	0.183
Sargan test	3118		
Hansen test	409		
Arellano–Bond AR(1)	–31.29***		
Arellano–Bond AR(2)	4.51**		
Number of instruments	32		
F statistic	29	29,226	425
Number of funds[5]	7,548	7,548	7,548

Table 3.4 reports the results of regressing fund flows on indicator variables for funds described as socially responsible investing funds (SRI) and funds managed by Principles for Responsible Investing (PRI) signatories. The period of analysis is from April 2006 to February 2018. Fund flow is calculated as the monthly change in total net assets (TNA) adjusted for monthly holding period returns. Column 1 presents the results for system generalized methods of moments (GMM). Columns 2 and 3 present baseline results for comparison using pooled ordinary least squares (OLS) and dynamic panel fixed effects, respectively. All the regressions include control variables (lagged and contemporaneous returns, lagged flows, lagged size [log of TNA], expense, and age). The coefficients for the control variables are consistent with empirical literature.

The coefficients for the typical regressor variables for fund flow analysis (contemporaneous and lagged returns, lagged fund flows, expense, size, and expense ratios) are included in Table A3.1 in Appendix 3A. These regressions also included fund fixed effects. All the coefficients largely aligned with existing empirical literature. Similar results were obtained for the regressions across fund types (retail and institutional), fund categories (large, mid, small, and micro caps), and investment styles (growth, income, and growth and income). Results for these regressions are presented in Tables B3.1 to B3.2 in Appendix 3B.

In summary, the results show that, after accommodating for endogeneity, causal relationships between the indicator variable for PRI signatories and the PRI x SRI interaction term become insignificant. This suggests that the results from the OLS and panel regressions are spurious, and signing the PRI is not likely to drive additional fund flows.

[5] In comparison to the original data presented in Table 3.3, 80 funds (from the original 7628) were omitted in the regressions due to missing observations for the age variable or insufficient observations to appropriately capture lagged observations for fund flow, return or size variables.

7. Discussion

The aim of this study is to identify the impact on fund flows caused by an investment manager signing the PRI. To do so, the comprehensive set of fund data from the CRSP Mutual Fund Database is matched with the PRI investment manager signatory list. Unfortunately, fund flow analysis is not straightforward. Fund flow analysis exhibits all three major forms of endogeneity problems: dynamic endogeneity, simultaneity, and unobserved heterogeneity. This means that the coefficients can be unreliable. Consequently, a system GMM approach is applied because it addresses these endogeneity issues. The major results show that investment managers signing the PRI has no significant effect on fund flows.

Interpreting the main results

The PRI indicator was not statistically significant, revealing that conventional funds managed by PRI signatories do not attract additional fund flows compared to those funds not managed by PRI signatories. This appears to contrast with the findings of Hartzmark and Sussman (2019), who identified a preference by investors for conventional funds with higher Morningstar ESG ratings. The contradiction could simply be due to the PRI not successfully communicating to investors the ESG merits of their signatories, compared to the ratings communicated by Morningstar[6]. This issue could be further examined by surveying investors regarding their understanding of what the PRI signature represents. Similarly, the portfolios of PRI signatories could be evaluated in relation to their Morningstar ratings.

The PRI x SRI interaction term was also not significant. This means that SRI investors do not prefer PRI-designated managers over non-PRI-designated managers. This result differs from the findings of Li and Humphrey (2017), wherein SRI funds received positive flows following their managers signing the PRI. However, their positive results may be due to endogeneity issues from missing regressors. For example, the PRI signing could correspond with missing explanatory variables such as the marketing effort of the funds. In contrast, this chapter employs methods that explicitly address this issue.

The system GMM results also revealed no significant flows to SRI funds. Despite this result being consistent with the baseline results, it is still a surprise. SRI investors are likely to be a distinct element of the investor market. Previous literature has demonstrated that investors in SRI funds exhibit different characteristics to conventional investors. The inflows of SRI investors are more sensitive to past positive returns and their outflows are less sensitive to past negative

[6] Although, as discussed earlier, Gibson et al. (2019) casts doubts on the ESG legitimacy of the portfolios managed by PRI signatories.

returns (Bollen, 2007; Marti-Ballester, 2015b; Renneboog et al., 2011), they have more stable fund flows (Peifer, 2011), and are more loyal to their choices (Benson & Humphrey, 2008; El Ghoul & Karoui, 2017). Given these distinct attributes of SRI investors, it would be anticipated that there would be additional fund flows associated with funds described as SRI funds. A possible explanation for this surprise result is that the positive flows from SRI investors could be offset by negative preferences from conventional investors. Empirical literature also documents the preferences for non-SRI funds. For example, Hong and Kacperczyk (2009) examined preferences for funds with significant exposures to "sin stocks". Therefore, a more convincing test of whether there are distinct fund flows associate with SRI funds should take the form of natural experiments. For example, exogenous events could be selected for their likely effect on SRI fund selection. This would be a more direct test for positive flows from SRI investors.

The insignificant results for the PRI indicator and PRI x SRI interaction terms also contrast with the OLS and dynamic panel results reported in this chapter. However, the OLS and panel methods are subject to endogeneity issues, which may have affected their results. In contrast, these issues are appropriately addressed by the system GMM methodology.

Signalling theory

SRI fund flows is a fertile area of research for applying signalling theory from management literature (Spence, 1973, 2002). Signalling theory deals with how individuals reduce uncertainty regarding strategic decisions in situations of incomplete and asymmetrical information. "In response, stakeholders seek out signals—observable actions that provide information about unobservable attributes" (Bergh et al., 2014, p. 1335). This theory is relevant to the context of an investor selecting an SRI fund. Bergh et al. (2014) provided an example wherein, if only high-quality new ventures secure venture capitalist funding, then this funding is a signal for distinguishing between high- and low-quality ventures. In a similar way, the designation of an SRI fund by a designating agent (e.g., the PRI) could distinguish high- and low-quality SRI processes.

A key element of signalling theory is the presence of a separating equilibrium. This usually means that choices are motivated by expectations, costs, and evidence associated with an observable signal. In the current context, the signal occurs when an investment manager signs the PRI. A separate equilibrium for this signal would be demonstrated by a statistically significant positive coefficient for the PRI indicator variable or the PRI x SRI interaction term. However, the current results imply that signing the PRI does not create a signal of quality for SRI investors.

The potential reasons for the insignificant results identify research trajectories that extend the applications of signalling theory, increase understandings of SRI fund flow drivers, and identify improved policies for the PRI and other SRI-designating agents. The reasons for the results reflect the essential aspects of a separating equilibrium: signal cost, an information problem, signal confirmation, and Pareto optimizing solutions (Bergh et al. (2014). The natural research trajectories include:

- Testing whether the **signal cost** encountered to gain the PRI designation is substantial enough. A sufficient cost is necessary to create a distinction between quality and non-quality SRI processes. Note that the cost is not necessarily solely about licensing and is likely to include structural and portfolio reorganization. An example of this cost is documented by Li and Humphrey (2017) in the form of increased portfolio turnover by investment managers preparing to sign the PRI.
- Addressing the **information problem**—in this case, whether the communication about the SRI quality of PRI signatories is clearly conveyed to investors. This appears a major challenge because the results for the PRI designation differ to those documented for other designating agents. For example, Hartzmark and Sussman (2019) found a positive impact on fund flows in response to Morningstar's "salient" presentation of SRI information.
- Investigating **signal confirmation**, which relates to measuring the quality of SRI outcomes and evaluating whether they are clearly demonstrated to investors. This trajectory includes identifying the most appropriate measurement approach and testing that the channel of information is effective.
- Using **Pareto optimizing solutions**. These occur where the recipient successfully uses the signal to identify products. The solutions depend on the signalling costs and the expectations of investors and funds. This element will motivate a range of potential theory development as well as applied empirical testing.

Considering optimizing solutions reveals the potentially rich knowledge that signalling theory can reveal about SRI fund flows. The "quality" in signalling theory is normally consistently understood by all the participating actors. However, the quality of an SRI fund is in the eye of the beholder. For an SRI investor, a quality SRI process increases their utility (Renneboog et al., 2008a). However, a successful SRI process can potentially negatively affect the utility of a conventional investor (Hong & Kacperczyk, 2009). This negative impact could take the form of the expenses attracted by undertaking SRI research and the reduced return efficiency from applying screens, thereby reducing the investment opportunity set. In particular, the "sin" stocks (with higher capital cost) are likely to be excluded. Signalling theory places significant emphasis

on the role of "separating equilibrium" (Bergh et al., 2014). In the context of SRI fund flow analysis, an array of equilibrium points is likely because of the variety of applicable utility functions in addition to the costs associated with quality signals.

A focus on signalling theory emphasizes the presence of endogeneity issues. The signal being analysed is intentionally proxying for unobserved qualities (Kirmani & Rao, 2000). Therefore, the signal is likely to be correlated with missing regressors (as well as the error term). While system GMM is one potential methodology for mitigating endogeneity issues, a purer solution involves identifying quasi-natural experiments. In the present case, this would require identifying exogenous shocks that drive fund flows to SRI funds and then testing to see whether the PRI signatures generate higher flows following the shocks. Alternatively, qualitative research in the form of interviews could be conducted with respect to the expectations and preferences of SRI investors.

Alternative interpretations and further research

The results reveal a lack of interest by investors in the guidance provided by a globally recognized international alliance concerned with social good (i.e., the UN). The results advance existing knowledge regarding the interrelationship between global social concerns and capital markets. The findings highlight a disconnect between the mechanisms for promoting social concerns and the actual preferences and behaviours of investors. Further research could increase understandings of this disconnect and provide potential resolutions. A range of insightful frameworks could potentially be applied to explain this phenomenon. The results could be explained by the following: signalling theory (as discussed previously), an imbalance between SRI and non-SRI investors in an asset pricing context (Heinkel et al., 2001), the use of a legitimizing perspective (Haigh & Hazelton, 2004), or determining if the SRI designations represent effective "swords" for SRI change or merely "banners" to motivate further action (Statman, 2000).

The lack of significant results found in this research could also simply be fuelled by a distrust of the UN by US investors. A negative attitude toward the UN by Americans has been reflected in recent surveys, possibly echoing the sentiment that "the UN is a tool used by other countries, including America's enemies, to curb US interests" (Call et al., 2017). This possible explanation establishes the potential for future empirical research contrasting the influence of the PRI with that of designations from other nongovernmental organizations (e.g., the Forum for Sustainable and Responsible Investment) and commercial agents (e.g., MSCI and Sustainalytics).

Although the system GMM model accommodates for endogeneity issues (which undermine the relevance of baseline models), econometric issues are encountered when applying system GMM

to fund flow data, fund flow control variables, and fund indicator variables. These issues are reflected in the Sargan–Hansen and Arellano–Bond test results and the indicator coefficient levels. Although the coefficients for the PRI indicator variable and PRI x SRI interaction term are not statistically significantly, their values appear unusually large. This may be attributed to the regressor variables containing high levels of persistence, resulting in near-collinearity and a near-singular correlation matrix. A cleaner solution to these issues would be to adopt a natural approach.

In conclusion, the major results of this chapter reveal that signing the PRI does not attract additional fund flows to either SRI or conventional funds. This result contrasts with those of previous literature, in which simpler econometric methods were employed. The results are important because they raise the prospect that signing the PRI is not an effective signal of SRI quality. This motivates further research to determine how the PRI designation could become more effective. This chapter, therefore, prompts the quest for better information reporting and actions to drive quality SRI.

8. Appendix 3A Contemporaneous and lagged returns and control variables

Table A3.1

Contemporaneous and lagged returns and control variables for Table 3.4

	System GMM	OLS	Dynamic panel
	(1)	(2)	(3)
lagged monthly fund flow	0.103***	0.513***	0.421***
	(0.00751)	(0.00107)	(0.00781)
monthly return	5.356***	7.174***	7.349***
	(1.357)	(0.375)	(0.433)
lagged monthly return	2.283***	7.383***	8.261***
	(0.501)	(0.376)	(0.478)
lagged size	-4.942***	-0.0376***	0.0248
	(0.844)	(0.00833)	(0.0380)
fund expense	-1,487***	-80.51***	-107.1***
	(458.6)	(3.347)	(32.40)
age	0.0272**	-0.0119***	-0.0177***
	(0.0110)	(0.000172)	(0.00129)
constant	30.70***	2.255***	2.942***
	(6.842)	(0.0595)	(0.451)

Table A3.1 reports the results of regressing fund flows on indicator variables for funds described as socially responsible investing funds (SRI) and funds managed by Principles for Responsible Investing (PRI) signatories. The period of analysis is from April 2006 to February 2018. Fund flow is calculated as the monthly change in total net assets (TNA) adjusted for monthly holding period returns. Column 1 presents the results for system generalized methods of moments (GMM). Columns 2 and 3 present baseline results for comparison using pooled ordinary least squares (OLS) and dynamic panel fixed effects, respectively. The coefficients presented here are for the control variables (lagged and contemporaneous returns, lagged flows, lagged size [log of TNA], expense, and age). The coefficients for the control variables are consistent with empirical literature.

9. Appendix 3B Results across Fund Types, Categories and Styles

Table B3.1
Results for Fund Types

	Retail (1)	Institutional (2)
PRI	2.509	-27.98
	(14.06)	(34.97)
SRI	87.81	-2,536
	(227.1)	(2,866)
PRI x SRI	-60.32	-254.6
	(398.2)	(985.3)
lagged monthly fund flow	0.160***	0.0695***
	(0.0139)	(0.0127)
monthly return	2.734	4.049
	(2.166)	(6.453)
lagged monthly return	4.355***	0.715
	(0.640)	(1.707)
lagged size	-2.751	-11.87*
	(1.720)	(7.078)
fund expense	-1,544**	-16,226
	(653.9)	(11,119)
age	0.00166	0.219
	(0.0212)	(0.179)
constant	27.00***	228.3
	(8.964)	(158.0)
Observations	339,253	304,749
Number of funds	3,208	4,220

Table B3.1 reports the results of regressing fund flows on indicator variables for funds described as socially responsible investing funds (SRI) and funds managed by Principles for Responsible Investing (PRI) signatories. The method of analysis is system generalized methods of moments (GMM) and the period of analysis is from April 2006 to February 2018. Fund flow is calculated as the monthly change in total net assets (TNA) adjusted for monthly holding period returns. Column 1 presents the results for Retail funds and Columns 2 present the results for Institutional Funds. The coefficients presented here include control variables (lagged and contemporaneous returns, lagged flows, lagged size [log of TNA], expense, and age).

Table B3.2
Results across Fund Categories and Styles

	Large-cap (1)	Mid-cap (2)	Small-cap (3)	Micro-cap (4)	Growth (5)	Income (6)	Growth & income (7)
PRI	6.209	10.20	-1.667	-59.34*	-8.507	-5.973	4.997
	(9.378)	(12.62)	(6.302)	(29.62)	(14.82)	(22.17)	(6.119)
SRI	0	-1,704	610.8	0	-5.636	-357.4	55.03
	(0)	(2,460)	(434.1)	(0)	(382.5)	(720.6)	(85.01)
PRI x SRI	0	1,981	-660.2*	0	-16.57	-58.38	-288.9
	(0)	(2,271)	(391.0)	(0)	(186.1)	(860.2)	(564.8)
lagged monthly fund flow	0.0395	0.120***	0.112***	0.159	0.0924***	0.0872**	0.103***
	(0.0282)	(0.0152)	(0.0158)	(0.101)	(0.0126)	(0.0346)	(0.0179)
monthly return	9.121	7.933**	10.46***	-2.973	1.433	2.821	-1.616
	(7.039)	(3.247)	(2.209)	(4.297)	(3.131)	(6.037)	(2.967)
lagged monthly return	2.897	1.560	3.922***	6.023***	0.893	4.851**	2.105*
	(3.048)	(1.289)	(0.915)	(1.918)	(0.827)	(2.208)	(1.109)
lagged size	-1.247	-0.816	-4.522***	-2.558	-6.665**	-14.17***	-2.536**
	(4.327)	(2.346)	(1.535)	(2.270)	(3.278)	(4.183)	(1.283)
fund expense	1,571	2,651	-2,849*	-58.64	-3,204	-8,356**	-838.9
	(2,725)	(2,540)	(1,571)	(1,269)	(2,160)	(3,450)	(741.3)
age	0.00196	-0.00498	0.0319	0.0295	0.0518	0.170*	0.00336
	(0.0320)	(0.0447)	(0.0205)	(0.0373)	(0.0414)	(0.0908)	(0.00743)
constant	-7.201	-33.97	46.05**	7.762	58.23	142.3***	13.24**
	(31.90)	(35.22)	(22.08)	(22.39)	(46.76)	(51.03)	(6.021)
observations	11,215	86,780	123,169	6,134	250,654	42,282	127,750
number of funds	106	946	1,351	57	2,837	542	1,709

Table B3.2 reports results from regressing fund flows on socially responsible investing funds (SRI) and Principles for Responsible Investing (PRI) indicator variables. The method of analysis is system GMM and the period of analysis is April 2006 to February 2018. Columns 1 to 7 presents the results for across different styles of funds.

Chapter 4 The value of a Principles for Responsible Investing designation: A setting for environmental social and governance natural experiments

1. 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 chapter 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 chapter 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 chapter 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 chapter 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 et al., 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.

This chapter proceeds as follows. The next section sets up the testing hypotheses in the context of a literature review. The following section then sets out a brief literature review 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, this chapter concludes with a discussion of the implications of the findings.

2. Literature Review

This chapter examines whether investment managers can attract funds by signing the PRI. The implied premise, that investors value the PRI authentication, has not been thoroughly researched. Even the broader topic of the motivations for SRI has only received limited attention. The motivations addressed in the literature include: expectation for higher returns (Guerard, 1997), non-financial utility (Hamilton et al., 1993; Hong & Kacperczyk, 2009; Renneboog et al., 2008a; Statman, 2000), and legitimisation (Haigh & Hazelton, 2004; Matten & Moon, 2008). This chapter adds to the existing literature on motivations for SRI by examining the influence of the

PRI. However, there is a further contribution to the SRI motivation literature associated with the method of analysis applied in this chapter. The analysis requires a test of whether the exogenous shocks behave as successful natural experiments. A preliminary research question therefore needs to be addressed: do ESG events trigger the choice of SRI funds over conventional funds? The ESG events are being treated as "gestalt shifts" likely to change the realisation of ESG concerns and motivate SRI investing. This conceptualisation follows Linnenluecke and Smith (2019) where executives encountered gestalt shifts in how they thought about environmental change and the threats and opportunities it presented. Bialkowski and Starks (2016, p. 3) thought about ESG events in a similar way; as "exogenous shocks to the mutual fund industry that would be expected to affect investor preferences for SRI funds." The set up for the analysis 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 applying the ESG series is the likely timing of the effect of the ESG events on the decision making by SRI investors. Huberman and Regev (2001) reveal how there can be a delay between the publication of important insights (e.g. scientific publications) and the subsequent more complete dissemination of the information to the market. The research by Griffin et al. (2015) tests alternative hypotheses to understand how relatively obscure but important science papers might have an impact on the market which is delayed until adequate media coverage. Their findings indicate markets act in an efficient manner and the impact is not delayed until subsequent broad media coverage. The approach adopted in this chapter is to therefore monitor the impact on SRI fund flows from the time of the ESG event.

This chapter 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 & Humphrey, 2008; Bollen, 2007; Marti-Ballester, 2015a; Renneboog et al., 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 & Humphrey, 2008; El Ghoul & Karoui, 2017). This chapter 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 et al., 2019; Armstrong et al., 2017; Barber et al., 2016; Khorana & Servaes, 2011;

Nanda et al., 2004)). However, there is very little published research on how fund flows are influenced by SRI designations (Hartzmark and Sussman (2019) and, specifically, the impact of the PRI (Li and Humphrey (2017). Therefore, building upon the first hypothesis, this chapter 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.

3. Socially responsible investing mutual fund data

The essence of this research is to determine whether investors are influenced by the signalling 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:

1. incorporating ESG issues into investment analysis and decision-making processes,
2. active ownership and incorporating ESG issues into ownership policies and practices,
3. seeking appropriate disclosure on ESG issues by investee entities,
4. promoting acceptance and implementation of the principles within the investment industry,
5. working together to enhance the effectiveness of implementing the principles; and
6. 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 in case of sudden value changes (582 observations), where the funds' equity exposures were less than 60% to ensure consistency of asset class type (1,499 observations), where the assets under management were less than $100 thousand and therefore not viable (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 data set commences in April 2006 when the PRI was launched in April 2006 through to February 2018. The data is summarized in Tables 4.1 and 4.2.

Table 4.1

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	

Table 4.2

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 (1)		Large-cap (2)		Mid-cap (3)		Small-cap (4)		Growth & income (5)		Growth (6)		Income (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 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.

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 232 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 4.1 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.

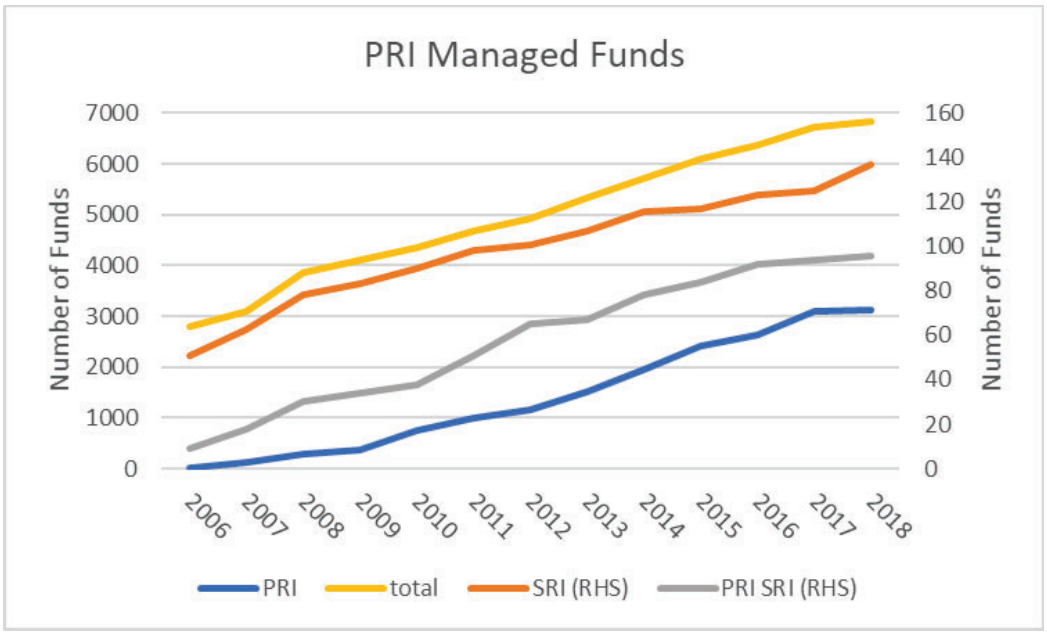


Figure 4.1 Growth in Managed Funds The figure shows the total number of US domestic equity funds (axis on LHS) at the end of the year from 2006 to 2018. The figure also shows the number of funds managed by PRI signatories (LHS), the number of SRI funds (RHS) and the number of SRI funds managed by PRI signatories (RHS).

4. 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 et al., 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 et al., 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 4.2). 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 4.2 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 4.3. The selected ESG events are listed along with the event date, category and type of event and the media coverage[7]. 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.

Factiva also enables a count of the relevant media reports for each month for each event. Figure 4.3 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.

[7] Statistics for the event types are presented in Table B4.1 in Appendix.

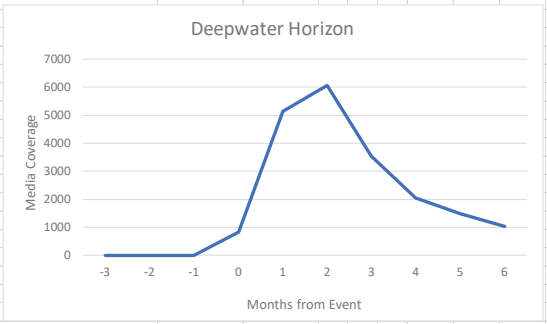
Table 4.3

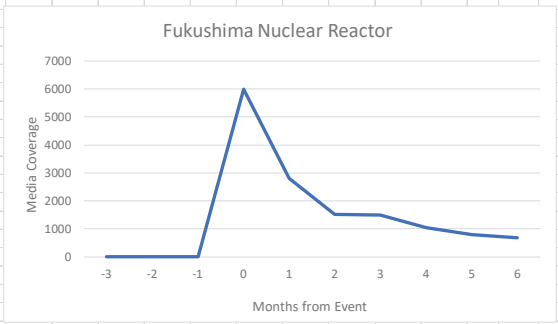
Major ESG Events

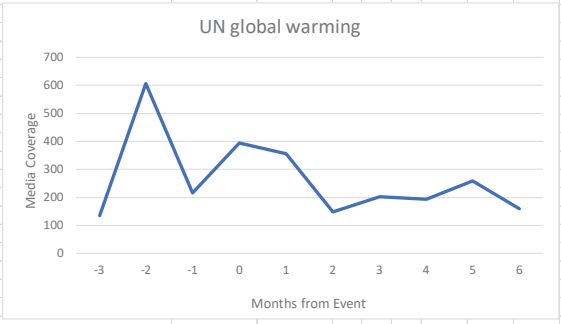
This table lists the major ESG events reported in the US press from April 2006. The events are listed according to their event type (where env indicates an environmental event, soc indicates a social event and gov indicates a governance event) and then in date order. The Category column shows further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

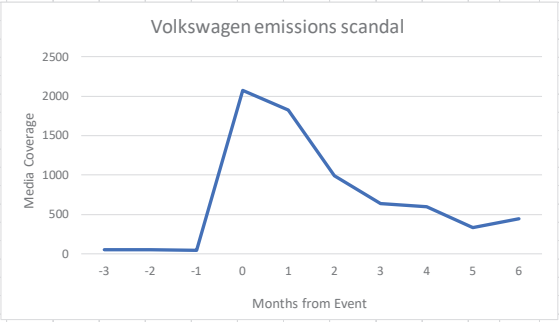
ESG Event	Date	Category	env	soc	gov	Media Coverage
Deepwater Horizon	Apr 2010	oil spill	1			24151
Fukushima Nuclear Reactor	Mar 2011	nuclear accident	1			17221
UN global warming	Nov 2014	Report	1			3297
Volkswagen emissions scandal	Sep 2015	corporate collapse and scandal	1		1	8809
Paris Climate Agreement	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

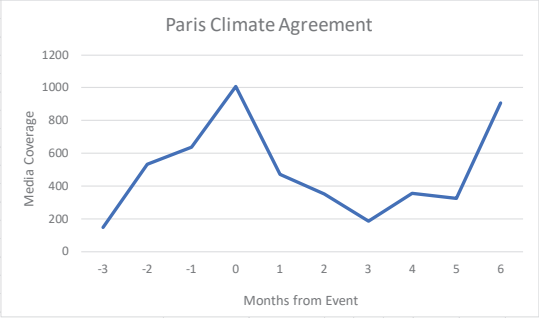
A two-month observation window from the time of the ESG events is employed to monitor the event impact on fund choices. This choice of window length was informed by the analysis conducted by Griffin et al. (2015). They analysed the market impact from significant scientific publications in contrast to the impact from subsequent media coverage of those publications. While only some of the ESG events correspond to this form of publication (e.g. Nobel prizes and UN human rights reports), their findings on media impact are helpful for the full range of ESG events. Griffin et al. (2015) found, despite the relative obscurity of the science publications, the market mainly responded to the actual publications rather than the subsequent media coverage. Therefore, in the present study, instead of using the media pattern to create differing window structures, a simple two-month window is created immediately following each event.

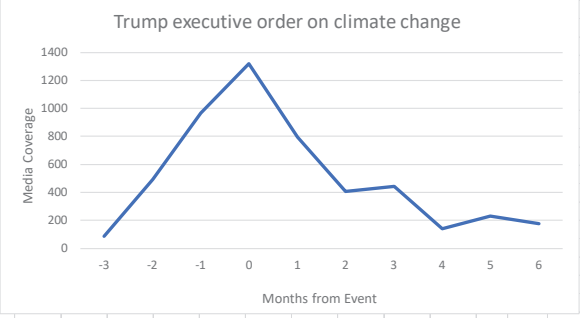

Deepwater Horizon
Media Coverage
7000
6000
5000
4000
3000
2000
1000
0
-3 -2 -1 0 1 2 3 4 5 6
Months from Event

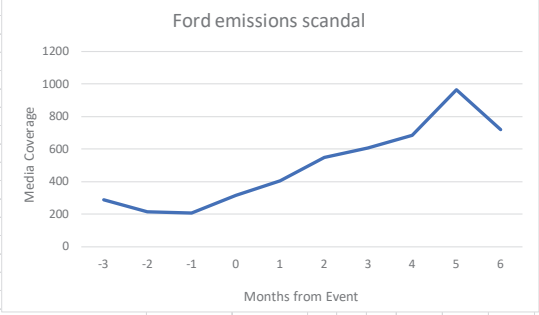

Fukushima Nuclear Reactor
Media Coverage
7000
6000
5000
4000
3000
2000
1000
0
-3 -2 -1 0 1 2 3 4 5 6
Months from Event

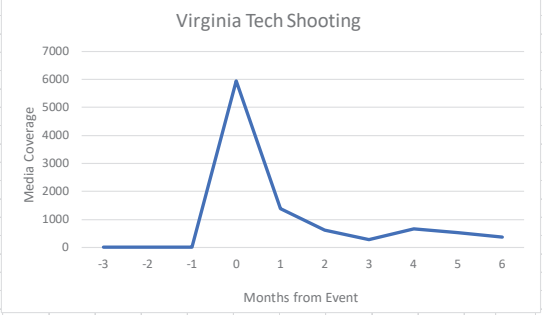

UN global warming
Media Coverage
700
600
500
400
300
200
100
0
-3 -2 -1 0 1 2 3 4 5 6
Months from Event

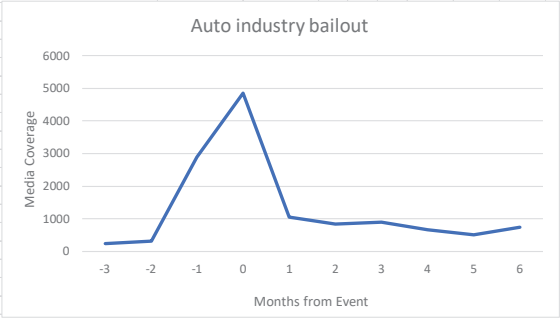

Volkswagen emissions scandal
Media Coverage
2500
2000
1500
1000
500
0
-3 -2 -1 0 1 2 3 4 5 6
Months from Event


Paris Climate Agreement
Media Coverage
1200
1000
800
600
400
200
0
-3 -2 -1 0 1 2 3 4 5 6
Months from Event

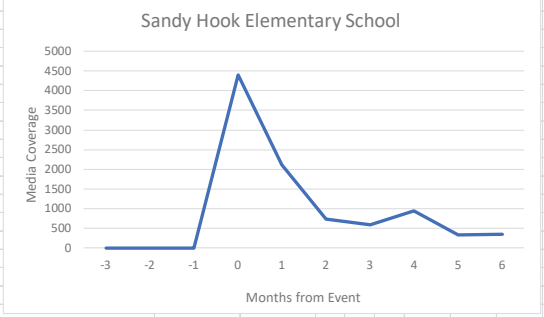

Trump executive order on climate change
Media Coverage
1400
1200
1000
800
600
400
200
0
-3 -2 -1 0 1 2 3 4 5 6
Months from Event

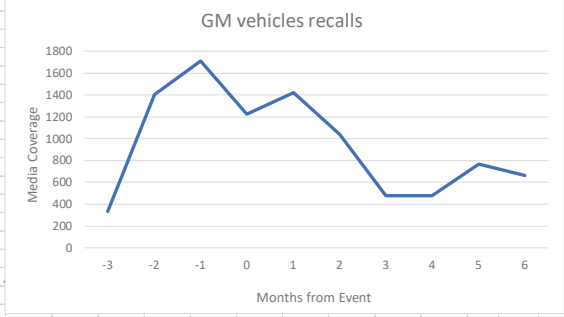

Ford emissions scandal
Media Coverage
1200
1000
800
600
400
200
0
-3 -2 -1 0 1 2 3 4 5 6
Months from Event


Virginia Tech Shooting
Media Coverage
7000
6000
5000
4000
3000
2000
1000
0
-3 -2 -1 0 1 2 3 4 5 6
Months from Event


Auto industry bailout
Media Coverage
6000
5000
4000
3000
2000
1000
0
-3 -2 -1 0 1 2 3 4 5 6
Months from Event


Oakland
Media Coverage
1400
1200
1000
800
600
400
200
0
-3 -2 -1 0 1 2 3 4 5 6
Months from Event


Sandy Hook Elementary School
Media Coverage
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
-3 -2 -1 0 1 2 3 4 5 6
Months from Event


GM vehicles recalls
Media Coverage
1800
1600
1400
1200
1000
800
600
400
200
0
-3 -2 -1 0 1 2 3 4 5 6
Months from Event

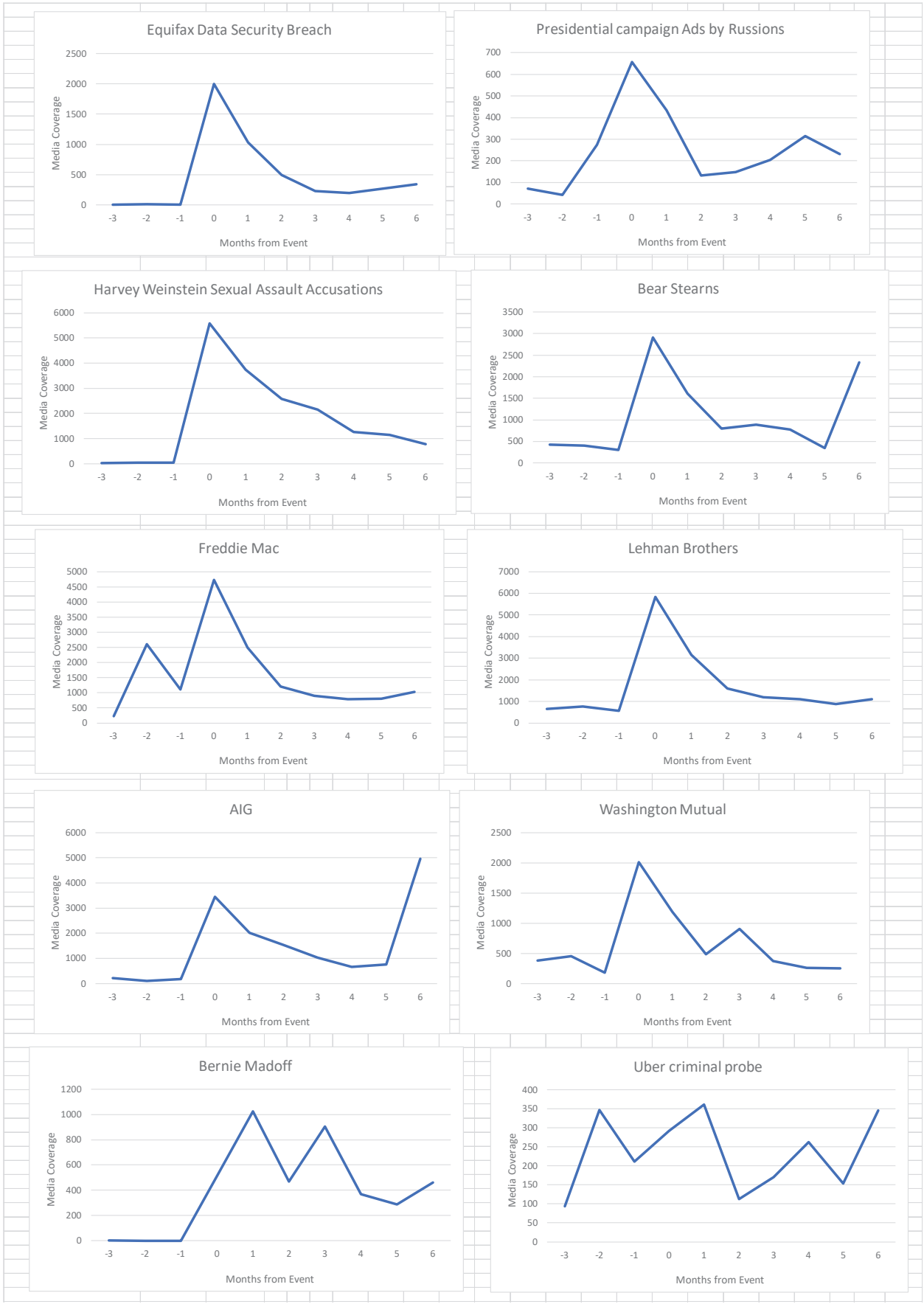


Figure 4.3 Monthly Media Coverage for Selected ESG Events The figure shows the media coverage for each major ESG event. The vertical axis is the number of media reports recorded by Factiva over the three months prior and the six months following each ESG event.

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.

5. 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 chapter, 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

$\text{fund flow}_{t,i}$ 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
$\text{return}_{t,i}$ is the monthly holding period return over month t for fund i
$\text{fees}_{t,i}$ are the management fees over month t for fund i
$\text{size}_{t,i}$ is the log of total net assets at the beginning of month t for fund i
$\text{age}_{t,i}$ 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 et al., 2010, p. 65). Lagged returns similarly have a positive impact (Carhart, 1997; Chevalier & Ellison, 1997; Goetzmann & Peles, 1997; Gruber, 1996; Ippolito, 1992; Sirri & Tufano, 1998). "Mutual fund consumers chase returns, flocking to funds with

highest recent returns" (Sirri & Tufano, 1998, p. 1590). Lagged fund flows is sometimes encountered as a regressor in fund flow literature with a positive coefficient (Chiang & Huang, 2017; Coval & 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 & 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 & Wilson, 2008; Renneboog et al., 2011; Sirri & 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 & Karoui, 2017; Pollet & 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 et al., 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).

6. 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 4.4 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 coefficients for contemporaneous and lagged monthly returns; control variables for fees, size and age are included in Table A4.1 in Appendix 4A. These regressions also included 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 4.5 below) to reflect the heterogeneous nature of the SRI community (Sandberg et al., 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.

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).

Table 4.4

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 coefficients for contemporaneous and lagged monthly returns; control variables for fees, size and age are presented in Table A4.1 in Appendix 4A. The regressions also included 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 (1)	Retail funds (2)	Institutional funds (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[8]	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

[8] Note there are funds which are not identified as either Retail or Institutional and therefore the addition of the number of Retail and Institutional funds does not equal the number of total funds.

Table 4.5

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 coefficients for contemporaneous and lagged monthly returns; control variables for fees, size and age are presented in Table A4.2 in Appendix 4A. These regressions also included 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 (1)	Mid-cap funds (2)	Small-cap funds (3)	Micro-cap funds (4)	Growth funds (5)	Income funds (6)	Growth & income funds (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

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. These results were consistently observed across supportive testing carried out across fund categories and styles (as discussed below), for the top thirty percentile of ESG events, and for longer windows of three and four months. The Hypothesis 2 and 3 findings potentially conflict with existing literature and are therefore addressed more fully in the following section.

Although the primary focus of this chapter 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 4.5 presents results for applying the regression across each fund style: large-, medium-, small- and micro-cap; and income, growth and growth & income combined (The coefficients for contemporaneous and lagged monthly returns; control variables for fees, size and age are included in Table A4.2 in Appendix 4A). 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 4.6 shows the regression results for each of the three event categories: environmental, social and governance (the coefficients for contemporaneous and lagged monthly returns; control variables for fees, size and age are included in Table A4.3 in Appendix 4A). 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.

Table 4.6

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

This chapter 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.

7. 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 signalling, and moral intensity motivates SRI investing. Riedl and Smeets (2017) used experiments to demonstrate "investors' intrinsic social preferences and, to a lesser extent, social signalling are major factors determining the likelihood of holding SRI equity funds." Further, McLachlan and Gardner (2004b) 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 chapter 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 et al. (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 et al., 2015). The specific application for the experimental setting in this chapter 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 potentially 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 earlier literature but is consistent with a the most recent studies. 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 potentially conflicts with Kim and Yoon (2020) where they suggest funds managed by PRI signatories attract funds after signing the PRI. Unfortunately, they do not employ a rigorous treatment for endogeneity and their results could therefore be attributable to omitted factors (e.g. contemporaneous efforts to build investment manager reputation and capabilities). In contrast, there are recent studies which reconciles with and potentially explain the results of this chapter.

Gibson et al. (2019) found that US investment managers who sign the PRI subsequently hold portfolios of stocks with lower ESG scores compared to managers who do not sign the PRI. Combining this with the findings of Hartzmark and Sussman (2019) can provide an explanation for the results of the current chapter. Hartzmark and Sussman (2019) found there is an industry-wide trend by investors towards funds which have stock holdings with higher ESG ratings. In the context of the current chapter, as investors move from conventional to SRI funds (following an ESG event) they are selecting the funds not managed by PRI signatories because the funds managed by PRI signatories have lower ESG ratings (Gibson et al., 2019). Further research could potentially reveal further facets of this phenomenon by focusing on retail funds managed by PRI signatories (e.g. to determine their Morningstar ESG ratings). This research would 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. Interpreting the combined results of Gibson et al. (2019) and Hartzmark and Sussman (2019) above suggests investors do not pay attention to whether a fund manager signs the PRI. However, further research could test to see if the motivations of the investors are even bleaker. It is possible investors are 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 previously promoted their responsible capabilities and legitimacy using 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 et al., 2019; Armstrong et al., 2017; Barber et al., 2016; Khorana & Servaes, 2011; Nanda et al., 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 chapter therefore contributes to the literature by increasing the facets by which we can understand the nature, drivers and stakeholders of investment vehicles.

This chapter 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.

8. Appendix 4A Contemporaneous and lagged returns and control variables

Table A4.1

Control variables for impact on Fund Flows following ESG Events

This table shows contemporaneous and lagged monthly returns, and control variables supporting Table 4.4. The dependent variable is monthly US equity fund flows. The control variables are 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 (1)	Retail funds (2)	Institutional funds (3)
monthly return	8.334***	10.20***	5.651***
	(0.478)	(0.637)	(0.784)
lagged monthly return	10.86***	15.04***	8.574***
	(0.544)	(0.801)	(0.895)
size	0.499***	-0.0648	1.142***
	(0.0807)	(0.130)	(0.104)
management fee	0.766*	1.764***	-1.240
	(0.443)	(0.493)	(0.882)
age	-0.0345***	-0.0299***	-0.0443***
	(0.00217)	(0.00301)	(0.00376)
constant	1.157***	1.807***	1.314**
	(0.411)	(0.565)	(0.657)

Table A4.2

Control variables for impact on Fund Flows of Different Types Following ESG Events

This table shows contemporaneous and lagged monthly returns, and control variables supporting Table 4.5. The dependent variable is monthly US equity fund flows. The control variables are 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 (1)	Mid-cap funds (2)	Small-cap funds (3)	Micro-cap funds (4)	Growth funds (5)	Income funds (6)	Growth & income funds (7)
monthly return	1.958	9.746***	8.343***	8.710***	7.792***	14.08***	6.628***
	(4.025)	(1.282)	(0.870)	(2.531)	(0.827)	(2.366)	(1.162)
lagged monthly return	2.122	12.33***	12.12***	11.52***	10.16***	17.87***	7.012***
	(3.596)	(1.500)	(1.070)	(2.843)	(0.916)	(2.373)	(1.260)
Size	0.299	0.939***	0.478***	0.209	0.240	1.102***	0.607***
	(0.761)	(0.173)	(0.148)	(0.263)	(0.147)	(0.325)	(0.200)
management fee	-14.95	0.454	-0.146	-1.548*	1.590**	2.035	1.150
	(9.792)	(1.479)	(0.616)	(0.772)	(0.772)	(1.856)	(1.280)
age	-0.0236**	-0.0440***	-0.0256***	-0.0104	-0.0312***	-0.0721***	-0.0372***
	(0.0116)	(0.00612)	(0.00412)	(0.00755)	(0.00347)	(0.0115)	(0.00550)
constant	3.973	0.562	0.732	1.091	1.082	2.577*	1.262
	(4.239)	(1.380)	(0.782)	(1.413)	(0.658)	(1.440)	(1.124)

Table A4.3

Control variables for impact following Environmental, Social and Governance Events

This table shows contemporaneous and lagged monthly returns, and control variables supporting Table 4.6. The dependent variable is monthly US equity fund flows. The control variables are fees, size and age; and fund fixed effects. The three columns show individual results for environmental (column 1), social (column 2) and governance (column 3) events. 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
monthly return	8.261***	8.617***	8.454***
	(0.470)	(0.472)	(0.470)
lagged monthly return	10.78***	10.77***	10.95***
	(0.544)	(0.543)	(0.543)
size	0.498***	0.494***	0.498***
	(0.0807)	(0.0808)	(0.0807)
management fee	0.763*	0.765*	0.756*
	(0.444)	(0.443)	(0.444)
age	-0.0345***	-0.0342***	-0.0346***
	(0.00215)	(0.00215)	(0.00215)
constant	1.187***	1.222***	1.173***
	(0.410)	(0.411)	(0.410)

9. Appendix 4B Descriptive Statistics for Media Coverage

Table B4.1

Summary Statistics for Media Coverage

This table presents the mean and standard deviations (SD) for the media average of the environmental, social and governance event types. The events occur within the testing period beginning April 2006 through to February 2018. The first two column presents the number of events, Columns 2 and 3 present statistics for the event month, and Columns 4 and 5 present statistics for event year.

Event Type	Number of Events	Event Month		Event Year	
	(1)	(2)	(3)	(4)	(5)
		Average	Standard Deviation	Average	Standard Deviation
Environmental	7	1 704	1 831	10 619	6 921
Social	8	3 234	2 039	9 265	5 814
Governance	11	2 253	1 762	9 489	5 517
Total	26	2 407	1 962	9 724	6 040

Chapter 5 Conclusion

This thesis begins with a systematic methodology in tackling important issues concerning environmental, social and governance (ESG) and socially responsible investing (SRI). It commences with a scientific and replicable method of conducting literature reviews: a systematic literature review (SLR). This style of review establishes a robust mapping of the themes encountered in the literature and, in the case of ESG investing, enables discovery of themes beyond the most dominant theme of performance. These additional themes include fund flow analysis, the motivations for ESG investing and the heterogeneous nature of ESG investing. As these areas of literature are relatively underdeveloped, they represent important gaps to be addressed. However, fund flow analysis is inundated with endogeneity challenges. This thesis rises to this challenge by implementing systematic and innovative solutions: system Generalised Method of Moments (GMM) and natural experiments. A natural experimental setting provides the opportunity to incorporate the heterogeneous nature of ESG events and their impact on investor motivations. The research presented in this thesis therefore addresses the research gaps on fund flows, ESG investing motivations and the heterogeneous nature of ESG.

Significant practical implications follow from the issues addressed in this thesis. Its primary concern is does the UN's Principles for Responsible Investing (PRI) activate SRI fund flows? The answer to this question is important from several perspectives. For investment managers it is relevant to understand whether signing the PRI attracts additional fund flows and is thereby valuable. From the perspective of the PRI, it is an indicator of whether it can achieve its mandate of producing a sustainable financial system. However, the implications are even wider. The results will either support or challenge the belief that intergovernmental organisations (IGO's) are an effective way to achieve global sustainable outcomes.

Unfortunately, the results of the thesis do not find evidence that signing the PRI generates additional fund flows. This means signing the PRI is not valuable to investment managers and the PRI is unlikely to have a significant influence on investment practices. The findings suggest the PRI and other similar IGO initiatives have limited scope to produce global sustainable outcomes. As a response to this problem, this thesis discusses potential strategies to improve the future influence of the PRI and other IGO initiatives.

Chapter 2 of this thesis sows the published knowledge on ESG issues for SRI has experienced significant growth. It is a relatively new area of literature and has not yet developed a broad range of research topics. Instead, this literature has a predominant focus on the performance of ESG investing compared to conventional investing (Benson & Humphrey, 2008; Bollen, 2007).

This chapter therefore employs a SLR to contributes a more extensive agenda for ESG and SRI research and lay the groundwork for this thesis.

An SLR process brings to light ancillary themes which are less obvious than the dominant performance theme. The ancillary themes include the heterogeneous nature of ESG investing, the costs from ESG investing, the motivations for ESG investing and the origins of this literature found in management literature. Further to these themes, the SLR approach also identifies the following newly emerging themes: the human element, the focus on climate change, the analysis of fund flows, the rise of non-western players and the new interest in fixed income. While each of these additional themes represents a platform to establish new knowledge, this thesis focuses on extending the techniques and knowledge concerning fund flow analysis. Chapters 3 and 4 therefore examine fund flows of SRI funds and whether the PRI impacts these flows. In addition to contributing to the literature on fund flows, this research also contributes to our knowledge on two ancillary areas of this literature: the heterogeneous nature of ESG investing and the motivations for ESG investing.

Chapter 3 tests whether an investment manager signing the PRI attracts more flows to their funds. Essentially this analysis tests the power of the PRI to signal better quality SRI funds to investors. This research has significant implications in determining whether the PRI can achieve its goal of "creating a sustainable global financial system". The broader implications of this research contribute to the debate as to whether intergovernmental organisations can successfully contribute to global sustainable developments.

However, fund flow analysis suffers from all three major forms of endogeneity: dynamic endogeneity, simultaneity and unobserved heterogeneity. These endogeneity issues are addressed by using a system GMM. This sophisticated econometric technique is applied to a uniquely constructed set of SRI fund flow data. The data is sourced from the Centre for Research in Security Prices (CRSP) mutual fund database combined with the signatory list from the PRI.

This chapter finds signing the PRI does not attracting additional fund flows, and thus casts doubt on the PRI to positively influence future SRI processes. Potential strategies to increase the impact of the PRI can be sourced from related literature. For example, institutional theory and the IGO advocates that an improved impact can be achieved through establishing greater autonomy and implementing new processes for collaboration (e.g. information sharing, coordinating action and resolving conflicts), as well as improving the signal on SRI quality. A focus on signalling theory is also useful for revealing strategic solutions. The theory identifies the key elements necessary to achieve influential signalling. These elements include the signal

cost, the nature of the information problem, the signal confirmation process and the desired construct of optimal solutions.

Chapter 4 extends upon the analysis of Chapter 3 by further analysing SRI fund flows but with the use of natural experiments. Despite the proficiency of system GMM in resolving endogeneity issues, there is a superior methodology. Wintoki et al. (2012) describes natural experiments as the "gold standard" for managing endogeneity problems.

Natural experiments are the ultimate solution for endogeneity (Gippel et al., 2015; Heider & Ljungqvist, 2015). Fund flow analysis is a pertinent application for natural experimentation because fund flow modelling is embedded with endogeneity and associated problems: missing explanatory variables, multicollinearity across the regressors, and simultaneity of flows and returns (confounded by a potentially non-linear relationship).

The combination of ESG and SRI creates a unique opportunity for natural experiments. A time series of ESG events acts as a series of exogenous shocks on investor preferences. Media coverage is used as an indicator of the significance of the individual ESG events (Griffin et al., 2015). The most significant ESG events are tested to see if they motivate the choice of SRI funds over conventional funds. Natural experiments produce test results which are not confounded by endogeneity and related econometric issues.

The results successfully validate the natural experiments. The ESG exogenous shocks do motivate investors' selection of SRI funds over conventional funds. However, the Chapter 4 results do not support the hypothesis that SRI funds managed receive more funds because they are managed by PRI signatories. There is also a negative impact on conventional retail fund flows where they are managed by PRI signatories. These results raise significant doubts about the value of investment managers signing the PRI. Further, the results challenge the idea that the UN's PRI is effective at influencing industry investment practices.

This thesis identifies exciting new themes to be researched in the area of ESG and SRI. These themes include fund flows, motivations for ESG investing, and the heterogeneous nature of ESG investing. This thesis contributes to filling the gaps in the literature by researching SRI fund flows, testing whether the UN's PRI motivates SRI investing, and incorporating heterogeneous ESG events in the testing. Research on these alternate and emerging themes will enrich our ESG and SRI knowledge but also lead to practical consequences.

Fund flows for SRI funds are analysed to test whether the PRI impacts SRI selection. System GMM and natural experiments are employed to mitigate the endogeneity issues embedded in fund flow modelling. A series of heterogeneous ESG events is constructed as a natural

experiment platform. The results unfortunately do not find significant influence by the PRI. This thesis therefore casts doubt on whether the PRI will be effective at "creating a sustainable global financial system". The results are important for developing successful strategies and allocating appropriate resources for the PRI and other intergovernmental initiatives. Strategies to improve the PRI's impact include the following: establishing greater autonomy, employing new frameworks to improve how they signal quality SRI processes, and improving the mechanisms for global collaboration.

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